

MicroWorlds**EX**

# Vocabulary





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## **Alphabetical Listing**

## A

Primitive <i>Input(s)</i>	Description	Examples
<b>abs</b> <i>number</i>	Stands for absolute. Reports the absolute value of its input.	Given that there is a turtle on the page:  <code>sety abs xcor</code>
<b>and</b> <i>true-or-false1</i> <i>true-or-false2</i>	Reports <b>true</b> if all its inputs report true. If more than two inputs are used, <b>and</b> and its inputs must be enclosed in parentheses.  See <b>or</b> and <b>not</b> .	The result is just an example.  <code>show and pos = [0 0]</code> <code>heading = 0</code> <b>true</b>
<b>(and</b> <i>true-or-false1</i> <i>true-or-false2</i> <i>true-or-false3...</i> )		
<b>announce</b> <i>word-or-list</i>	Displays the <b>word-or-list</b> message in an alert box. Clicking OK closes the box. If you drag the alert box to a new position while it is being displayed, this is the position where the next alert box is opened in the project.  See <b>question</b> and <b>answer</b> .	<code>announce [Guess what's in the package...]</code>
<b>answer</b>	Reports the contents of the last answer typed in the <b>question</b> dialog box. It also reports special values after a dialog box have been used: OK if the OK button was used, the empty list if the Cancel button was used, or the button's label if a different button was used. The value reported by answer is always overwritten by the last usage of a <b>question</b> or a dialog box.  See <b>question</b> and <b>Dialog Boxes</b> in the section <b>Fundamentals</b> in the Help System.	Given that <b>question</b> was used with a yes-no answer:  <code>if answer = "yes</code> <code>[setsh "happy]</code> <code>if answer = "no</code> <code>[setsh "sad]</code>

<b>arctan</b>  <i>number</i>	<p>Stands for <b>arc tangent</b>. Reports the arc tangent (the inverse function of the tangent) of its input.</p> <p>See <b>tan</b> and <b>cos</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>show arctan heading 89.8090147756</pre>
<b>ascii</b>  <i>char</i>	<p>Stands for American Standard Code for Information Interchange. Reports the ASCII number which represents the character.</p> <p>See <b>char</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>to encoder top repeat count text1 [encode] end to encode select cf cut insert char (ascii clipboard) + 3 end</pre>
<b>ask</b>  <i>turtle-or-text-name</i>  <i>instruction-list</i>  <b>ask</b>  <i>list-of-names</i>  <i>instruction-list</i>	<p>Temporarily tells each element in the first input to run the instruction list. The first input can be the name(s) of one or many turtles or text boxes. <b>Ask</b> does not change the current turtle or text box. The apostrophe can be used to ask a turtle to report something.</p> <p>See also <b>talkto</b>.</p>	<p>Given that t1, t2 and the text1 exist on the page:</p> <pre>ask [t1 t2] [clickon] ask "text1 [cleartext] t2, setpos ask " t1 [pos] t2, setpos t1's " pos</pre>

**B**

Primitive <i>Input(s)</i>	Description	Examples
<b>back (bk)</b> <i>number</i>	Moves the turtle backwards. See also <b>forward</b> .	Given that there is a turtle on the page:  <pre>pd repeat 4 [bk 50 lt 90]</pre>
<b>bg</b>	Stands for <b>background</b> . Reports a number representing the color of the background. The background color is 0 (white) when MicroWorlds EX starts up	<pre>repeat 140 [setbg bg + 1] setbg 0</pre>
<b>bottom</b>	Puts the cursor (insertion point), in the current text box, at the end of the text. Try using this command in a button so that you can see the effect on the cursor.  See <b>top</b> , <b>sol</b> , <b>eol</b> , and <b>eot?</b> .	Given that there is a text box on the page:  <pre>pr "hello top pr "say bottom pr "there</pre>
<b>broadcast</b> <i>word-or-list</i>	Sends a message for all the turtles on the current page to hear. Broadcast triggers the instruction found in the <b>OnMessage</b> field in the Rules Tab of the turtle's backpack. If there is no instruction in a turtle's OnMessage field, the broadcasted message is ignored.  See <b>tell</b> , <b>message</b> and <b>sender</b> . See also <b>Rules Tab - OnMessage</b> in the section <b>Fundamentals</b> in the Help System.	In the Onclick field of t1's backpack:  <pre>broadcast "here</pre> In the OnMessage field of t2's backpack:  <pre>towards sender</pre> Click on t1
<b>butfirst (bf)</b> <i>word-or-list</i>	Reports all but the first component of a word or list.  See <b>butlast</b> , <b>first</b> , and <b>last</b> .	Given that there is a text box on the page:  <pre>to triangle :word if :word = " [stop] pr :word triangle butfirst :word end</pre>

<b>butlast (bl)</b>  <i>word-or-list</i>	Reports all but the last component of a <b>word</b> or <b>list</b> .  See <b>butfirst</b> , <b>first</b> , and <b>last</b> .	Given that there is a text box on the page:  <pre>to revprint :word if :word = " [pr " stop] insert last :word revprint butlast :word end</pre>
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## C

Primitive <i>Input(s)</i>	Description	Examples
<b>cancel</b>  <i>instruction-list</i>	<p>Stops the process given as input. The process must have been launched using <b>launch</b>, <b>when</b>, <b>forever</b>, buttons, or clickable turtles. The input must be the exact same instruction list that started the process.</p> <p>See <b>Stopping Processes</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that mytune is an existing audio object:</p> <pre>to delay launch [mytune] wait random 200 cancel [mytune] end</pre>
<b>carefully</b>  <i>word-or-list-to-run1</i>  <i>word-or-list-to-run2</i>	<p>Runs the first input, a word or list of instructions. If the first input contains an error, <b>carefully</b> runs the second input, a word or list of instructions and sets <b>errorMessage</b> to the error that occurred. If there is no error in the first input, the second input is ignored.</p> <p>See <b>carefully</b> and <b>Carefully</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>To be tried twice.</p> <pre>to createifdoesntexist carefully [newturtle "newborn"] [] setx 30 st end</pre>
<b>cb</b>	<p>Stands for <b>cursor back</b>. Moves the cursor (insertion point) in the current text box to the previous character. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>cf</b>, <b>cd</b>, and <b>cu</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>bottom repeat 5 [cb insert "x cb]</pre>
<b>cc</b>	<p>Stands for clear the Command Center. Clears the text in the Command Center.</p>	<pre>repeat 5 [show "flash wait 5 cc]</pre>

<b>cd</b>	<p>Stands for <b>cursor down</b>. Moves the cursor (insertion point) in the current text box to the next physical line. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>cu</b>, <b>cf</b>, and <b>cb</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top repeat 5 [cd insert "x ]</pre>
<b>cf</b>	<p>Stands for <b>cursor forward</b>. Moves the cursor (insertion point) in the current text box to the next character. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>cb</b>, <b>cd</b>, and <b>cu</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top repeat 5 [cf insert "x ]</pre>
<b>cg</b>	<p>Stands for <b>clear graphics</b>. Clears the graphics on the page and returns the current turtle to its home position, pointing up. See also <b>clean</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd fd 50 cg</pre>
<b>char</b> <i>number</i>	<p>Stands for <b>character</b>. Reports the character represented by the ASCII number given as input. The number must be between 32 and 255. An exception is <b>char 9</b>, the tab character.</p> <p>See <b>ascii</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>to decoder top repeat count text1 [decode] end  to decode select cf cut insert char (ascii clipboard) - 3 end</pre>
<b>chdir</b> <i>pathname</i>	<p>Stands for <b>change directory</b>. Changes the current drive and/or subdirectory name to <i>path</i>. To return to the desktop, use the volume name alone as input to <b>chdir</b>. Use vertical bars if the name contains spaces.</p> <p>See <b>currentdir</b> and <b>directories</b>.</p>	<p>Given that these directories exist.</p> <pre>chdir "Media  chdir "  C:\MicroWorlds\My Work </pre>

<b>clean</b>	<p>Clears the graphics without changing any turtle's position.</p> <p>See also <b>cg</b>.</p>	<p>Given that there is a turtle on the page.</p> <pre>pd fd 50 clean</pre>
<b>clearname</b> <i>word</i>	<p>Clears a global variable from memory.</p> <p>See <b>clearnames</b>, <b>names</b>, <b>make</b>, and <b>name</b>.</p>	<pre>make "speed 5 make "direction "right show :speed 5 clearname "speed show :speed <b>speed has no value</b></pre>
<b>clearnames</b>	<p>Clears all the global variables from memory. MicroWorlds EX doesn't clear the variables when you open or create a new project. Therefore, it may be necessary to use <b>clearnames</b> when you start a new project.</p> <p>See <b>names</b>, <b>clearname</b>, <b>make</b>, and <b>name</b>.</p>	<pre>make "speed 5 make "direction "right show :speed 5 clearnames show :speed <b>speed has no value</b> show :direction <b>direction has no value</b></pre>
<b>cleartext (ct)</b>	<p>Clears the text in the current text box.</p>	<p>Given that there is a text box on the page:</p> <pre>repeat 5 [pr "line] cleartext</pre>
<b>clickoff</b>	<p>Simulates a mouse click on the current turtle, turning it off if it was on. This command has an effect only if the turtle is running its OnClick instruction.</p> <p>See <b>clickoff</b>, <b>listen</b>, and <b>Rules Tab - Clickon</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there are turtles with OnClick instructions on the page:</p> <pre>t1, clickon wait 30 clickoff everyone [clickoff]</pre>
<b>clickoff</b>	<p>Simulates a mouse click on the current turtle, turning it off if it was on. This command has an effect only if the turtle is programmed to react to a mouse click.</p> <p>See <b>clickon</b>, <b>listen</b>, and <b>Turtles and Clickon</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that there are several turtles on the page, with OnClick instructions:</p> <pre>everyone [clickon] t1, clickoff everyone [clickoff]</pre>

<b>clickon</b>	<p>Simulates a mouse click on the current turtle, turning it on if it was off. This command has an effect only if the turtle has an OnClick instruction.</p> <p>See <b>clickon</b>, <b>listen</b>, and <b>Rules Tab - Clickon</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there are turtles with OnClick instructions on the page:</p> <pre>t1, clickon wait 30 clickoff everyone [clickon]</pre>
<b>clickon</b>	<p>Simulates a mouse click on the current turtle, turning it on if it was off. This command has an effect only if the turtle is programmed to react to a mouse click.</p> <p>See <b>clickoff</b>, <b>listen</b>, and <b>Turtles and Clickon</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that there are several turtles on the page with OnClick instructions:</p> <pre>t1, clickon everyone [clickon]</pre>
<b>clipboard</b>	<p>Reports the contents of the text clipboard. The clipboard contains the last text that has been cut or copied using the <b>cut</b> or <b>copy</b> command, or the equivalent Edit menu items or Toolbar buttons. The <b>Clear</b> menu item and the Delete/Backspace keys do not affect the clipboard.</p> <p>See also <b>select</b> and <b>paste</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom cut repeat 2 [pr clipboard]</pre>
<b>clone</b> <i>turtle-name</i>	<p>Creates a copy of the named turtle. The new turtle takes the first available name on the current page (t followed by a number). Except for the name and position, the new turtle is a perfect clone of the original (backpack contents).</p>	<p>Given that t1 exists on the page:</p> <pre>clone "t1</pre>
<b>closeworksheet</b>	<p>Closes and saves the current Microsoft Excel file. This is the Excel file that was opened with the command <b>openworksheet</b>.</p> <p>See <b>getcell</b> and <b>setcell</b>.</p>	<p>MicroWorlds EX will create this worksheet if it doesn't exist:</p> <pre>openworksheet "graph "sheet1 setcell 1 2 10 closeworksheet</pre>

<b>color</b>	<p>Reports the turtle's color as a number. <b>Color</b> reports a number, even if a name was used as input for <b>setc</b>.</p> <p>See also <b>setc</b>.</p>	<p>Given that there's a turtle on page:</p> <pre>show color 9 repeat 140 [setc color + 1]</pre>
<b>colorunder</b>	<p>Reports the color under the center point of the current turtle as a number. <b>Colorunder</b> reports the color number if the color's on the background, on a drawing or stamped shape on the current page or on the Wallpaper.</p> <p>See also <b>Private and Public Color Detection</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there's a turtle on the page. Place a turtle over a red drawing.</p> <pre>if colorunder = 15 [seth 1 fd 15]</pre>
<b>copy</b>	<p>Puts a copy of the selected text in the clipboard. It unselects the current selection.</p> <p>See <b>cut</b>, <b>paste</b> and <b>select</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom copy paste wait 20 ct</pre>
<b>cos</b> <i>number</i>	<p>Stands for <b>cosine</b>. Reports the cosine of its input.</p> <p>See <b>sin</b> and <b>tan</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>show cos heading 0.5</pre>
<b>count</b> <i>word-or-list</i>	<p>Reports the number of components in the word or the list.</p> <p>See <b>item</b> and <b>textcount</b>.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show count "hello 5 show count [hello there] 2 show count text1 42</pre>

<p><b>createprojectvar</b></p> <p><i>word-or-list</i></p>	<p>Stands for <b>create project variable</b>. Creates a project variable represented by a command and a reporter. For example, if the project variable "amount" is created, the command <b>setamount</b> sets the variable's value, and <b>amount</b> reports its value. Project variables are saved with your project.</p> <p>The Project Tab shows the project variables. Individual variables can be removed with the right-click menu item <b>Remove</b>. You can also use the <b>remove</b> command to remove a project variable.</p> <p>See <b>projectvars</b>, <b>make</b>, <b>remove</b> and <b>name</b>. See also <b>Local Variables</b> and <b>Global Variables</b> in the section <b>Programming</b> in the Help System.</p>	<pre>createprojectvar "amount setamount 22 show amount 22 createprojectvar [friends foes]</pre>
<p><b>cu</b></p>	<p>Stands for <b>cursor up</b>. Moves the cursor (insertion point) in the current text box to the previous physical line. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>cd</b>, <b>cb</b>, and <b>cf</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>bottom repeat 5 [cu insert "x ]</pre>
<p><b>currentdir</b></p>	<p>Stands for <b>current directory</b>. Reports the current directory that was set.</p> <p>See <b>chdir</b>.</p>	<p>The result is just an example.</p> <pre>show currentdir C:\MicroWorldsEX\projects</pre>
<p><b>cut</b></p>	<p>Deletes the text selection in the current text box and puts a copy in the clipboard.</p> <p>See <b>select</b>, <b>copy</b> and <b>paste</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom cut wait 20 paste</pre>

**D**

Primitive <i>Input(s)</i>	Description	Examples
<b>delete</b>	Deletes the character to the right of the cursor (insertion point) in the current text box.	Given that there is a text box on the page:  <pre>ct pr "unfair top delete delete</pre>
<b>difference</b>  <i>number1</i>  <i>number2</i>	Reports the result of subtracting <b><i>number2</i></b> from <b><i>number1</i></b> .  See - and minus.	Given that these turtles exist on the page. The result is just an example.  <pre>show difference 30 40 show difference t1's "heading t2's "heading 30</pre>
<b>directories</b>	Reports a list of subdirectory names. To change directories through a command, use <b>chdir</b> .  See <b>chdir</b> .	The result is just an example.  <pre>show directories Media My Work Projects</pre> <p>A directory name made up of more than one word will look like two files in the list. Use <b>make</b> and <b>names</b> so that the actual names are enclosed in vertical bars. In this example, "My Work" is the name of one directory.</p> <pre>make "dirs directories show names make "dir [Media  My Work  Projects]</pre>

<p><b>distance</b></p> <p><i>turtle-name</i></p>	<p>Reports the distance between the current turtle and the turtle indicated.</p> <p>See <b>towards</b>.</p>	<p>Given that there are two turtles on the page, t1 and t2. Select <b>Animate</b> in each turtle's right-click menu..</p> <pre>t1, forever [if 50 &lt; distance "t2 [towards "t2]]</pre> <p><b>Note:</b></p> <pre>if 50 &lt; distance "t2</pre> <p>is equivalent to:</p> <pre>if (distance "t2) &gt; 50</pre> <p>The parentheses are required in the second case because otherwise, MicroWorlds compares t2 and 50 instead of comparing (distance "t2) and 50.</p>
<p><b>dolist</b></p> <p><i>range</i></p> <p><i>instruction-list</i></p>	<p>Runs the instruction list for each item in a list. The first input, <i>range</i>, is a list with a temporary variable name and a list of items. The second input is a list of instructions that uses the variable name included in the first input. Be careful about the absence or presence of the ":" before the "i".</p> <p>See <b>dotimes</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>dolist [i [15 25 35]] [setc :i wait 4]]</pre>
<p><b>done?</b></p> <p><i>instruction-list</i></p>	<p>Reports <b>true</b> if the process indicated is completed. The process must have been launched using <b>launch</b> or <b>forever</b>. The input must be an exact copy of the instruction list that started the process. <b>Done?</b> can be used as an input to <b>waituntil</b> in order to synchronize events.</p>	<p>Given that jazz is an existing audio object and t1 is a turtle with an OnClick instruction:</p> <pre>to dance launch [jazz] everyone [clickon] waituntil [done? [jazz]] everyone [clickoff] end</pre>



<b>dotimes</b>	Runs the instruction list for all values starting with 0 up to the specified <i>maximum</i> value. The first input is a list with a temporary variable name and a maximum number. The second input is a list of instructions that uses the variable name included in the first input. Be careful about the absence or presence of the ":" before the "i".	Given that there is a text box on the page:
<i>maximum</i>		
<i>instruction-list</i>	See <b>dolist</b> .	<pre>dotimes [i 4] [pr se :i sqrt :i]</pre>

**E**

Primitive <i>Input(s)</i>	Description	Examples
<b>empty?</b> <i>word-or-list</i>	Reports <b>true</b> if the input is an empty word or empty list.	Given that text1 exists on the page and it contains some text:  <pre>show empty? "<b>true</b>" show empty? []<b>true</b> show empty? text1<b>false</b> to insist question [Your name please...] if empty? answer [insist] end</pre>
<b>eol</b>	Stands for <b>end of line</b> . Moves the cursor (insertion point) in the current text box to the end of the current logical line. Try using this command in a button so that you can see the effect on the cursor.  See <b>sol</b> .	Given that there is a text box on the page:  <pre>top eol insert "!!!"</pre>
<b>eot?</b>	Stands for <b>end of text</b> . Reports <b>true</b> if the cursor (insertion point) in the current text box is at the end of the text. <b>Eot?</b> is generally used to stop a procedure that processes information in a text box using cursor (insertion point) commands like <b>cd</b> , <b>eol</b> , etc.  See <b>bottom</b> .	Given that there is a text box containing some text on the page:  <pre>to addhyphens top doall end  to doall sol insert "- eol if eot? [stop] cd doall end</pre>
<b>equal?</b> <i>word-or-list1</i> <i>word-or-list2</i>	Reports <b>true</b> if the two inputs are equal. The inputs may be words, numbers, or lists.  See <b>identical?</b> and <b>=</b> .	<pre>show equal? "A "a<b>true</b></pre>

<b>erfile</b>  <i>pathname</i>	<p>Stands for <b>erase file</b>. Erases any type of file if it is not locked. The input must be the name of a file in the current directory or a full pathname. Use vertical bars if the name contains spaces.</p>	<p>Given that these files exist:</p> <pre>erfile "farm erfile "C:\projects\farm</pre> <p>If one of the elements of the path has spaces, vertical bars must enclose the whole path:</p> <pre>erfile " C:\My projects\farm </pre> <p>When there is more than one file with the same name, you need to add the extension.</p> <pre>erfile "quake.mw2</pre>
<b>errormessage</b>	<p>Reports the last error message trapped by <b>carefully</b>. If <b>errormessage</b> reports an empty word, it means that the last operation using <b>carefully</b> did not report an error.</p> <p>See <b>carefully</b> and <b>Carefully</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>To be tried twice.</p> <pre>to create carefully [newturtle "newborn] [show errormessage] setx 30 st end</pre>
<b>everyone</b>  <i>instruction-list</i>	<p>Makes all the turtles on the current page run the instruction, one after the other.</p> <p>See <b>ask</b> and <b>talkto</b>.</p>	<p>Given that there are a few turtles on the page:</p> <pre>everyone [glide -80 2]</pre>
<b>everyone</b>  <i>instruction-list</i>	<p>Makes all the turtles on the current page run the instruction, one after the other.</p> <p>See <b>ask</b> and <b>talkto</b>.</p>	<p>Given that there are several turtles on the page:</p> <pre>everyone [glide -80 2]</pre>
<b>exp</b>  <i>number</i>	<p>Stands for <b>exponential</b>. Reports the number to the power of the constant e.</p>	<pre>show exp 1 2,71828182846</pre>

<p><b>exporttext</b></p> <p><i>pathname</i></p> <p><i>text-name</i></p>	<p>Exports the text found in the designated text box, the Command Center or public Procedures Tab to the file named indicated, in a unicode text file format.</p> <p>For the <b>pathname</b>, use a simple file name to save the file in the current directory or full or relative pathname to save the file in a different directory. If the file name has no extension, the resulting file is a txt (plain text) file. Add a rtf extension to the file name to get a Rich Text Format file.</p> <p>The second input, <b>text-name</b>, must be a text box name or the special word cc (to export the text in the Command Center) or procedures (to export the text in the public Procedures Tab).</p> <p>This command is equivalent to the Export Text item in the File menu.</p> <p>See a <b>loadtext</b> and <b>importtext</b>. See also <b>Exporting Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that text1 exists on the page.</p> <pre>exporttext "story.rtf "text1 exporttext "C:\mydir\cmds "cc exporttext "procs "procedures</pre>
<p><b>exportturtle</b></p> <p><i>pathname</i></p>	<p>Saves the current turtle on disk. The turtle file contains the turtle and all the contents of its backpack. If the <b>pathname</b> is just a word, the turtle is saved in the current directory with the extension mwa. An exported turtle can be imported or dragged and dropped into a different project, or emailed.</p> <p>See <b>importturtle</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>exportturtle "model</pre>

**F**

Primitive <i>Input(s)</i>	Description	Examples
<b>files</b>  <i>filetype</i>	<p>Outputs a list of files of the given <b>filetype</b> in the current directory. If the input is "*", all file types are taken into account.</p> <p>See <b>chdir</b> and <b>currentdir</b>.</p>	<p>Given that these files exist:</p> <pre>show files "txt My Work report</pre> <p>A file name made up of more than one word will look like two files in the list. Use <b>make</b> and <b>names</b> so that the actual names are enclosed in vertical bars. In this example, "My Work" is the name of one text file.</p> <pre>make "texts files "txt show names make "texts [ My Work  report]</pre>
<b>fill</b>	<p>Fills a closed area with the turtle's pen color. If the area is not perfectly closed, the paint "leaks" onto the entire page. Fill works regardless of the turtle's pen state (up or down).</p> <p>See <b>setc</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd repeat 4 [fd 50 rt 90] rt 45 pu fd 5 setc "yellow fill</pre>
<b>first</b>  <i>word-or-list</i>	<p>Reports the first component of the word or list.</p> <p>See <b>butfirst</b>, <b>butlast</b>, and <b>last</b>.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show first "hello h show first [Hello there] Hello show first text1 T</pre>

<b>fontsize</b>	<p>Reports the font size used at the insertion point in the current text box. If text that has more than one font size is selected, <b>fontsize</b> reports the size of the text that was selected last.</p> <p>See <b>setfontsize</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>pr "hello setfontsize fontsize + 10 pr "there</pre>
<b>forever</b> <i>word-or-list-to-run</i>	<p>Runs the input repeatedly as an independent parallel process. Use <b>cancel</b>, the <b>Stop All</b> menu item (Edit menu) or button (Toolbar), or <b>Ctrl+Break</b> to stop the process.</p> <p>See <b>launch</b> and <b>Timing and Synchronization</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that these turtles exist on the page:</p> <pre>t1, forever [fd 5 / 4 rt 2] t2, forever [fd 1 rt 2]</pre>
<b>forward (fd)</b> <i>number</i>	<p>Moves the turtle forward.</p> <p>See <b>back</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd repeat 4 [fd 50 rt 90 wait 2]</pre>
<b>found?</b>	<p>Reports true if the last <b>search</b> instruction was successful.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>to replaceall :this :bythat search :this if not found? [stop] insert :bythat replaceall :this :bythat end</pre>
<b>fput</b> <i>word-or-list</i> <i>list</i>	<p>Stands for first <b>put</b>. Reports the list created by adding the first input at the beginning of the second input. The second input has to be a list.</p> <p>See <b>lput</b>.</p>	<pre>show fput "a [e I o u y] a e I o u y</pre>

<p><b>freeze</b></p> <p><i>object-name</i></p>	<p>Freezes objects so that they cannot be moved, resized, or removed with the mouse. The input is the name of an object on the page, or a list containing many object names. A page name can also be used as input to freeze all the elements contained in that page.</p>	<p>Given that these objects exist on the page:</p> <pre>freeze "t1 freeze [button1 text1] freeze "page1</pre>
<p><b>freeze</b></p> <p><i>list-of-names</i></p>	<p>See <b>unfreeze</b>, <b>freezebg</b> and <b>unfreezebg</b>. See also <b>Freezing Objects</b> in the section <b>Fundamentals</b> in the Help System.</p>	
<p><b>freeze</b></p> <p><i>page-name</i></p>		
<p><b>freezebg</b></p>	<p>Stands for <b>freeze background</b>. Freezes the background graphics in their current state. You can still draw over the background and erase the new drawings, but the original background (before freezing) won't be erased.</p> <p>See <b>unfreezebg</b>, <b>snapshot</b> and <b>restore</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd fd 50 freezebg repeat 45 [fd 40 rt 3] cg</pre>

## G

Primitive <i>Input(s)</i>	Description	Examples
<b>get</b>  <i>object</i>  <i>property</i>	<p>Reports a property of an object in the current project. The first input is the name of an object, a color, a page or the special word Project. The second input is a property name.</p> <p>Following is a list of the properties each object can have:</p> <p><b>Project:</b></p> <p>presentationmode? showtoolbar? showcc? showtabs? showstatusbar? showtechniques? dialogs</p> <p><b>Page:</b></p> <p>transition turtles texts buttons sliders melodies sounds music videos checkboxes roundbuttonsets listboxes dropdowns colordemons hyperlinks</p> <p><b>Turtle:</b></p> <p>visible? frozen? menu notes procedures onclick ontick ontouching onmessage onevent own on? <i>colorname</i></p> <p><b>Button:</b></p> <p>visible? pos size onclick on? frozen? visible?</p> <p><b>Slider:</b></p> <p>visible? pos showname? limits value frozen? vertical? visible?</p>	<p>Given that these objects exist on the page:</p> <pre>show get "t1 "onclick show get "t1 "on? show get "button1 "onclick show get "text1 "size show get "t1 "own show get "t1 "red show get "question "pos</pre>



	<p><b>Text:</b></p> <p>text visible? transparent?  showname? frozen? pos size  visible? onreadline, singleline?</p> <p><b>Public color detection:</b></p> <p>onturtle mouseclick</p> <p><b>Hyperlinks:</b></p> <p>visible? pos showname? frozen?  on? link</p> <p><b>Media Objects:</b></p> <p>visible? pos showname? frozen?  on?</p> <p><b>Additional for Melodies:</b></p> <p>instrument volume tempo</p> <p><b>Additional for Video:</b></p> <p>size</p> <p><b>Question and Announce:</b></p> <p>pos</p> <p><b>Choosers (round buttons sets,  etc.):</b></p> <p>pos value visible? showname?  frozen? labels (except for check  boxes)</p> <p>See <b>set</b>.</p>	
<p><b>getcell</b></p> <p><i>row-number</i></p> <p><i>column-number</i></p>	<p>Reports the value of the cell specified by the <b>row-number</b> and <b>column-number</b> of the current Microsoft Excel worksheet. Note that the command <b>openworksheet</b> makes an Excel worksheet available to MicroWorlds EX.</p> <p>See also <b>setcell</b> and <b>closeworksheet</b>.</p>	<p>MicroWorlds EX will create this worksheet if it doesn't exist. The result is just an example:</p> <pre>openworksheet "graph "sheet1 show getcell 1 1 50</pre>

<p><b>getlabel</b></p> <p><i>object-name</i></p>	<p>Reports the label (the text) of the current selection in the designated chooser (round button set, list box or drop down menu). The other option for reporting the current selection is to use the object name. <b>show listbox1</b> reports the position of the current selection in the list of selections (reports 0 if nothing is selected) and <b>show getlabel "listbox1"</b> reports the label corresponding to that selection, as a long word.</p> <p>See <b>Choosers and Dialog Boxes</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that listbox1 exist on the page or in a dialog box:</p> <pre>show getlabel "listbox1 if (getlabel "radioset1) = "Yes [fd 50] setcolor getlabel "listbox1</pre>
<p><b>getpage</b></p> <p><i>page-name</i></p>	<p>Displays the page. The input must be the name of a page in the current project. Typing the page name alone has the same effect.</p>	<p>Given that there are several pages in the project (click on the page before you start because readchar works when the page is the current "active" area):</p> <pre>to gotopagewhenkey :page let [a readchar] getpage :page end</pre>
<p><b>getproject</b></p> <p><i>pathname</i></p>	<p>Gets the project indicated (the current project is not saved). The input must be the name of a project in the current directory or a full or relative path to access another directory.</p> <p><b>Getproject</b> can load projects with extensions mwx (MicroWorlds EX), mw2 (MicroWorlds Pro uncompressed) or mwz (MicroWorlds Pro compressed).</p> <p>See <b>saveproject</b>.</p>	<p>Given that these files exist:</p> <pre>getproject "sunset getproject "  My Project </pre>

<p><b>giveturtle</b></p> <p><i>word</i></p>	<p>Assigns a state variable to the current turtle and creates a command-reporter pair of primitives that can be used in the current project only: the word <b>set</b> followed by the name of the variable (for example, <b>giveturtle "speed</b> creates a <b>setspeed</b> command) and the name of the variable (in this example, the reporter <b>speed</b>).</p> <p>The State Tab of the turtle's backpack displays the <b>giveturtle</b> variables. The value of the variable can also be set by double-clicking on the variable name in the turtle's backpack.</p> <p>After a <b>giveturtle</b> instruction, the value of the variable is empty until it is set.</p> <p>See <b>turtlesown</b> and <b>State Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>giveturtle "hasrun sethasrun "false fd 50 sethasrun "true ifelse hasrun [announce [I'm tired]] [fd 50]</pre>
<p><b>glide</b></p> <p><i>distance</i></p> <p><i>speed</i></p>	<p>Makes the turtle glide over the <b>distance</b> indicated. The second input sets the turtle's gliding speed. The maximum distance and maximum speed for <b>glide</b> are 9999 and 99, respectively.</p>	<p>Given that there is a turtle on the page:</p> <pre>glide 50 1 glide 100 0.1</pre>
<p><b>greater?</b></p> <p><i>number1</i></p> <p><i>number2</i></p>	<p>Reports <b>true</b> if the first input is greater than the second input.</p> <p>See <b>less?</b> and <b>&gt;</b>.</p>	<p>Given that a turtle exists on the page:</p> <pre>ifelse greater? xcor ycor [setc "lime] [setc "blue]</pre>

**H**

Primitive <i>Input(s)</i>	Description	Examples
<b>heading</b>	<p>Reports the current turtle's heading in degrees. The degrees correspond to those of a compass; 0 degrees is due North, 90 is East, 180 is South, and 270 is West.</p> <p>See <b>seth</b>, <b>right</b>, <b>left</b>.</p>	<p>Given that there is a turtle on the page. Your result will differ:</p> <pre>seth random 360 show heading 33</pre>
<b>hidetext</b>	<p>Hides the current text box. You cannot type in a hidden text box, but primitives such as <b>print</b>, <b>insert</b>, and <b>cleartext</b> still work. This command is equivalent to the <b>Hide</b> function in the text box's right-click menu on the page and in the Project Tab. Text boxes can also be made invisible and visible through their dialog boxes. Use the eye tool to see all hidden text boxes, as well as open their dialog boxes.</p> <p>See <b>showtext</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>hidetext wait 20 showtext</pre>
<b>home</b>	<p>Moves the turtle to the center of the page coordinates [0 0], pointing up.</p> <p>See <b>setpos</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>home pd repeat 50 [home setpos se random 100 random 100]</pre>
<b>ht</b>	<p>Stands for hide turtle. Hides the current turtle.</p> <p>See <b>st</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>glide 60 2 ht fd 50 st glide 60 2</pre>

## I

Primitive <i>Input(s)</i>	Description	Examples
<b>identical?</b>  <i>word-or-list1</i>  <i>word-or-list2</i>	<p>Reports <b>true</b> if both inputs are identical. A word and a list containing the same word are not identical. Corresponding characters of each input must match in terms of uppercase and lowercase letters. (Style, font, and text color are ignored.)</p> <p>See <b>equal?</b>.</p>	<pre>show identical? "a "a <b>true</b> show identical? "Hello "hello <b>false</b></pre>
<b>if</b>  <i>true-or-false</i>  <i>list-to-run</i>	<p>Runs the instruction list only if the <b>true-or-false</b> condition (first input) reports <b>true</b>.</p> <p>See <b>ifelse</b>.</p>	<p>Given that these turtles exist on the page:</p> <pre>to go t1, forever [fd 1 check] end  to check if 30 &lt; distance "t2 [towards "t2] end</pre>
<b>ifelse</b>  <i>true-or-false</i>  <i>list-to-run1</i>  <i>list-to-run2</i>	<p>Runs the first instruction list if the <b>true-or-false</b> condition (first input) is <b>true</b>. Runs the second instruction list if the <b>true-or-false</b> condition is <b>false</b>.</p> <p>See <b>if</b>.</p>	<pre>to quiz question [Washington is in...] ifelse member? answer [U.S.A. US USA U.S.] [announce [Congrats!]] [announce [Oops]] end</pre>

<b>importtext</b>  <i>pathname</i>  <i>text-name</i>	<p>Imports the text from the named file into the text box, Procedures Tab, or Command Center.</p> <p>For the <b>pathname</b>, use a simple file name to import a file from the current directory or full or relative pathname to import a file in a different directory.</p> <p>The input for <b>text-name</b> must be the name of a text box or the special words <b>cc</b> (Command Center) or <b>procedures</b> (public Procedures Tab).</p> <p>This command is equivalent to the <b>Export Text</b> item in the File menu.</p> <p>See <b>exporttext</b>, <b>loadtext</b> and <b>Importing Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that these files exist and text1 exists on the page:</p> <pre>importtext "story.rtf "text1 importtext "C:\mydir\cmds "cc importtext "brain "procedures</pre>
<b>importturtle</b>  <i>pathname</i>	<p>Imports the turtle file on the current page. The turtle file contains all the characteristics of the turtle (the contents of its backpack). A turtle file is created by the command <b>exportturtle</b>, or by the options <b>Export</b> and <b>Mail</b> it in the turtle's right-click menu.</p> <p>See <b>exportturtle</b> and <b>Exporting, Importing and Mailing Turtles</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that this turtle file exists:</p> <pre>importturtle "model</pre>
<b>inback</b>	<p>Puts the current turtle behind all the other turtles on the page. A newly created turtle is always in front of the others.</p> <p>See <b>infront</b>.</p>	<p>Given that t1 is facing t2, less than 100 steps away:</p> <pre>t1, setc " red infront glide 100 0.1 inback glide -100 0.1</pre>
<b>infront</b>	<p>Brings the current turtle in front of all the other turtles on the page. A newly created turtle is always in front of the others.</p> <p>See <b>inback</b>.</p>	<p>Given that t1 is facing t2, less than 100 steps away:</p> <pre>t1, setc " red infront glide 100 0.1 inback glide -100 0.1</pre>

<b>insert</b>  <i>word-or-list</i>	<p>Inserts the input at the cursor position, in the current text box. The text is NOT followed by a carriage return or a line feed.</p> <p>See <b>print</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>settc "violet insert "w settc "red insert "o settc "orange insert "w</pre>
<b>int</b>  <i>number</i>	<p>Stands for integer. Reports the integer portion of its input.</p> <p>See <b>round</b>.</p>	<p>Given that a turtle exists on the page:</p> <pre>to snap setx 30 * int xcor / 30 sety 30 * int ycor / 30 end</pre> <p>Put this procedure in a backpack, and the command snap in the OnClick field. Drag the turtle around and click on it.</p>
<b>item</b>  <i>number</i>  <i>word-or-list</i>	<p>Reports the specified element of a word or a list. The first input must be between 1 and the number of elements in the word or the list.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show item 2 "hello e show item 2 [Hello there] <b>there</b> show item 2 text1 <b>h</b></pre>

## K

Primitive	Description	Examples
<i>Input(s)</i>		
<b>key?</b>	<p>Reports <b>true</b> if a key is being pressed on the keyboard. Use <b>stopall</b> to reset <b>key?</b> to false.</p> <p>See <b>readchar</b>.</p>	<p>Given that there are several pages in the project (click on the page before you start because <b>readchar</b> works when the page is the current "active" area:</p> <pre> to flip forever [nextpage wait 10] waituntil [key?] cancel [nextpage wait 10] end </pre>



## L

Primitive <i>Input(s)</i>	Description	Examples
<b>last</b> <i>word-or-list</i>	<p>Reports the last component of the word or list.</p> <p>See <b>first</b> and <b>butlast</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>to revprint :word if :word = " [pr " stop] insert last :word revprint butlast :word end</pre>
<b>launch</b> <i>word-or-list-to-run</i>	<p>Runs the input as an independent parallel process. If the process is launched from the Command Center, the cursor reappears immediately. Use <b>cancel</b>, the <b>Stop All</b> menu item (Edit menu) or button (Toolbar), or <b>Ctrl+Break</b> to stop the process.</p> <p>See <b>forever</b> and <b>Timing and Synchronization</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that chopin is an existing audio object and fly is a procedure:</p> <pre>launch [chopin] fly cancel [chopin]</pre>
<b>left (lt)</b> <i>number</i>	<p>Turns the turtle to the left. The maximum value for <b>number</b> is 9999.</p> <p>See <b>right</b> and <b>seth</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>seth 0 lt 90 seth 90 repeat 5 [fd 50 lt 144]</pre>
<b>less?</b> <i>number1</i> <i>number2</i>	<p>Reports <b>true</b> if the first number is less than the second number.</p> <p>See <b>greater?</b> and <b>&lt;</b>.</p>	<p>Given that a turtle exists on the page:</p> <pre>ifelse less? xcor ycor [setc "lime] [setc "blue]</pre>

<b>let</b>  <i>list-of-names-and-values</i>	<p>Creates one or many temporary variables. The variables exist only while the procedure containing the <b>let</b> instruction and procedures called by this procedure are running. The input is a list of paired variable names and values. <b>Let</b> can only be used in a procedure. Use <b>let</b> when you know in advance the value of the variable.</p> <p>See <b>local</b> and <b>Local Variables</b> in the section <b>Programming</b> in the Help System.</p>	<pre>to pythagore :x :y let [sqr x * :x sqry :y * :y] op sqrt sum :sqr x :sqry end</pre>
<b>list</b>  <i>word-or-list1</i>  <i>word-or-list2</i>  <b>(list</b>  <i>word-or-list1</i>  <i>word-or-list2</i>  <i>word-or-list3....)</i>	<p>Reports one list made by combining the inputs (words or lists). If more than two inputs are used (or only one input), <b>list</b> and its inputs must be enclosed in parentheses. <b>List</b> maintains the structure of its input elements.</p> <p>See <b>sentence</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>show list 2 3 2 3 show list "a [b] a [b] show (list "a "b "c "d) a b c d make "x 10 make "y 20 setpos list :x :y</pre>
<b>list?</b>  <i>word-or-list</i>	<p>Reports true if the input is a list.</p> <p>See <b>word?</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>show list? pos true show list? heading false</pre>
<b>listen</b>	<p>Sets the global "turtle who" (the turtle obeying instructions from the Command Center). This command allows you to change the global "turtle who" within a process that has been launched (for example, from a button).</p> <p>See <b>Process</b> and <b>Who</b> in the section <b>More Techniques</b> in the Help System. See also <b>talkto</b> and <b>ask</b>.</p>	<p>Given that t1 and t2 exist on the page and that there is a button having t1, listen in its OnClick instruction.</p> <pre>t2, clickon fd 30 Click on the button fd 30</pre>

<b>In</b>  <i>number</i>	<p>Stands for natural logarithm. Reports the natural logarithm (the logarithm in base e) of the number. Inverse of <b>exp</b>.</p> <p>See <b>log</b> and <b>exp</b>,</p>	<pre>show ln 100 4.60517018599</pre>
<b>loadpict</b>  <i>pathname</i>	<p>Stands for <b>load picture</b>. Loads the picture on the current page. The input must be the name of a picture file that MicroWorlds EX supports in the current directory or a full or relative path.</p> <p>See <b>savepict</b> and <b>Importing Pictures</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that these files exist:</p> <pre>loadpict "scene loadpict "c:\projects\scene loadpict "media\tornadol.jpg</pre>
<b>loadshape</b>  <i>pathname</i>  <i>shape-number</i>	<p>Loads the specified picture file into the specified shape spot in the public Shapes Tab. The picture file name becomes the name of the shape if there is no other shape with that name in that Tab.</p> <p>The file must be the name of a picture file that MicroWorlds EX supports in the current directory or a full or relative path. The shape-number can be any number from 1 to 128.</p> <p>See <b>saveshape</b> and <b>Importing and Exporting Pictures</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that these files exist:</p> <pre>loadshape "volcano 20 loadshape "c:\picts\volc.gif 20</pre>
<b>loadtext</b>  <i>pathname</i>	<p>Loads the text file in the current text box. For the <i>pathname</i>, use a simple file name to import a file from the current directory or full or relative pathname to import a file in a different directory.</p> <p>See <b>importtext</b> and <b>Importing Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a text box on the page and that such files exist:</p> <pre>loadtext "story loadtext "c:\projects\story</pre>

<b>local</b>  <i>word-or-list</i>	<p>Makes the specified variable local to the procedure in which <b>local</b> is used. <b>Local</b> can only be used in a procedure. Use <b>local</b> when you have to perform some calculations on a variable within a procedure.</p> <p>See <b>let</b>, <b>make</b>, and <b>name</b>.</p>	<p>Given that there are several pages in the project.</p> <pre>to slideshow local "pictures make "pictures files "jpg slideone :pictures end  to slideone :list if empty? :list [stop] cg loadpict first :list wait 30 slideone bf :list end</pre>
<b>log</b>  <i>number</i>	<p>Stands for <b>log</b>arithm. Reports the logarithm of the number.</p> <p>See <b>ln</b> and <b>exp</b>.</p>	<pre>show log 100 2</pre>
<b>lput</b>  <i>word-or-list</i>  <i>list</i>	<p>Stands for last <b>put</b>. Reports the list created by adding the first input at the end of the second.</p> <p>See <b>fput</b>.</p>	<pre>show lput "y [a e I o u] a e I o u y</pre>

**M**

Primitive	Description	Examples
<b>Input(s)</b>		
<b>make</b> <i>word</i> <i>word-or-list</i>	<p>Creates a variable named <b>word</b> and gives it the value <b>word-or-list</b>. These variables keep their values as long as you don't clear them or quit MicroWorlds EX. They are not saved with your project. If you want your variables to have specific values each time the project is loaded, you should have a <b>startup</b> procedure. To get the variable's value, use the colon in front of the variable name.</p> <p>See <b>name</b>, <b>thing</b>, <b>clearname</b>, <b>names</b>, and <b>createprojectvar</b>. See also <b>Global Variables</b> in the section <b>Programming</b> in the Help System,</p>	<pre>make "friends [Kim Lea Bob] show :friends <b>Kim Lea Bob</b> show first :friends <b>Kim</b></pre>
<b>member?</b> <i>word-or-list1</i> <i>word-or-list2</i>	<p>Reports <b>true</b> if the first input is a component of the second. Note that a list cannot be a component of a word.</p>	<p>Given that there is a text box on the page and it contains some text:</p> <pre>to quiz question [Washington is in...] ifelse member? answer [U.S.A. US USA U.S.  United States ] [announce [Congrats!]] [announce [Oops]] end</pre>

<b>merge</b>  <i>pathname</i>  <i>word-or-list-of-types</i>	<p>Imports pages, procedures, or shapes from another project into the current project. The first input must be the name of a project in the current folder or a full or relative path to access a different folder. This is the project you want to import from.</p> <p>The second input can be the name of a specific page, a list of page names, the word <b>procedures</b> (to import the procedures from the project Procedures Tab and project variables), <b>pages</b> (to import all the pages), or <b>shapes</b> (to replace the shapes in the current project's Shapes Tab). Instead of using <b>merge</b>, we highly recommend using Import Turtle to import shapes and/or procedures included in a turtle's backpack. If there are names in the source project that are the same as those in the current project, the new names will be renamed with a number.</p>	<p>Given that these files exist:</p> <pre>merge "clocks "procedures</pre> <p>Imports the procedures and project variables.</p> <pre>merge "clocks "pages</pre> <p>Imports all the pages.</p> <pre>merge "clocks [page1 page3]</pre> <p>Imports individual pages.</p> <pre>merge "C:\projects\scene "shapes</pre> <p>Replaces public shapes in the current project (shape numbers that were not blank in the imported file).</p>
<b>message</b>	<p>Reports the contents of the last message send by <b>broadcast</b> or <b>tell</b>. <b>Message</b> must be used in the OnMessage field of a turtle's backpack.</p> <p>See <b>tell</b>, <b>broadcast</b> and <b>sender</b>. See also <b>Rules Tab - OnMessage</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>When you click on t1, t2 goes at position [100 100]:</p> <p>In the Onclick field of t1's backpack:</p> <pre>broadcast [100 100]</pre> <p>In the OnMessage field of t2's backpack:</p> <pre>setpos message</pre> <p>Click on t1</p>
<b>minus</b>  <i>number</i>	<p>Reports the additive inverse of its input. <b>Minus</b> must be used to report the additive inverse of a variable (<b>minus :num</b> or <b>minus heading</b> instead of <b>-:num</b> or <b>-heading</b>).</p> <p>See <b>-</b> and <b>difference</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>setx minus ycor -55</pre>

<b>mousepos</b>	<p>Stands for <b>mouse position</b>. Reports the page coordinates representing the current mouse position on the screen.</p> <p>See <b>setpos</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>setpos mousepos</pre>
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**N**

Primitive <i>Input(s)</i>	Description	Examples
<b>name</b>  <i>word-or-list</i>  <i>word</i>	<p>Creates a variable named <b>word</b> and gives it the value <b>word-or-list</b>. These variables keep their values as long as you don't clear them or quit MicroWorlds EX. They are not saved with your project.</p> <p>See <b>name</b>, <b>thing</b>, <b>clearname</b>, <b>names</b>, and <b>createprojectvar</b>. See also <b>Global Variables</b> in the section <b>Programming</b> in the Help System.</p>	<pre>name [Kim Lea Bob] "friends show :friends <b>Kim Lea Bob</b> show first :friends <b>Kim</b></pre>
<b>name?</b>  <i>word</i>	<p>Reports <b>true</b> if the input is the name of a variable.</p> <p>See <b>make</b> and <b>name</b>. See also <b>Global Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Define this procedure. Run the other instructions in the Command Center.</p> <pre>to translate :word if name? :word [op thing :word] end  make "table "mesa make "house "casa show translate "table <b>mesa</b></pre>
<b>namepage (np)</b>  <i>page-name</i>	<p>Names the page being displayed with the input. <b>Namepage</b> corresponds to the <b>Name Page</b> function in the Pages menu. Once the page is named, the <b>page-name</b> is a command that displays that page.</p>	<p>Given that this page doesn't already exist:</p> <pre>namepage "presentation</pre>
<b>names</b>	<p>Reports the names of all the variables with their values.</p>	<pre>make "city "  New York  make "friends [Ted Lea] make "age 12</pre>



<b>newbutton</b>  <i>name</i>  <i>[x y]</i>  <i>instruction-list</i>	<p>Creates a new button with the name and instruction specified, at the position [x y] indicated. The name cannot be more than 32 characters (including spaces). The position [x y] is the top, left corner of the button. The button is created in the Once mode. It is sized to fit the instruction-list. At the time of creation, the label of the button is the same as its instruction. Use set to change the label.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newbutton "mybutton [5 60] [note 65 5]</pre> <p>The button shows its instruction as its label. Do this to set the label:</p> <pre>set "mybutton "label "GO!</pre>
<b>newcheckbox</b>  <i>name</i>  <i>[x y]</i>  <i>label</i>	<p>Creates a new check box at the position indicated, with the label provided. The name of the check box reports its current state: <b>true</b> if it is checked, <b>false</b> otherwise.</p>	<p>Given that this object doesn't already exist on the page and doodle is in the turtle's OnClick field in Forever mode:</p> <pre>newcheckbox "pen [0 0] "Draw to doodle ifelse pen [pd] [pu] fd 50 rt random 360 end</pre>
<b>newdropdown</b>  <i>name</i>  <i>[x y]</i>  <i>list-of-labels</i>	<p>Creates a new drop down menu at the position indicated and containing the list of labels provided. The name of the drop down menu reports the position of the current selection in the list of selections. The other option for reporting the current selection is to use <b>getlabel</b>. <b>Show dropdown1</b> reports the position of the current selection (reports 0 if nothing is selected) and <b>show getlabel</b> "dropdown1 reports the label (text) corresponding to that selection as a word.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newdropdown "colselect [0 0] [Red Green Bleu] if colselect = 0 [announce [Choose one]]</pre>
<b>newlistbox</b>  <i>name</i>  <i>[x y]</i>  <i>list-of-labels</i>	<p>Creates a new list box at the position indicated and containing the list of labels provided. The name of the list box reports the position of the current selection in the list of selections. The other option for reporting the current selection is to use <b>getlabel</b>. <b>Show listbox1</b> reports the position of the current selection (reports 0 if nothing is selected) and <b>show getlabel</b> "listbox1 reports the label (text) corresponding to that selection.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newlistbox "colselect [0 0] [Red Green Bleu] if colselect = 0 [announce [Choose one]]</pre>

<b>newpage</b>	Opens a new page called Page <b>x</b> ( <b>x</b> is the next available number).	<b>newpage</b>
<b>newprojectsize</b>  <i>[xsize ysize]</i>	<p>Sets the page size on the computer screen for new projects. The input is a list of two numbers: the width and the height of the page in turtle steps. Before using <b>newprojectsize</b>, there must be an empty project on the screen. The page size of a project is saved with the project. The minimum size is 40 by 40 and the maximum size is 2000 by 2000. The default project size is 744 by 426 when the display setting (in the Control Panel) is 1024 x 768 and 592 by 322 when the display setting (in the Control Panel) is 800 x 600. This command corresponds to the <b>New Project Size</b> function in the File menu.</p> <p>See <b>File Menu</b> in the section <b>Fundamentals</b> and <b>Posting Projects on the Web</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Choose New Project from the File menu so there is a perfectly empty project on the screen.</p> <pre>newprojectsize [40 40] newprojectsize "standard</pre> <p>Resets the project size to the default size.</p>
<b>newroundbuttonset</b>  <i>name</i>  <i>[x y]</i>  <i>list-of-labels</i>	<p>Creates a new round button set at the position indicated and containing the list of labels provided. The name of the round button set reports the position of the current selection in the list of selections. The other option for reporting the current selection is to use <b>getlabel</b>. <b>Show roundbuttonset1</b> reports the position of the current selection (reports 0 if nothing is selected) and <b>show getlabel</b> reports the text of the selection.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newroundbuttonset "colselect [0 0] [Red Green Bleu] if colselect = 0 [announce [Choose one]]</pre>

<b>newslider</b>  <i>name</i>  <i>[x y]</i>  <i>[min max current]</i>	<p>Creates a new slider using the specified name and at the position indicated. The position <i>[x y]</i> is the top, left corner of the slider. The last input is a list of three numbers representing the minimum, maximum, and current value of the slider. The minimum and maximum values are</p> <p>-9999 and 9999 respectively.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newslider "step [100 100] [0 8 3] show step 3 setstep 5 setstep [10 20 15]</pre>
<b>newtext</b>  <i>name</i>  <i>[x y]</i>  <i>[xsize ysize]</i>	<p>Creates a new text box using the <b>name</b> and size specified and at the position <i>[x y]</i> indicated. The position is the top, left corner of the box. The maximum <i>[xsize ysize]</i> is the size of the page in the project.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newtext " mynotes [0 0] [50 100] pr " Notes</pre>
<b>newturtle</b>  <i>name</i>	<p>Creates a new turtle with the <b>name</b> indicated. The new turtle appears at the position [0 0] and is hidden. Use <b>st</b> to make it visible. <b>Newturtle</b> makes the turtle that is created the current turtle.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newturtle "newborn setx 30 st</pre>
<b>nextpage</b>	<p>Displays the next page in the page list. Pages are listed alphabetically in the page list. Rename your pages to create the desired sequence.</p> <p>See <b>pagelist</b>, <b>prevpage</b> and <b>Pages Menu</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there are several pages in the project:</p> <pre>repeat count pagelist [nextpage wait 10]</pre>
<b>not</b>  <i>true-or-false</i>	<p>Reports the logical inverse of its input.</p> <p>See <b>and</b> and <b>or</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>ifelse not xcor &gt; 0 [setc "red] [setc "blue]</pre>

<p><b>note</b></p> <p><i>number-or-list-of-numbers</i></p> <p><i>duration</i></p>	<p>Plays a note using the current instrument. The first input is the MIDI note number and the second is the duration in tenths of a second. If the first input is a list of numbers, <b>note</b> plays a chord. Middle C is 60. The maximum number for <b>note</b> is 127; the maximum <b>duration</b> is 255. There can be no more than 16 numbers in <b>list-of-numbers</b>.</p> <p>See <b>rest</b>.</p>	<pre>note 60 4 note [72 76 79 84] 15</pre>
<p><b>number?</b></p> <p><i>word-or-list</i></p>	<p>Reports <b>true</b> if the input is a number.</p> <p>See <b>word?</b> and <b>list?</b>.</p>	<pre>to insist question [How old are you?] if not number? answer [insist] end</pre>

## O

Primitive	Description	Examples
<i>Input(s)</i>		
<b>onreadline</b> <i>text-box-name</i> <i>instruction</i>	<p>Sets the designated text box to the instruction, which will then be run when appropriate text is entered in the text box and Enter is pressed. The text box name tag changes to blue to show that an <b>onreadline</b> instruction is active. The second input is a procedure or MicroWorlds primitive that requires a number, word or long word (a sequence of characters including spaces) as input. Whatever text is typed into the text box becomes the input for this primitive or procedure. Pressing Enter runs the complete instruction.</p> <p>To turn off the effect of <b>onreadline</b>, make the second input an empty word as in:</p> <p><b>onreadline</b> <i>text-box-name</i> "</p> <p>Onreadline is particularly useful for "faking" a Command Center in projects for the Web. For more information, see <b>Making a Text Box into a Command Center</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that text1 exist on the page:</p> <pre>onreadline "text1 "run</pre> <p>Type fd 50 in that text box and press <b>Enter</b>.</p>
<b>opacity</b>	<p>Returns the opacity of the current turtle's pen and shape. The value is a percentage.</p> <p>See <b>setopacity</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd setpensize 30 setopacity 72 repeat 36 [fd 10 rt 10 setopacity opacity - 2]</pre>
<b>opaque</b> <i>text-box-name</i>	<p>Makes the designated text box opaque. This is equivalent to selecting <b>Opaque</b> in the text box's right-click menu, on the page or in the Project Tab. It is also equivalent to unchecking the box <b>Transparent</b> in the text box's dialog box.</p> <p>See <b>transparent</b>.</p>	<p>Given that text1 exists on the page and it contains some text:</p> <pre>transparent " text1 opaque " text1</pre>

<p><b>openworksheet</b></p> <p><i>pathname</i></p> <p><i>sheet</i></p>	<p>Opens the specified file in Microsoft Excel on the specified worksheet. The first input must be the name of an Excel file in the current directory or a full or relative path. The second input must be the name of the sheet.</p> <p>The Excel related primitives only work if you have this program available on your computer.</p> <p>See <b>getcell</b>, <b>setcell</b>, and <b>closeworksheet</b>.</p>	<p>MicroWorlds EX will create this worksheet if it doesn't exist:</p> <pre>openworksheet "cards "sheet1</pre>
<p><b>or</b></p> <p><i>true-or-false1</i></p> <p><i>true-or-false2</i></p> <p>(<b>or</b></p> <p><i>true-or-false1</i></p> <p><i>true-or-false2</i></p> <p><i>true-or-false3...</i>)</p>	<p>Reports true if any of its inputs report <b>true</b>. If more than two inputs are used, <b>or</b> and its inputs must be enclosed in parentheses.</p> <p>See <b>and</b> and <b>not</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>ifelse or xcor &gt; 30 xcor &lt; -30 [setc "red] [setc "blue]</pre>
<p><b>output (op)</b></p> <p><i>word-or-list</i></p>	<p>Stops the procedure and reports a word or list. <b>Output</b> can only be used in a procedure.</p>	<pre>to double :x op :x + :x end  show double 10 20</pre>

**P**

Primitive <i>Input(s)</i>	Description	Examples
<b>pagelist</b>	Reports a list containing the names of all the pages in the current project. The first name reported by <b>pagelist</b> is always the current page. The remaining pages in the project are listed alphabetically.	Given that there are several pages in the project:  <pre>repeat count pagelist [nextpage wait 10]</pre>
<b>parse</b> <i>word</i>	Turns character strings into plain lists. Spaces and carriage returns, and linefeed sequences contained in the character string become separators in the list. <b>Parse</b> can be used to turn the long word (a sequence of characters including spaces) reported by text boxes into lists of words.	The result is just an example.  <pre>question [Type in a sentence] show answer <b>This is a sentence</b> show count answer 18 show count parse answer 4</pre>
<b>paste</b>	Pastes a copy of the clipboard in the current text box. The clipboard contains the last text that has been cut or copied using the <b>cut</b> or <b>copy</b> command, or the equivalent Edit menu items and Toolbar buttons.  See also <b>select</b> .	Given that there is a text box containing some text on the page:  <pre>top select bottom cut wait 5 paste paste</pre>
<b>pd</b>	Stands for <b>pen down</b> . Puts down the pen of the current turtle. The turtle then leaves a trace when it moves, but not when it is dragged.  See <b>pu</b> and <b>pe</b> .	Given that there is a turtle on the page:  <pre>repeat 6 [pu fd 10 pd fd 10]</pre>
<b>pe</b>	Stands for <b>pen erase</b> . Puts down the eraser of the current turtle. The turtle erases the graphics when it moves.  See <b>pd</b> and <b>pu</b> .	Given that there is a turtle on the page:  <pre>setc "red fill pe repeat 5 [fd 50 rt 144]</pre>

<b>pensize</b>	<p>Reports a number representing the pen size of the current turtle. The original pen size is 1. The maximum is 30.</p> <p>See <b>setpensize</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>setpensize 30 repeat 29 [fd 1 setpensize pensize - 1]</pre>
<b>pi</b>	<p>Reports the constant pi.</p>	<pre>show pi 3,14159265359 seth 360 / pi</pre>
<b>pick</b> <i>word-or-list</i>	<p>Reports an element chosen randomly from the <b>word</b> or the <b>list</b>. Picking from a word reports a character, picking from a list reports an element of the list (a word or a list).</p> <p>See <b>textpick</b>.</p>	<p>Given that these turtles exist on the page. The result is just an example.</p> <pre>show pick "hello e talkto pick [t1 t2 t3 t4] fd 30</pre>
<b>pictlist</b>	<p>Stands for <b>picture list</b>. Reports a list containing the names of picture files in the current directory. Only the files with picture formats that MicroWorlds EX supports (created using <b>savepict</b> or other applications) are shown.</p> <p>See <b>textlist</b>, <b>projectlist</b>, and <b>files</b>. See also Importing and exporting Pictures in the section <b>Fundamentals</b> in the Help System.</p>	<p>The result is just an example.</p> <pre>show pictlist mybackground.bmp MW.gif</pre> <p>A file name made up of more than one word will look like two files in the list. Use <b>make</b> and <b>names</b> so that the actual names are enclosed in vertical bars. In this example, "autumn scene.gif" is the name of one file.</p> <pre>make "picts pictlist show names make "picts [mybackground.bmp  autumn scene.gif  ]</pre>
<b>placepict</b> <i>pathname</i>  <i>[x y]</i>  <i>size</i>	<p>Stands for <b>place picture</b>. Imports a picture file, places it at the designated position, and adjusts its size to fit the size indicated. The first input is the file name in the current directory or a full or relative pathname; the second input is the position for the top, left corner of the picture, and the third input is the size of the image on the page, in x and y turtle steps.</p>	<pre>placepict "cat [0 0] [100 100]</pre>



<b>pos</b>	<p>Stands for <b>position</b>. Reports the position of the turtle as a list of two numbers (co-ordinates). [0 0] is the position at the center of the page.</p> <p>See <b>setpos</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>show pos t1, setpos t2's "pos</pre>
<b>power</b>  <i>number1</i>  <i>number2</i>	<p>Reports <i>number1</i> raised to the power of <i>number2</i>.</p>	<p>Given that a turtle exists on the page:</p> <pre>pu home pd dotimes [i 24]   [sety (power :i 2)    / 10    setx xcor + 1]</pre>
<b>presentationmode</b>	<p>Hides the Tabs, Command Center, Toolbar, Status Bar, and MicroWorlds EX menus. The project is centered on the screen and the background is filled in. <b>Presentationmode</b> is used to display completed projects. To return to MicroWorlds EX's regular mode, use <b>presentationmode</b> again (using a button or another clickable object), press <b>Esc</b> or double-click in the area surrounding your project. This command corresponds to the <b>Presentation Mode</b> item in the View menu and button in the Toolbar.</p>	<b>presentationmode</b>
<b>prevpage</b>	<p>Stands for <b>previous page</b>. Displays the previous page in the page list. Pages are listed alphabetically in the page list. Rename your pages to create the desired sequence.</p> <p>See <b>pagelist</b>, <b>nextpage</b> and <b>Pages Menu</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there are several pages in the project:</p> <pre>repeat count pagelist [prevpage wait 10]</pre>
<b>print (pr)</b>  <i>word-or-list</i>	<p>Prints a word or list in the current text box. The text is followed by a carriage return and line feed sequence.</p> <p>See <b>insert</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>bottom pr " print [The End]</pre>

<p><b>product</b></p> <p><i>number1</i></p> <p><i>number2</i></p> <p>(<b>product</b></p> <p><i>number1</i></p> <p><i>number2</i></p> <p><i>number3...</i>)</p>	<p>Reports the result of multiplying its inputs. If more than two inputs are used, <b>product</b> and its inputs must be enclosed in parentheses.</p>	<pre>show product 10 10 100</pre>
<p><b>projectlist</b></p>	<p>Reports a list containing the names of MicroWorlds EX and MicroWorlds Pro projects in the directory (mw, mw2, mwz files)</p> <p>See <b>textlist</b>, <b>pictlist</b>, and <b>files</b>.</p>	<p>The result is just an example.</p> <pre>show projectlist maze.mwz my adventure.mwx</pre> <p>A file name made up of more than one word will look like two files in the list. Use <b>make</b> and <b>names</b> so that the actual names are enclosed in vertical bars. In this example, "my adventure" is the name of one project.</p> <pre>make "projects projectlist show names make "projects [maze.mwz  my adventure.mwx ]</pre>
<p><b>projectsize</b></p>	<p>Reports the current project size, in turtle steps.</p> <p>See <b>newprojectsize</b>.</p>	<pre>show projectsize</pre>
<p><b>projectvars</b></p>	<p>Stands for <b>project variables</b>. Reports the list of currently defined project variables.</p> <p>See <b>createprojectvar</b>.</p>	<pre>createprojectvar "age setage 12 show projectvars age</pre>
<p><b>pu</b></p>	<p>Stands for <b>pen up</b>. Lifts up the pen of the current turtle. The turtle will not leave a trace when it moves.</p> <p>See <b>pd</b> and <b>pe</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 6 [pu fd 10 pd fd 10]</pre>

## Q

Primitive <i>Input(s)</i>	Description	Examples
<b>question</b>  <i>word-or-list</i>	<p>Opens a dialog box displaying the question and an area to type the answer. <b>Answer</b> reports what was typed in the dialog box. If you write a very long question, only the part that fits is displayed. If you drag the dialog box to a new position while the question is being displayed, this is the position where the next question dialog is opened in the project.</p> <p>See <b>answer</b>.</p>	<pre>question [Are you in a good mood today? (answer yes or no)] question [ Are you in a good mood today? (answer yes or no) ]</pre>
<b>quotient</b>  <i>number1</i>  <i>number2</i>	<p>Reports the result of dividing <b>number1</b> by <b>number2</b>.</p>	<pre>show quotient 100 50 2</pre>

**R**

Primitive <i>Input(s)</i>	Description	Examples
<b>random</b> <i>number</i>	Reports a random non-negative integer (including 0) less than <b>number</b> . The maximum number is 9999.	Given that a turtle exists on the page. The result is just an example.  <pre>fd random 30 rt random 60</pre>
<b>readchar</b>	Pauses the execution and waits for a character to be typed on the keyboard.  See <b>key?</b> .	Given that there is a turtle on the page. Click on the page before you start because <b>readchar</b> works when the page is the current "active" area:  <pre>to direct let [key readchar] if (ascii :key) = 37   [seth 270] if (ascii :key) = 38   [seth 0] if (ascii :key) = 39   [seth 90] if (ascii :key) = 40   [seth 180] end</pre> Animate the turtle and create a button with the instruction Direct in Forever mode. You can now use the arrow keys to control the turtle.
<b>recycle</b>	Frees up unused MicroWorlds EX memory space. MicroWorlds EX automatically recycles by itself to free up space. Therefore, only use the <b>recycle</b> command when you do not want the automatic recycle to occur when you are running a program.  See <b>space</b> .	<pre>show space recycle show space</pre>

<b>remainder</b>  <i>number1</i>  <i>number2</i>	<p>Reports the remainder after <b>number1</b> is divided by <b>number2</b>. The remainder of a negative number is negative. If <b>number1</b> and <b>number2</b> are non-integers, they are rounded to the nearest integers.</p>	<p>Given that a turtle exists on the page. The result is just an example:</p> <pre>show remainder 100 3 1 show remainder xcor 10 8</pre>
<b>remove</b>  <i>object-name</i>  <b>remove</b>  <i>page-name</i>  <b>remove</b>  <i>variable-name</i>	<p>Deletes an object, page, project variable created with <b>createprojectvar</b> or a turtle variable created with <b>turtlesown</b> or <b>giveturtle</b>. If the named object is not on the current page, MicroWorlds looks for it on the other pages in the project. If the input to <b>remove</b> is <b>procedures</b>, the Public Procedures Tab is cleared. If you remove the only page of a project, a new page called Page1 is created. You can also remove objects with the <b>Remove</b> option in the object's right-click menu on the page or in the Project Tab.</p>	<p>Given that t1 exists on the page:</p> <pre>remove "t1</pre>
<b>rename</b>  <i>object-name</i>  <i>new-object-name</i>	<p>Sets a new name for the object or the page.</p>	<p>Given that these objects exist:</p> <pre>rename "t1 "myfriend rename "text1 "mynotes rename "page1 "intro</pre>
<b>repeat</b>  <i>number</i>  <i>instruction-list</i>	<p>Runs the list of instructions the specified number of times.</p> <p>See <b>dotimes</b> and <b>dolist</b> for more advanced features.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd repeat 96 [bk 40 fd 40 rt 4]</pre>
<b>rerandom</b>	<p>Reproduces the same sequence of numbers generated by <b>random</b>. After running <b>rerandom</b>, <b>random</b> with the same input generates the same sequence of numbers the next time.</p>	<pre>rerandom repeat 2 [show random 10] 8 5 rerandom repeat 2 [show random 10] 8 5</pre>

<p><b>resetdialog</b></p> <p><i>name-of-dialog-box</i></p>	<p>Resets all the choosers in the named dialog box to their default values. You can set the default value or round button sets, list boxes and drop down menus in their own dialog boxes. Without a <b>resetdialog</b>, the values previously set when you last used the dialog box are maintained when the dialog box is reopened.</p> <p>See <b>Dialog Boxes</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that dialog1 exists:</p> <p>dialog1</p> <p>Make some changes to the choosers. Click on Cancel.</p> <p>dialog1</p> <p>The selections you made earlier are still present in the dialog box. Click on OK.</p> <pre>resetdialog "dialog1 dialog1</pre> <p>The values are reset to those set in the dialog box editor.</p>
<p><b>reset</b></p>	<p>Stands for <b>reset</b> timer. Resets the timer to 0. The timer starts when you start up MicroWorlds EX.</p> <p>See <b>timer</b>.</p>	<p>Define this procedure and run the other instructions in the Command Center.</p> <pre>to reflex reset setnum1 1 + random 10 setnum2 1 + random 10 question (se [What is] num1 "times num2 [?]) ifelse answer = num1 * num2 [announce se timer / 10 "sec] [announce [Wrong answer]] end</pre> <p>Type this in the Command Center:</p> <pre>createprojectvar "num1 createprojectvar "num2 reflex</pre>
<p><b>resetvideo</b></p> <p><i>word</i></p>	<p>Resets the video to the beginning.</p>	<p>Given that this object exists on the page:</p> <pre>resetvideo "video1</pre>

<b>rest</b>  <i>duration</i>	<p>Inserts a rest in a sequence of notes. The <b>duration</b> is in tenths of a second, and has a maximum of 255.</p> <p>See <b>note</b>.</p>	<pre>to song note 60 5 note 62 5 note 64 5 rest 10 note 60 5 note 62 5 note 60 15 end</pre>
<b>restore</b>	<p>Restores the background to the way it was the last time a snapshot command was issued. The turtle's position does not change. Everything else remains intact. See <b>snapshot</b>, <b>freezebg</b> and <b>unfreezebg</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd lt 11 fd 9999 snapshot rt 22 fd 9999 restore</pre>
<b>right (rt)</b>  <i>number</i>	<p>Turns the turtle to the right. The maximum value for <b>number</b> is 9999.</p> <p>See <b>left</b> and <b>seth</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>seth 0 seth 90 rt 90 repeat 5 [fd 50 rt 144]</pre>
<b>round</b>  <i>number</i>	<p>Reports the <b>number</b> given as input rounded to the nearest integer. Numbers ending with .5 are rounded to the higher integer.</p>	<p>Given that a turtle exists on the page:</p> <pre>to snap setx 30 * round xcor / 30 sety 30 * round ycor / 30 end</pre> <p>Put this procedure in a backpack, and the command snap in the OnClick field. Drag the turtle around and click on it.</p>
<b>run</b>  <i>word-or-list-to-run</i>	<p>Runs (executes) a word or an instruction list.</p> <p>See <b>onreadline</b>.</p>	<p>Given that text1 exists on the page and it contains a MicroWorlds EX instruction:</p> <pre>run text1</pre>

## S

Primitive <i>Input(s)</i>	Description	Examples
<b>savepict</b>  <i>pathname</i>	<p>Stands for <b>save picture</b>. Saves the current page and its background as a picture file. The default file format (if you don't specify a format using an appropriate graphic file extension) is PNG.</p> <p>When you use the <b>savepict</b> command, the turtles, buttons, text boxes, and other objects are not part of the background. Stamped images and stamped text are part of the background. Use the File menu function <b>Export Page Image</b> to save the picture of the page including all objects.</p> <p><b>Savepict</b> saves the file in the current directory unless you use a full or relative pathname.</p> <p>See <b>Importing and Exporting Pictures</b> in the section <b>Fundamentals</b> in the Help System.</p>	<pre>savepict "scene savepict "C:\projects\scene savepict "scene.jpg</pre>
<b>saveproject</b>	<p>Saves the current project without closing it. The project must have a name in order for this command to work. This is equivalent to the <b>Save</b> item in the File menu. Use this primitive if you want to save your project before getting another project with <b>getproject</b>.</p>	<pre>saveproject</pre>
<b>saveshape</b>  <i>pathname</i>  <i>number</i>	<p>Saves the specified shape from the project Shapes Tab as a picture file. Use a simple file name to save the file in the current directory or full or relative pathname to save the file in a different directory.</p> <p>If the file name has no extension, the resulting file is a png image. Add a jpg, gif or bmp extension to the file name to get a specific file format.</p>	<p>Given that there is a turtle on the page with shapes in the spot 1.</p> <pre>saveshape "moon 1 saveshape "moon.jpg 1 saveshape "C:\graph\moon.jpg 1</pre>



<b>savetext</b>  <i>pathname</i>	<p>Saves the text found in the current text box in a unicode text file format.</p> <p>The input can be a file name with or without an extension (and the file will be saved in the current directory) or a full or relative path. This command is equivalent to the <b>Export Text</b> item in the File menu. To save the Procedures Tab or the content of the Command Center as a text file, see <b>exporttext</b>.</p> <p>See <b>loadtext</b> and <b>textlist</b>. See also <b>Exporting Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a text box on the page and it contains some text:</p> <pre>savetext "story savetext "C:\proj\story savetext "story.rtf</pre>
<b>search</b>  <i>word</i>	<p>Tells MicroWorlds EX to search and select (highlight) the word in the current text box. Nothing happens if the word is not found., except for the fact that <b>found?</b> is set to <b>false</b>. <b>Search</b> starts searching at the insertion point. Use <b>unselect</b> to undo the highlighting effect of search.</p> <p>See also <b>found?</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>to replaceall :this :bythat search :this if not found? [stop] insert :bythat replaceall :this :bythat end</pre>
<b>select</b>	<p>Tells MicroWorlds EX to start selecting text at the cursor position in the current text box. Any cursor motion (<b>top</b>, <b>bottom</b>, <b>cu</b>, <b>cd</b>, <b>cf</b>, and <b>cb</b>) will select text.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom</pre>
<b>selected</b>	<p>Reports as a word a copy of the characters in the block of selected text in the active text box. If no block of characters is selected, <b>selected</b> reports the empty word. Use <b>parse</b> to convert the block of characters into a list.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom make "selection selected show :selection</pre> <p>The content of the text box is reprinted in the Command Center.</p>

<p><b>sender</b></p>	<p>Reports the name of the turtle who has made the last <b>broadcast</b> or <b>tell</b>. <b>Sender</b> must be used in the OnMessage field of a turtle's backpack.</p> <p>See <b>tell</b>, <b>message</b> and <b>broadcast</b>. See also <b>Rules Tab - OnMessage</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>In the Onclick field of t1's backpack:</p> <pre>broadcast "here</pre> <p>In the OnMessage field of t2's backpack:</p> <pre>towards sender</pre> <p>Click on t1.</p>
<p><b>sentence (se)</b></p> <p><i>word-or-list1</i></p> <p><i>word-or-list2</i></p> <p><b>(sentence</b></p> <p><i>word-or-list1</i></p> <p><i>word-or-list2</i></p> <p><i>word-or-list3..)</i></p>	<p>Reports a list which is made up of its inputs (words or lists). <b>Sentence</b> can take more than 2 inputs when <b>sentence</b> and the inputs are enclosed in parentheses.</p> <p>See <b>list</b>.</p>	<p>Given that these turtles exist on the page:</p> <pre>show se "Hello "there Hello there</pre> <pre>to middle t2, setpos sentence ((t1's "xcor)+(t3's "xcor)) / 2 ((t1's "ycor)+(t3's "ycor)) / 2 end</pre>
<p><b>set</b></p> <p><i>object</i></p> <p><i>property</i></p> <p><i>value</i></p>	<p>Sets a property for an object to the specified value. The first input is the name of an object. The second input is a property name and the last one is the value.</p> <p><b>Project:</b></p> <p>presentationmode? showtoolbar? showcc? showtabs? showstatusbar? showtechniques?</p> <p><b>Page:</b></p> <p>transition</p> <p><b>Turtle:</b></p> <p>visible? frozen? menu, notes procedures onclick onlick ontouching onmessage onevent on? <i>colorname</i></p> <p><b>Button:</b></p> <p>visible? pos size onclick on? frozen? visible?</p>	<p>Given that these objects exist on the page:</p> <pre>set "text1 "visible? &gt;false set "t1 "onclick [once [seth random 360 fd 50]] set "t1 "red [once [rt 180]] set "slider1 "showname? "true set "brown "mouseclick [silly-sound] set "blue "onturtle [once [announce [You win!]]] set "announce "pos [0 0] set "page1 "transition 2</pre>

	<p><b>Slider:</b></p> <p>visible? pos showname? limits value frozen? vertical? visible?</p> <p><b>Text:</b></p> <p>text visible? transparent? showname? frozen? pos size visible? singleline?</p> <p><b>Public color detection:</b></p> <p>mouseclick, onturtle</p> <p><b>Hyperlinks:</b></p> <p>visible? pos showname? frozen? link</p> <p><b>Media Objects:</b></p> <p>visible? pos showname? frozen? on?</p> <p><b>Additional for Video:</b></p> <p>size</p> <p><b>Question and Announce:</b></p> <p>pos</p> <p><b>Choosers (round buttons sets, etc.):</b></p> <p>pos value visible? showname? frozen? labels (except for checkboxes)</p> <p>See <b>get</b>.</p>	
<p><b>setbg</b></p> <p><i>color-name-or-number</i></p>	<p>Stands for <b>set background</b>. Sets the background color for the page. The input can be the name of a color or a number. Use <b>setbg 0</b> or <b>setbg "white</b> to reset the original background. You can't use <b>setbg</b> on a frozen background.</p> <p>See <b>bg</b>, <b>fill</b>, <b>freezebg</b> and <b>unfreezebg</b>.</p>	<pre>setbg 29 repeat 10 [setbg bg - 1] setbg "red setbg 0</pre>

<p><b>setcell</b></p> <p><i>row-number</i></p> <p><i>column-number</i></p> <p><i>value</i></p>	<p>Sets the <b>value</b> of the specified cell (in <b>row-number</b>, <b>column-number</b>) in the current Microsoft Excel worksheet. Note that the command <b>openworksheet</b> makes an Excel <b>worksheet</b> available to MicroWorlds EX.</p> <p>The Excel related primitives only work if you have this program available in your computer.</p> <p>See <b>getcell</b> and <b>closeworksheet</b>.</p>	<p>Given that this worksheet exists:</p> <pre>openworksheet "cards "sheet1 setcell 1 1 50 setcell 1 2 100 setcell 1 3 "  =AVERAGE(A1:B1)   show getcell 1 3 75</pre>
<p><b>setcolor (setc)</b></p> <p><i>color-name-or-number</i></p>	<p>Sets the color of the turtle's pen. If the turtle has its original shape, it changes color to show the pen color. The input can be the name of a color or a number. The original pen color is black, or color number 9. The input can be an integer, a fraction or a one place decimal.</p> <p>See <b>color</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>setc 45 fill setc "orange fill</pre>
<p><b>setfont</b></p> <p><i>word</i></p>	<p>Sets the font for the selected text in the current text box. If no text is selected, <b>setfont</b> sets the cursor to use that font for typing. The input must be the name of a font in your system. If the name of the font has spaces, for example, Times New Roman, you must enclose the whole name in vertical bars. You can also set the text font by choosing Font from the Text menu.</p> <p>See <b>settc</b>, <b>setfontsize</b>, and <b>setstyle</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom setfont "arial setfont "  times new roman </pre>
<p><b>setfontsize</b></p> <p><i>number</i></p>	<p>Sets the font size for the selected text in the current text box. If no text is selected, <b>setfontsize</b> sets the cursor to use that font size for typing. You can also set the text size by choosing Font from the Text menu. We recommend using "True Type Fonts" (those with the symbol in the font dialog box). True type fonts allow many font sizes.</p> <p>See <b>setfont</b>, <b>settc</b>, and <b>setstyle</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom setfontsize fontsize + 10</pre>
<p><b>setfooter</b></p> <p><i>word-or-list</i></p>	<p>Sets the contents of the footer on printouts. Normally, the footer is empty. Use the empty list as input if you do not want any footer after using <b>setfooter</b>.</p>	<pre>setfooter [MicroWorlds Lovers, Grade 4] setfooter []</pre>

<p><b>setheading</b> (seth)</p> <p><i>number</i></p>	<p>Sets the turtle's heading to the specified direction (in degrees). The degrees correspond to those of a compass: 0 degrees is due North, 90 is East, 180 is South, and 270 is West. <b>Right</b> and <b>left</b> turn a turtle a number of degrees from its current heading. <b>Seth</b> makes a turtle point to a specific direction, regardless of its previous heading.</p> <p>See <b>heading</b>, <b>right</b> and <b>left</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>seth 0 seth 90 rt 90 seth 90</pre>
<p><b>setinstruction</b></p> <p><i>word-to-run</i></p> <p><b>setinstruction</b></p> <p><i>instruction-list</i></p>	<p>Sets the instruction for the current turtle. This is equivalent to typing the instructions in the turtle's OnClick instruction field in its backpack. If the list includes the word <b>forever</b> or <b>launch</b>, the instruction's mode is set to Forever or Once, accordingly. If these words are not included, the mode is unchanged. If the turtle is running an instruction when <b>setinstruction</b> is used, the turtle will click off.</p> <p>See <b>set</b> and <b>get</b></p>	<p>Given that there is a turtle on the page:</p> <pre>to turnoff setsh "off setinstruction "on end  to turnon setsh "on setinstruction "off end</pre>
<p><b>setinstrument</b></p> <p><i>name-or-number</i></p>	<p>Sets the instrument for the next <b>note</b> command. There are 7 instrument names: piano, harpsichord, vibraphone, guitar, violin, clarinet, and kalimba. You can also use any number from 1 to 128. This setting is not saved with the project. If needed, put a <b>setinstrument</b> instruction in a <b>startup</b> procedure. See <b>Startup</b>.</p>	<pre>setinstrument "violin note 60 10</pre>
<p><b>setopacity</b></p> <p><i>number</i></p>	<p>Sets the opacity of the turtle and its pen. The input must be between 0 and 100 and represents a percentage.</p> <p>See <b>opacity</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd setpensize 30 setopacity 72 repeat 36 [fd 10 rt 10 setopacity opacity - 2]</pre>

<b>setpensize</b>  <i>number</i>	<p>Sets the turtle's pen size which determines the thickness of the lines it will draw. The pen size can also be set by picking a brush shape and the pencil in the Painting/Clipart palette and clicking on a turtle with the Pencil tool. (The pen size is the diameter of the brush.) The original pen size is 1. The maximum pen size is 30.</p> <p>See <b>pensize</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd setpensize 30 repeat 29 [fd 1 setpensize pensize - 1]</pre>
<b>setpos</b>  <i>[x y]</i>	<p>Stands for <b>set position</b>. Moves the turtle to the designated x y coordinates. The center point of the page is [0 0]. The maximum number for x and y is 9999.</p> <p>See <b>pos</b> and <b>Private and Public Color Detection</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>setpos [0 0] setpos [-50 50]</pre>
<b>setrotate</b>  <i>list-of-turtle-numbers-or-names</i>	<p>Sets an animation mode based on the turtle's heading. The range of possible headings (360 degrees) is divided by the number of shapes in the list and the turtle uses the appropriate shape. If there are 4 shapes in the list, the turtle uses the first shape for a heading of -45 to 44, the second shape for 45 to 134, and so on. This mode can also be set in the turtle's backpack, in the State tab.</p> <p>See <b>shape</b> and <b>setshape</b>, and <b>Animation - Changing Shapes Based on Heading</b> in the section <b>Fundamentals</b> in the Help System</p>	<p>Given that there is a turtle on the page and these shapes names and numbers are defined:</p> <pre>setrotate [north south east west] repeat 360 [rt 1] setrotate [1 2 3 4 5 6 7 8] repeat 360 [rt 1]</pre>

<b>setshape</b> <b>(setsh)</b>  <i>shape-name-or-number</i>  <b>setshape</b> <b>(setsh)</b>  <i>list-of-names-or-numbers</i>	<p>Gives a shape or a set of shapes to the turtle. <b>Setshape</b> also resets the animation mode to Setshape if it was set to Setrotate. The maximum number for <b>setshape</b> is 128. When a list of shape names or numbers is given as input, each <b>forward</b> and <b>back</b> command makes the turtle cycle through the list of shapes. The shape can also be set by selecting one or several shapes from the Painting/Clipart palette and clicking on a turtle.</p> <p>See <b>setrotate</b>, <b>shape</b>, and <b>Animation - Changing Shapes...</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>setsh 1 setsh "cat setsh [1 2 3] setsh [cat1 cat2 cat3] glide 50 0.1</pre>
<b>setsize</b>  <i>number</i>	<p>Sets the size of the turtle. The original size is 40 and the minimum and maximum sizes are 5 and 160, respectively. Turtle shapes look nice when they are multiples of 20. You can also change the size of the turtle with the magnifiers.</p> <p>See <b>size</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>setsize 15 repeat 12 [setsize size + 5 wait 5]</pre>
<b>setstyle</b>  <i>word-or-list</i>	<p>Sets the font style for the selected text in the current text box. If no text is selected, <b>setstyle</b> sets the cursor to use that style for typing. The input must be the name of a style (<b>regular</b>, <b>bold</b>, <b>italic</b>, <b>underline</b>). Multiple styles can be applied by inserting styles in a list. You can also set the text style by choosing Font from the Text menu.</p> <p>See <b>setfont</b>, <b>setfontsize</b>, and <b>settc</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom setstyle "italic setstyle [bold italic]</pre>
<b>settc</b>  <i>color-name-or-number</i>	<p>Stands for <b>set text color</b>. Sets the color for the selected text in the current text box. If no text is selected, <b>settc</b> sets the cursor to use that color for typing. The input can be the name of a color or a number. The original text color is black, or color number 9. You can also set the text color by choosing <b>Color</b> in the Text menu.</p> <p>See <b>setfont</b>, <b>setfontsize</b>, and <b>setstyle</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>settc "violet insert "w settc "15 insert "o settc "orange insert "w</pre>

<b>setx</b> <i>number</i>	Sets the x coordinate of the current turtle. The y coordinate remains unchanged.	Given that there is a turtle on the page:  setx 100 setx 0
<b>sety</b> <i>number</i>	Sets the y coordinate of the current turtle. The x coordinate remains unchanged.	Given that there is a turtle on the page:  sety 100 sety 0
<b>shape</b>	Reports the shape name or number, or the list of shape names or numbers of the current turtle.  See <b>setshape</b> .	Given that there is a turtle on the page:  repeat 4 [setsh shape + 1]
<b>show</b> <i>word-or-list</i>	Prints a word or a list in the Command Center. The outer level of brackets in a list are not shown.	Given that t1 exists on the page:  show "hello <b>hello</b> show [hello there] <b>hello there</b> show pos 0 0
<b>showtext</b>	Makes the current text box visible.  See <b>hidetext</b> .	Given that there is a text box containing some text on the page:  hidetext wait 20 showtext
<b>sin</b> <i>number</i>	Stands for sine. Reports the sine of <i>number</i> degrees.  See <b>cos</b> and <b>tan</b> .	Given that a turtle exists on the page. The result is just an example.  show sin 45 <b>0.707106781187</b> show sin heading <b>-0.866025403784</b>
<b>size</b>	Reports the size of the current turtle.  See <b>setsize</b> and <b>Changing the Turtle's Size</b> in the section <b>Fundamentals</b> in the Help System.	Given that there is a turtle on the page:  setsize 15 repeat 12 [setsize size + 5 wait 5]



<p><b>snaparea</b></p> <p><i>shape-number</i></p> <p><i>[x y]</i></p> <p><i>[xsize ysize]</i></p>	<p>Copies the graphics in the defined area and pastes it in a shape spot in the public Shapes Tab. <b>[x y]</b> is the top left starting point, and <b>[xsize ysize]</b> determines the size of the rectangle that is copied into the shape. To find out the values you need for the position and size, drag a region on the page and look for the x, y, xsize and ysize values in the Status bar.</p> <p>See <b>snapshape</b> and <b>Copying Background Graphics into a Shape</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Draw a complex background and look at the public Shapes Tab for the effect of this command:</p> <pre>snaparea 1 [0 0] [50 60]</pre>
<p><b>snapshape</b></p>	<p>Copies the page graphics (not the wallpaper) behind the turtle into the current shape of the turtle. You cannot use <b>snapshape</b> if the turtle has its original turtle shape. The turtle must be completely visible on the page. <b>Snapshape</b> resets the turtle's size to 40 (its original size) even if the size has been changed.</p> <p>If you want to copy the shape into an empty spot in the public Shapes Tab, set the turtle to this shape before using <b>snapshape</b>.</p> <p>See <b>snaparea</b> and <b>Copying Background Graphics into a Shape</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page, NOT wearing the default turtle shape. Draw a complex background and look at the public Shapes Tab for the effect of this command:</p> <pre>pd rt 11 fd 9999 setsh 5 snapshape cg pu fd 50</pre>
<p><b>snapshot</b></p>	<p>Takes a snapshot of the background. The next time a <b>restore</b> command is used, the background will be restored to what it was at the moment the snapshot was taken. Note that there is only one snapshot per project, and the snapshot is not saved with the project.</p> <p>See <b>restore</b>, <b>freezebg</b> and <b>unfreezebg</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd lt 11 fd 9999 snapshot rt 22 fd 9999 restore</pre>

<b>sol</b>	<p>Stands for <b>s</b>tart of line. Brings the cursor (insertion point) in the current text box to the beginning of the current logical line. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>eol</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>sol delete insert "I</pre>
<b>space</b>	<p>Reports the amount of free MicroWorlds EX space in bytes.</p> <p>See <b>recycle</b>.</p>	<pre>show space recycle show space</pre>
<b>sqrt</b> <i>number</i>	<p>Stands for <b>s</b>quare root. Reports the square root of its input.</p>	<pre>show sqrt 100 10</pre>
<b>st</b>	<p>Stands for <b>s</b>how turtle. Shows the current turtle.</p> <p>See <b>ht</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>t1, repeat 5 [ht wait 5 st]</pre>
<b>stamp</b>	<p>Stamps a copy of the turtle on the background. The pen does not have to be down to stamp. You can also use the Stamper tool in the Toolbar to stamp the turtle's shape.</p> <p>See <b>Stamping a Turtle</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 10 [stamp fd 40]</pre>
<b>stamptext</b> <i>text-box-name</i>	<p>Leaves a copy of the designated transparent text box on the background. This is equivalent to using the Stamper tool on a transparent text box. See <b>transparent</b>.</p>	<p>Given that text1 exists on the page and it contains some text:</p> <pre>transparent "text1 stamptext "text1</pre> <p>Drag the text box away.</p>
<b>startup</b>	<p>Startup is a special name for a public procedure. If your project has a procedure named startup, this startup procedure is executed automatically when you open the project. Use this feature to setup your project: display the right page and start the presentation mode for example.</p>	<p>Given that there is such a page in the project. Save the project with a different page showing, close and reopen the project.</p> <pre>to startup intropage presentationmode end</pre>

<b>stop</b>	<p>Stops the procedure that is running. <b>Stop</b> can only be used in a procedure.</p> <p>See <b>stopall</b>, <b>stopme</b>, and <b>output</b>.</p>	<p>Given that there is text box on the page:</p> <pre>to countup :number   if :number &gt; 100     [stop]   print :number   countup :number + 5 end</pre>
<b>stopall</b>	<p>Stops all running procedures and processes, including turtles and buttons. <b>Stopall</b> can be used as a button, from the Command Center, or in a stop rule in a procedure. This primitive sets the Stop All button in the Toolbar. All the processes are stopped, and the OnTick processes are paused. The OnTick processes resume immediately when a new process is launched.</p> <p>See <b>stop</b> and <b>stopme</b>.</p>	<p>Given that there are several turtles running towards a red area:</p> <pre>to race   everyone [if 15 =     colorunder     [announce se who "wins     stopall]] end</pre>
<b>stopme</b>	<p>Stops the process in which this command was run. <b>Stopme</b> cannot be used to stop a turtle inside a color instruction. In this case, use <b>clickoff</b> instead.</p> <p>See <b>stop</b> and <b>stopall</b>.</p>	<p>Given that these turtles exist on the page and that they are close to one another:</p> <pre>t1, forever [fd 1 if   (distance "t2) &gt; 150   [stopme]]</pre>
<b>sum</b> <i>number1</i> <i>number2</i>  <b>(sum</b> <i>number1</i> <i>number2</i> <i>number3...)</i>	<p>Reports the sum of its inputs. If more than two inputs are used, <b>sum</b> and its inputs must be enclosed in parentheses.</p> <p>See <b>+</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>show sum 10 10 20 show sum xcor ycor 212</pre>

**T**

Primitive <i>Input(s)</i>	Description	Examples
<b>talkto (tto)</b> <i>turtle-name</i>  <b>talkto (tto)</b> <i>text-box-name</i>  <b>talkto (tto)</b> <i>list-of-names</i>	<p>Makes the turtle(s) or text box current. This command has the same effect as typing the name of a turtle or text box followed by a comma. This is the only way of making many turtles do the same thing at the same time.</p> <p>See <b>ask</b>, and <b>Processes and Who</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that there are three turtles on the page:</p> <pre>tto [t1 t2 t3] repeat 7 [fd 10 wait 1]</pre>
<b>tan</b> <i>number</i>	<p>Stands for <b>tangent</b>. Reports the tangent of its input.</p> <p>See <b>sin</b> and <b>cos</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>show tan heading -1.73205080757</pre>
<b>tc</b>	<p>Stands for <b>text color</b>. Reports the number of the text color used in the current text box at the insertion point. If text that has more than one color is selected, <b>tc</b> reports the color of the last character that has been selected.</p> <p>See <b>settc</b>.</p>	<p>Given that text1 exists on the page.</p> <pre>to rainbow settc "violet pr tc settc " red pr tc settc " orange pr tc end</pre>

<p><b>tell</b></p> <p><i>turtle-name</i></p> <p><i>word-or-list</i></p>	<p>Sends a message for the turtle or turtles named as input to hear. <b>Tell</b> triggers the instruction found in the OnMessage field in the Rules Tab of the specified turtle's or turtles' backpack(s).</p> <p>See <b>broadcast</b>, <b>message</b> and <b>sender</b>. See also <b>Rules Tab - OnMessage</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>In the Onclick field of t1's backpack:</p> <pre>tell "t2 "here</pre> <p>In the OnMessage field of t2's backpack:</p> <pre>towards sender</pre> <p>Click on t1.</p>
<p><b>textcount</b></p> <p><i>text-box-name</i></p>	<p>Reports the number of lines in the named text box. Lines are delimited by carriage returns and line feed sequences (they are logical lines, not physical lines). Empty lines are taken into account. The number that <b>textcount</b> reports is the maximum number that can be used with <b>textitem</b>.</p> <p>See <b>textpick</b>, <b>count</b>, and <b>Programming With Texts</b> in the <b>Programing</b> section in the Help System.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show textcount "text1 33</pre>
<p><b>textitem</b></p> <p><i>line-number</i></p> <p><i>text-box-name</i></p>	<p>Reports the designated "line" of the named text box. Lines are delimited by carriage returns and line feed sequences (they are logical lines, not physical lines). Empty lines are taken into account. The first input must be between 1 and the number of lines in the text box. The line reported by <b>textitem</b> is a long word (a sequence of characters including spaces). Use <b>parse</b> to turn a long word into a list.</p> <p>See <b>textpick</b>, <b>textcount</b>, and <b>Programming With Texts</b> in the <b>Programing</b> section in the Help System.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show textitem 2 "text1 This is the second line</pre>

<b>textlist</b>	<p>Reports a list containing the names of text files in the current directory. Only text type files (extensions txt or rtf) are shown.</p> <p>See <b>files</b>, <b>projectlist</b>, and <b>pictlist</b>.</p>	<p>The result is just an example.</p> <pre>show textlist mytext.txt listoffriends.rtf</pre>
<b>textpick</b> <i>text-box-name</i>	<p>Reports the text of a randomly-chosen line from the named text box. Lines are delimited by carriage returns and line feed sequences (they are logical lines, not physical lines). <b>Textpick</b> can pick empty lines. The line reported by <b>textpick</b> is a long word (a character string including spaces). Use <b>parse</b> to turn a long word into a list.</p> <p>See <b>textitem</b>, <b>textcount</b>, and <b>Programming With Texts</b> in the <b>Programing</b> section in the Help System.</p>	<p>Given that text1 and text2 exists on the page and text1 contains some text. One of the lines of text1 is printed in text2.</p> <pre>settext2 textpick "text1"</pre>
<b>textwho</b>	<p>Reports the name of the current text box. You can change the current text box using the text box name followed by a comma or with <b>talkto</b>.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show textwho text1 if textwho = "text1 [ct]</pre>
<b>thing</b> <i>name</i>	<p>Reports the value of the named variable. Corresponds to the use of a colon ( : ) preceding a word.</p> <p>See <b>make</b> and <b>name</b>. See also <b>Global Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Define this procedure. Run the other instructions in the Command Center.</p> <pre>to translate :word if name? :word [op thing :word] op "Unknown end  make "table "mesa make "house "casa show translate "table mesa</pre>

<p><b>timer</b></p>	<p>Reports a number representing the time elapsed since MicroWorlds EX started, or since the last <b>reset</b> command was run. The number is in tenths of a second.</p> <p>See <b>reset</b>.</p>	<p>Define this procedure and run the other instructions in the Command Center.</p> <pre> to reflex   resett   setnum1 1 + random 10   setnum2 1 + random 10   question   (se [What is] num1     "times num2 [?])   ifelse answer = num1 *     num2     [announce se timer       / 10 "sec]     [announce [Wrong       answer]]   end    createprojectvar "num1   createprojectvar "num2   reflex </pre>
<p><b>top</b></p>	<p>Moves the cursor (insertion point) to the beginning of the text in the current text box. Try using this command in a button so that you can see the effect on the cursor. See <b>bottom</b>.</p>	<p>Given that there is a text box on the page:</p> <pre> pr "there! top print "Hello </pre>
<p><b>touchedturtle</b> (tturtle)</p>	<p>Reports the name of the turtle that is touched by the one running this command. <b>Touchedturtle</b> can only be used inside the OnTouching field of a turtle's backpack.</p> <p>See <b>touching?</b> and <b>Rules Tab - OnTouching</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>In the Onclick field of t1's backpack:</p> <pre> towards "t2 glide 9999 1 </pre> <p>In the OnTouching field of t1's backpack:</p> <pre> if touchedturtle = "t2 [lt 90] </pre> <p>Click on t1.</p>

<p><b>touching?</b></p> <p><i>turtle-name</i></p> <p><i>turtle-name</i></p>	<p>Reports <b>true</b> if the two turtles are touching each other; reports <b>false</b> if they are not touching.</p> <p><b>Touching?</b> always reports <b>false</b> if one of the turtles is hidden.</p> <p>See <b>touchedturtle</b> and <b>Rules Tab - OnTouching</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that t1 and t2 exist on the page:</p> <pre>to meet t1, forever [wander] waituntil [touching? " t1 " t2] cancel [wander] end  to wander seth random 360 glide 100 1 end</pre>
<p><b>towards</b></p> <p><i>turtle-name</i></p>	<p>Sets the heading of the current turtle to aim towards the turtle whose name is given as input.</p> <p>See <b>distance</b> and <b>seth</b>.</p>	<p>Given that t1 and t2 exist on the page:</p> <pre>to go t1, forever [fd 1 check] end  to check if 30 &lt; distance "t2 [towards "t2] end</pre>
<p><b>transparent</b></p> <p><i>text-box-name</i></p>	<p>Makes the designated text box transparent. This is equivalent to selecting Transparent in the text box's right-click menu, on the page or in the Project Tab. An empty text box cannot be made transparent.</p> <p>See <b>opaque</b>.</p>	<p>Given that text1 exists on the page and it contains some text:</p> <pre>transparent " text1 opaque " text1</pre>



<p><b>turtlesown</b></p> <p><i>word</i></p>	<p>Assigns a state variable to all the turtles in the current project. This variable can then be set to a specific value for each turtle. This command creates a command-reporter pair of primitives that can be used in the current project only: the word <b>set</b> followed by the name of the variable (for example, <b>turtlesown "speed</b> creates a <b>setspeed</b> command) and the name of the variable (in this example, <b>speed</b>).</p> <p>The State Tab of the turtle's backpack displays the <b>turtlesown</b> variables. The value of the variable can also be set by double-clicking on the variable name in the turtle's backpack.</p> <p>After a <b>turtlesown</b> instruction, the value of the variable is empty until it is set.</p> <p>See <b>giveturtle</b> and <b>State Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Given that these turtles exist on the page:</p> <pre>turtlesown "start t1, setstart [-50 -51] t2, setstart [-30 -51] everyone [setpos start]</pre>
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## U

Primitive	Description	Examples
<i>Input(s)</i>		
<b>unfreeze</b> <i>object-name</i>  <b>unfreeze</b> <i>list-of-names</i>	<p>Unfreezes the button, text box, turtle, slider, or any object on a page, so they can be changed using the mouse. A page name can also be used as input to unfreeze all the elements contained on that page. This command corresponds to the <b>Unfreeze</b> menu item accessible by right-clicking on object icons (previously frozen) in the Project Tab area. The eye tool can be used to move frozen objects.</p> <p>See <b>freeze</b>, <b>freezebg</b> and <b>unfreezebg</b>. See also <b>Freezing Objects</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that these objects exist on the page:</p> <pre>unfreeze "t1 unfreeze [button1 text1] unfreeze " page1</pre>
<b>unfreeze</b> <i>page-name</i>	<p>See <b>freeze</b>, <b>freezebg</b> and <b>unfreezebg</b>. See also <b>Freezing Objects</b> in the section <b>Fundamentals</b> in the Help System.</p>	
<b>unfreezebg</b>	<p>Stands for <b>unfreeze background</b>. Unfreezes the background that was frozen by <b>freezebg</b>. When you click on the page icon in the Project Tab, a message appears in the Status Bar if the background is frozen.</p> <p>See <b>freezebg</b>, <b>snapshot</b> and <b>restore</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>to go setc "orange pd rt 11 fd 9999 wait 15 freezebg setc "yellow rt 11 fd 9999 wait 15 cg wait 15 unfreezebg cg end</pre>
<b>unselect</b>	<p>Undoes the highlighting effect of <b>select</b> or <b>search</b>.</p>	<p>Given that there is a text box on the page and it contains some text:</p> <pre>top select bottom setfont " Comic Sans MS  unselect</pre>

## W

Primitive <i>Input(s)</i>	Description	Examples
<b>wait</b> <i>duration</i>	Causes a pause in the execution of a program or instruction. <b>Duration</b> is measured in 10ths of a second.	Given that there is a turtle on the page:  <code>forever [fd 1 wait 1]</code>
<b>waituntil</b> <i>true-or-false-list-to-run</i>	Tells MicroWorlds EX to wait until <b>true-or-false-instruction-list</b> is true before running another instruction. The input must be an instruction list that reports either <b>true</b> or <b>false</b> when it is run.  See <b>done?</b> .	Given that these turtles exist on the page:  <code>waituntil [touching? "t1 "t2]</code>
<b>wallpaper</b>	Displays the Wallpaper page. See <b>The Wallpaper</b> in the section <b>Fundamentals</b> in the Help System.	Given that page1 exists in the project:  <code>wallpaper pd fd 100 page1 cg</code>
<b>when</b> <i>true-or-false-instruction-list</i> <i>instruction-list</i>	Starts an independent parallel process that repeatedly tests whether the first instruction list reports <b>true</b> or <b>false</b> . If it reports true, the second instruction list is run. To stop a <b>when</b> instruction, use <b>cancel</b> (only on the true-or-false-instruction-list), Stop All, or press <b>Ctrl+Break</b> .  Note: we strongly recommend using the Turtle events in backpack (When this - Do that) instead of this command.  See <b>Stopping Processes</b> in the section <b>More Techniques</b> in the Help System.	Given that there is a turtle on the page:  <code>when [ycor &gt; 0] [bk 40]</code>
<b>who</b>	Reports the name of the current turtle.  See <b>ask</b> , <b>listen</b> , <b>talkto</b> , and <b>Processes and Who</b> in the section <b>More Techniques</b> in the Help System.	Given that there are many turtles on the page:  <code>everyone [fd 20 * butfirst who]</code>

<b>word</b>	Combines its inputs into one word and reports the word. <b>Word</b> can be used to make a list into a word. <b>Word</b> can take one input or more than 2 inputs when <b>word</b> and the inputs are enclosed in parentheses.	Given that there is a text box on the page:
<i>word-or-list1</i>		to oneup :word
<i>word-or-list2</i>		print sentence [You may be] :word print sentence [But I am] word butlast :word "ier end
<b>(word</b>	See <b>list</b> and <b>word?</b> .	Try:
<i>word-or-list1</i>		oneup "happy
<i>word-or-list2</i>		
<i>word-or-list3...)</i>		
<b>word?</b>	Reports <b>true</b> if the input is a word.	show word? "hello <b>true</b>
<i>word-or-list</i>	See <b>number?</b> and <b>list?</b>	

## X

Primitive <i>Input(s)</i>	Description	Examples
<b>xcor</b>	<p>Stands for <b>x</b> coordinate. Reports the x coordinate of the current turtle.</p> <p>See <b>pos</b>, <b>setx</b> and <b>ycor</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 360 [setx xcor + 5 sety 100 * sin xcor]</pre>

## Y

Primitive <i>Input(s)</i>	Description	Examples
<b>ycor</b>	<p>Stands for <b>y</b> coordinate. Reports the y coordinate of the current turtle.</p> <p>See <b>pos</b>, <b>sety</b>, and <b>xcor</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 360 [sety ycor + 5 setx 100 * sin ycor]</pre>

## **Conceptual Listing**

## Turtles and Graphics

Primitive	Description	Examples
<b>Input(s)</b>		
<b>ask</b>  <i>turtle-or-text-name</i>  <i>instruction-list</i>	Temporarily tells each element in the first input to run the instruction list. The first input can be the name(s) of one or many turtles or text boxes. Ask does not change the current turtle or text box. The apostrophe can be used to ask a turtle to report something. See also <b>talkto</b> .	<p>Given that t1 and t2 have OnClick instructions, and text1 exists on the page:</p> <pre>ask [t1 t2] [clickon] ask "text1 [cleartext] t2, setpos ask "t1 [pos] t2, setpos t1's "pos</pre>
<b>ask</b>  <i>list-of-names</i>  <i>instruction-list</i>		
<b>back (bk)</b>  <i>number</i>	Moves the turtle backwards. See also <b>forward</b> .	<p>Given that there is a turtle on the page:</p> <pre>pd repeat 4 [bk 50 lt 90]</pre>
<b>bg</b>	Stands for <b>background</b> . Reports a number representing the color of the background. The background color is 0 (white) when MicroWorlds EX starts up	<pre>repeat 140 [setbg bg + 1] setbg 0</pre>
<b>broadcast</b>  <i>word-or-list</i>	<p>Sends a message for all the turtles on the current page to hear. Broadcast triggers the instruction found in the <b>OnMessage</b> field in the Rules Tab of the turtle's backpack. If there is no instruction in a turtle's OnMessage field, the broadcasted message is ignored.</p> <p>See <b>tell</b>, <b>message</b> and <b>sender</b>. See also <b>Rules Tab - OnMessage</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>In the Onclick field of t1's backpack:</p> <pre>broadcast "here</pre> <p>In the OnMessage field of t2's backpack:</p> <pre>towards sender</pre> <p>Click on t1</p>
<b>cg</b>	Stands for <b>clear graphics</b> . Clears the graphics on the page and returns the current turtle to its home position, pointing up. See also <b>clean</b> .	<p>Given that there is a turtle on the page:</p> <pre>pd fd 50 cg</pre>



<b>clean</b>	<p>Clears the graphics without changing any turtle's position.</p> <p>See also <b>cg</b>.</p>	<p>Given that there is a turtle on the page.</p> <pre>pd fd 50 clean</pre>
<b>clickon</b>	<p>Simulates a mouse click on the current turtle, turning it on if it was off. This command has an effect only if the turtle has an OnClick instruction.</p> <p>See <b>clickon</b>, <b>listen</b>, and <b>Rules Tab - Clickon</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there are turtles with OnClick instructions on the page:</p> <pre>t1, clickon wait 30 clickoff everyone [clickon]</pre>
<b>clickoff</b>	<p>Simulates a mouse click on the current turtle, turning it off if it was on. This command has an effect only if the turtle is running its OnClick instruction.</p> <p>See <b>clickoff</b>, <b>listen</b>, and <b>Rules Tab - Clickon</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there are turtles with OnClick instructions on the page:</p> <pre>t1, clickon wait 30 clickoff everyone [clickoff]</pre>
<b>clone</b> <i>turtle-name</i>	<p>Creates a copy of the named turtle. The new turtle takes the first available name on the current page (t followed by a number). Except for the name and position, the new turtle is a perfect clone of the original (backpack contents).</p>	<p>Given that t1 exists on the page:</p> <pre>clone "t1</pre>
<b>color</b>	<p>Reports the turtle's color as a number. <b>Color</b> reports a number, even if a name was used as input for <b>setc</b>.</p> <p>See also <b>setc</b>.</p>	<p>Given that there's a turtle on the page:</p> <pre>show color 9 repeat 140 [setc color + 1]</pre>
<b>colorunder</b>	<p>Reports the color under the center point of the current turtle as a number. <b>Colorunder</b> reports the color number if the color's on the background, on a drawing or stamped shape on the current page or on the Wallpaper.</p> <p>See also <b>Private and Public Color Detection</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there's a turtle on the page. Place a turtle over a red drawing.</p> <pre>if colorunder = 15 [seth 1 fd 15]</pre>

<p><b>distance</b></p> <p><i>turtle-name</i></p>	<p>Reports the distance between the current turtle and the turtle indicated.</p> <p>See <b>towards</b>.</p>	<p>Given that there are two turtles on the page, t1 and t2. Select <b>Animate</b> in each turtle's right-click menu..</p> <pre>t1, forever [if 50 &lt; distance "t2 [towards "t2]]</pre> <p>Note:</p> <pre>if 50 &lt; distance "t2</pre> <p>is equivalent to:</p> <pre>if (distance "t2) &gt; 50</pre> <p>The parentheses are required in the second case because otherwise, MicroWorlds compares t2 and 50 instead of comparing (distance "t2) and 50.</p>
<p><b>exportturtle</b></p> <p><i>pathname</i></p>	<p>Saves the current turtle on disk. The turtle file contains the turtle and all the contents of its backpack. If the pathname is just a word, the turtle is saved in the current directory with the extension mwa. An exported turtle can be imported or dragged into a different project, or emailed.</p> <p>See <b>importturtle</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>exporttturtle "model</pre>
<p><b>everyone</b></p> <p><i>instruction-list</i></p>	<p>Makes all the turtles on the current page run the instruction, one after the other.</p> <p>See <b>ask</b> and <b>talkto</b>.</p>	<p>Given that there are a few turtles on the page:</p> <pre>everyone [glide -80 2]</pre>
<p><b>fill</b></p>	<p>Fills a closed area with the turtle's pen color. If the area is not perfectly closed, the paint "leaks" onto the entire page. <b>Fill</b> works regardless of the turtle's pen state (up or down).</p> <p>See <b>setc</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd repeat 4 [fd 50 rt 90] rt 45 pu fd 5 setc "yellow fill</pre>
<p><b>forward (fd)</b></p> <p><i>number</i></p>	<p>Moves the turtle forward.</p> <p>See <b>back</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd repeat 4 [fd 50 rt 90 wait 2]</pre>

<b>freezebg</b>	<p>Stands for <b>freeze background</b>. Freezes the background graphics in their current state. You can still draw over the background and erase the new drawings, but the original background (before freezing) won't be erased.</p> <p>See <b>unfreezebg</b>, <b>snapshot</b> and <b>restore</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd fd 50 freezebg repeat 45 [fd 40 rt 3] cg</pre>
<b>giveturtle</b> <i>word</i>	<p>Assigns a state variable to the current turtle and creates a command-reporter pair of primitives that can be used in the current project only: the word <b>set</b> followed by the name of the variable (for example, <b>giveturtle "speed</b> creates a <b>setspeed</b> command) and the name of the variable (in this example, the reporter <b>speed</b>).</p> <p>The State Tab of the turtle's backpack displays the <b>giveturtle</b> variables. The value of the variable can also be set by double-clicking on the variable name in the turtle's backpack.</p> <p>After a <b>giveturtle</b> instruction, the value of the variable is empty until it is set.</p> <p>See <b>turtlesown</b> and <b>State Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Given that there is a turtle on the page, you can give it a "personal" home position:</p> <pre>giveturtle "homepos sethomepos [50 50] fd 50 setpos homepos home setpos homepos</pre>
<b>glide</b> <i>distance</i> <i>speed</i>	<p>Makes the turtle glide over the <b>distance</b> indicated. The second input sets the turtle's gliding speed. The maximum distance and maximum speed for <b>glide</b> are 9999 and 99, respectively.</p>	<p>Given that there is a turtle on the page:</p> <pre>glide 50 1 glide 100 0.1</pre>
<b>heading</b>	<p>Reports the current turtle's heading in degrees. The degrees correspond to those of a compass; 0 degrees is due North, 90 is East, 180 is South, and 270 is West.</p> <p>See <b>seth</b>, <b>right</b>, <b>left</b>.</p>	<p>Given that there is a turtle on the page. Your result will differ:</p> <pre>seth random 360 show heading 33</pre>
<b>home</b>	<p>Moves the turtle to the center of the page coordinates [0 0], pointing up.</p> <p>See <b>setpos</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>home pd repeat 50 [home setpos se random 100 random 100]</pre>

<b>ht</b>	<p>Stands for hide turtle. Hides the current turtle.</p> <p>See <b>st</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>glide 60 2 ht fd 50 st glide 60 2</pre>
<b>importturtle</b> <i>pathname</i>	<p>Imports the turtle file on the current page. The turtle file contains all the characteristics of the turtle (the contents of its backpack). A turtle file is created by the command <b>exportturtle</b>, or by the options <b>Export</b> and <b>Mail it</b> in the turtle's right-click menu.</p> <p>See <b>exportturtle</b> and <b>Exporting, Importing and Mailing Turtles</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that such a file exists in the current directory:</p> <pre>importturtle "model"</pre>
<b>inback</b>	<p>Puts the current turtle behind all the other turtles on the page. A newly created turtle is always in front of the others.</p> <p>See <b>infront</b>.</p>	<p>Given that t1 is facing t2, less than 100 steps away:</p> <pre>t1, setc "red infront glide 100 0.1 inback glide -100 0.1</pre>
<b>infront</b>	<p>Brings the current turtle in front of all the other turtles on the page. A newly created turtle is always in front of the others.</p> <p>See <b>inback</b>.</p>	<p>Given that t1 is facing t2, less than 100 steps away:</p> <pre>t1, setc "red infront glide 100 0.1 inback glide -100 0.1</pre>
<b>left (lt)</b> <i>number</i>	<p>Turns the turtle to the left. The maximum value for <b>number</b> is 9999.</p> <p>See <b>right</b> and <b>seth</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>seth 0 lt 90 seth 90 repeat 5 [fd 50 lt 144]</pre>
<b>listen</b>	<p>Sets the global "turtle who" (the turtle obeying instructions from the Command Center). This command allows you to change the global "turtle who" within a process that has been launched (for example, from a button).</p> <p>See <b>Process</b> and <b>Who</b> in the section <b>More Techniques</b> in the Help System. See also <b>talkto</b> and <b>ask</b>.</p>	<p>Given that t1 and t2 exist on the page and that there is a button having t1, listen in its OnClick instruction.</p> <pre>t2, clickon fd 30 Click on the button fd 30</pre>

<p><b>loadshape</b></p> <p><i>pathname</i></p> <p><i>shape-number</i></p>	<p>Loads the specified picture file into the specified shape spot in the Public Shapes Tab. The picture file name will become the name of the shape if there is no other shape with that name in that Tab.</p> <p>The file must be the name of a picture file that MicroWorlds supports in the current directory or a full or relative path. The shape-number can be any number from 1 to 128.</p> <p>See <b>saveshape</b> and <b>Importing and Exporting Pictures</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page and that these files exists:</p> <pre>loadshape "volcano 20</pre> <p>Loads the volcano picture into shape 20. The shape will be named volcano.</p> <pre>loadshape "c:\picts\volcano.gif 20</pre>
<p><b>message</b></p>	<p>Reports the contents of the last message send by <b>broadcast</b> or <b>tell</b>. <b>Message</b> must be used in the OnMessage field of a turtle's backpack.</p> <p>See <b>tell</b>, <b>broadcast</b> and <b>sender</b>. See also <b>Rules Tab - OnMessage</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>When you click on t1, t2 goes at position [100 100]:</p> <p>In the Onclick field of t1's backpack:</p> <pre>broadcast [100 100]</pre> <p>In the OnMessage field of t2's backpack:</p> <pre>setpos message</pre> <p>Click on t1</p>
<p><b>newturtle</b></p> <p><i>word</i></p>	<p>Creates a new turtle with the name indicated. The new turtle appears at the position [0 0] and is hidden. Use <b>st</b> to make it visible. <b>Newturtle</b> makes the turtle that is created the current turtle.</p>	<p>Given that there is not a turtle with that name on the page:</p> <pre>to create newturtle "newborn setx 30 st end</pre>
<p><b>opacity</b></p>	<p>Returns the opacity of the current turtle's pen and shape. The value is a percentage.</p> <p>See <b>setopacity</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd setpensize 30 setopacity 72 repeat 36 [fd 10 rt 10 setopacity opacity - 2]</pre>
<p><b>pd</b></p>	<p>Stands for <b>pen down</b>. Puts down the pen of the current turtle. The turtle then leaves a trace when it moves, but not when it is dragged.</p> <p>See <b>pu</b> and <b>pe</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 6 [pu fd 10 pd fd 10]</pre>

<b>pe</b>	<p>Stands for <b>pen erase</b>. Puts down the eraser of the current turtle. The turtle erases the graphics when it moves.</p> <p>See <b>pd</b> and <b>pu</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>setc "red fill pe  repeat 5 [fd 50 rt 144]</pre>
<b>pensize</b>	<p>Reports a number representing the pen size of the current turtle. The original pen size is 1. The maximum is 30.</p> <p>See <b>setpensize</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd setpensize 30 repeat 29 [fd 1 setpensize pensize - 1]</pre>
<b>pos</b>	<p>Stands for <b>position</b>. Reports the position of the turtle as a list of two numbers (coordinates). [0 0] is the position at the center of the page.</p> <p>See <b>setpos</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>show pos t1, setpos t2's "pos</pre>
<b>pu</b>	<p>Stands for <b>pen up</b>. Lifts up the pen of the current turtle. The turtle will not leave a trace when it moves.</p> <p>See <b>pd</b> and <b>pe</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 6 [pu fd 10 pd fd 10]</pre>
<b>restore</b>	<p>Restores the background to the way it was the last time a snapshot command was issued. The turtle's position does not change. Everything else remains intact. See <b>snapshot</b>, <b>freezebg</b> and <b>unfreezebg</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd lt 11 fd 9999 snapshot rt 22 fd 9999 restore</pre>
<b>right (rt)</b>  <i>number</i>	<p>Turns the turtle to the right. The maximum value for <b>number</b> is 9999.</p> <p>See <b>left</b> and <b>seth</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>seth 0 seth 90 rt 90 repeat 5 [fd 50 rt 144]</pre>
<b>saveshape</b>  <i>pathname</i>  <i>number</i>	<p>Saves the specified shape (located in the public Shapes Tab) as a picture file. Use a simple file name to save the file in the current directory or full or relative pathname to save the file in a different directory.</p> <p>If the file name has no extension, the resulting file is a bmp image. Add a jpg, gif or png extension to the file name to get a specific file format.</p>	<p>Given that there is a shape in spot 1 of the public Shapes Tab:</p> <pre>saveshape "moon 1 saveshape "moon.jpg 1 saveshape "c:\graph\moon.jpg 1</pre>

<p><b>sender</b></p>	<p>Reports the name of the turtle who has made the last <b>broadcast</b> or <b>tell</b>. <b>Sender</b> must be used in the OnMessage field of a turtle's backpack.</p> <p>See <b>tell</b>, <b>message</b> and <b>broadcast</b>. See also <b>Rules Tab - OnMessage</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>In the Onclick field of t1's backpack:</p> <pre>broadcast "here</pre> <p>In the OnMessage field of t2's backpack:</p> <pre>towards sender</pre> <p>Click on t1.</p>
<p><b>setbg</b></p> <p><i>color-name-or-number</i></p>	<p>Stands for <b>set background</b>. Sets the background color for the page. The input can be the name of a color or a number. Use <b>setbg 0</b> or <b>setbg "white</b> to reset the original background. You can't use <b>setbg</b> on a frozen background.</p> <p>See <b>bg</b>, <b>fill</b>, <b>freezebg</b> and <b>unfreezebg</b>.</p>	<pre>setbg 29 repeat 10 [setbg bg - 1] setbg "red setbg 0</pre>
<p><b>setcolor (setc)</b></p> <p><i>color-name-or-number</i></p>	<p>Sets the color of the turtle's pen. If the turtle has its original shape, it changes color to show the pen color. The input can be the name of a color or a number. The original pen color is black, or color number 9. The input can be an integer, a fraction or a one place decimal.</p> <p>See <b>color</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>setc 45 fill setc "orange fill</pre>
<p><b>setheading (seth)</b></p> <p><i>number</i></p>	<p>Sets the turtle's heading to the specified direction (in degrees). The degrees correspond to those of a compass: 0 degrees is due North, 90 is East, 180 is South, and 270 is West. <b>Right</b> and <b>left</b> turn a turtle a number of degrees from its current heading. <b>Seth</b> makes a turtle point to a specific direction, regardless of its previous heading.</p> <p>See <b>heading</b>, <b>right</b> and <b>left</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>seth 0 seth 90 rt 90 seth 90</pre>
<p><b>setopacity</b></p> <p><i>number</i></p>	<p>Sets the opacity of the turtle and its pen. The input must be between 0 and 100 and represents a percentage.</p> <p>See <b>opacity</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd setpensize 30 setopacity 72 repeat 36 [fd 10 rt 10 setopacity opacity - 2]</pre>

<b>setpensize</b>  <i>number</i>	<p>Sets the turtle's pen size which determines the thickness of the lines it will draw. The pen size can also be set by picking a brush shape and the pencil in the Painting/Clipart palette and clicking on a turtle with the Pencil tool. (The pen size is the diameter of the brush.) The original pen size is 1. The maximum pen size is 30.</p> <p>See <b>pensize</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd setpensize 30 repeat 29 [fd 1 setpensize pensize - 1]</pre>
<b>setpos</b>  <i>[x y]</i>	<p>Stands for <b>set position</b>. Moves the turtle to the designated x y coordinates. The center point of the page is [0 0]. The maximum number for x and y is 9999.</p> <p>See <b>pos</b> and <b>Private and Public Color Detection</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>setpos [0 0] setpos [-50 50]</pre>
<b>setrotate</b>  <i>list-of-turtle-numbers-or-names</i>	<p>Sets an animation mode based on the turtle's heading. The range of possible headings (360 degrees) is divided by the number of shapes in the list and the turtle uses the appropriate shape. If there are 4 shapes in the list, the turtle uses the first shape for a heading of -45 to 44, the second shape for 45 to 134, and so on. This mode can also be set in the turtle's backpack, in the State tab.</p> <p>See <b>shape</b> and <b>setshape</b>, and <b>Animation - Changing Shapes Based on Heading</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page and these shapes names and numbers are defined:</p> <pre>setrotate [north south east west] repeat 360 [rt 1] setrotate [1 2 3 4 5 6 7 8] repeat 360 [rt 1]</pre>
<b>setshape (setsh)</b>  <i>shape-name-or-number</i>  <b>setshape (setsh)</b>  <i>list-of-names-or-numbers</i>	<p>Gives a shape or a set of shapes to the turtle. <b>Setshape</b> also resets the animation mode to Setshape if it was set to Setrotate. The maximum number for <b>setshape</b> is 128. When a list of shape names or numbers is given as input, each <b>forward</b> and <b>back</b> command makes the turtle cycle through the list of shapes. The shape can also be set by selecting one or several shapes from the Painting/Clipart palette and clicking on a turtle.</p> <p>See <b>setrotate</b>, <b>shape</b>, and <b>Animation - Changing Shapes...</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>setsh 1 setsh "cat setsh [1 2 3] setsh [cat1 cat2 cat3] glide 50 0.1</pre>



<b>setsize</b>  <i>number</i>	<p>Sets the size of the turtle. The original size is 40 and the minimum and maximum sizes are 5 and 160, respectively. Turtle shapes look nice when they are multiples of 20. You can also change the size of the turtle with the magnifiers.</p> <p>See <b>size</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>setsize 15 repeat 12 [setsize size + 5 wait 5]</pre>
<b>setx</b>  <i>number</i>	<p>Sets the x coordinate of the current turtle. The y coordinate remains unchanged.</p>	<p>Given that there is a turtle on the page:</p> <pre>setx 100 setx 0</pre>
<b>sety</b>  <i>number</i>	<p>Sets the y coordinate of the current turtle. The x coordinate remains unchanged.</p>	<p>Given that there is a turtle on the page:</p> <pre>sety 100 sety 0</pre>
<b>shape</b>	<p>Reports the shape name or number, or the list of shape names or numbers of the current turtle.</p> <p>See <b>setshape</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 4 [setsh shape + 1]</pre>
<b>size</b>	<p>Reports the size of the current turtle.</p> <p>See <b>setsize</b> and <b>Changing the Turtle's Size</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>setsize 15 repeat 12 [setsize size + 5 wait 5]</pre>
<b>snaparea</b>  <i>shape-number</i>  <i>[x y]</i>  <i>[xsize ysize]</i>	<p>Copies the graphics in the defined area (page and wallpaper) and pastes it in a shape spot in the public Shapes Tab. <b>[x y]</b> is the top left starting point, and <b>[xsize ysize]</b> determines the size of the rectangle that is copied into the shape. To find out the values you need for the position and size, drag a region on the page and look for the x, y, xsize and ysize values in the Status bar.</p> <p>See <b>snapshape</b> and <b>Copying Background Graphics into a Shape</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Draw a complex background and look at the public Shapes Tab for the effect of this command:</p> <pre>snaparea 1 [0 0] [50 60]</pre>

<b>snapshot</b>	<p>Copies the page graphics (not the wallpaper) behind the turtle into the current shape of the turtle. You cannot use <b>snapshot</b> if the turtle has its original turtle shape. The turtle must be completely visible on the page.</p> <p><b>Snapshot</b> resets the turtle's size to 40 (its original size) even if the size has been changed.</p> <p>If you want to copy the shape into an empty spot in the public Shapes Tab, set the turtle to this shape before using <b>snapshot</b>.</p> <p>See <b>snapshot</b> and <b>Copied Background Graphics into a Shape</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page, NOT wearing the default turtle shape. Draw a complex background and look at the public Shapes Tab for the effect of this command:</p> <pre>pd rt 11 fd 9999 setsh 5 snapshot cg pu fd 50</pre>
<b>st</b>	<p>Stands for show turtle. Shows the current turtle.</p> <p>See <b>ht</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>t1, repeat 5 [ht wait 5 st]</pre>
<b>stamp</b>	<p>Stamps a copy of the turtle on the background. The pen does not have to be down to stamp. You can also use the Stamper tool in the Toolbar to stamp the turtle's shape.</p> <p>See <b>Stamping a Turtle</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 10 [stamp fd 40]</pre>

<p><b>talkto (tto)</b></p> <p><i>turtle-name</i></p>	<p>Makes the turtle(s) or text box current. This command has the same effect as typing the name of a turtle or text box followed by a comma. This is the only way of making many turtles do the same thing at the same time.</p>	<p>Given that there are three turtles on the page:</p> <pre>tto [t1 t2 t3] repeat 7 [fd 10 wait 1]</pre>
<p><b>talkto (tto)</b></p> <p><i>text-box-name</i></p>	<p>See <b>ask</b>, and <b>Processes and Who</b> in the section <b>More Techniques</b> in the Help System.</p>	
<p><b>talkto (tto)</b></p> <p><i>list-of-names</i></p>		
<p><b>tell</b></p> <p><i>turtle-name</i></p> <p><i>word-or-list</i></p>	<p>Sends a message for the turtle or turtles named as input to hear. <b>Tell</b> triggers the instruction found in the OnMessage field in the Rules Tab of the specified turtle's or turtles' backpack(s).</p> <p>See <b>broadcast</b>, <b>message</b> and <b>sender</b>. See also <b>Rules Tab - OnMessage</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>In the Onclick field of t1's backpack:</p> <pre>tell "t2 "here</pre> <p>In the OnMessage field of t2's backpack:</p> <pre>towards sender</pre> <p>Click on t1.</p>
<p><b>tell</b></p> <p><i>list-of-turtle-names</i></p> <p><i>word-or-list</i></p>		
<p><b>touchedturtle (tturtle)</b></p>	<p>Reports the name of the turtle that is touched by the one running this command. <b>Touchedturtle</b> can only be used inside the OnTouching field of a turtle's backpack.</p> <p>See <b>touching?</b> and <b>Rules Tab - OnTouching</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>In the Onclick field of t1's backpack:</p> <pre>towards "t2 glide 9999 1</pre> <p>In the OnTouching field of t1's backpack:</p> <pre>if touchedturtle = "t2 [lt 90]</pre> <p>Click on t1.</p>

<p><b>touching?</b></p> <p><i>turtle-name</i></p> <p><i>turtle-name</i></p>	<p>Reports <b>true</b> if the two turtles are touching each other; reports <b>false</b> if they are not touching. <b>Touching?</b> always reports <b>false</b> if one of the turtles is hidden.</p> <p>See <b>touchedturtle</b> and <b>Rules Tab - OnTouching</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that t1 and t2 exist on the page:</p> <pre>to meet t1, forever [wander] waituntil [touching? "t1 "t2] cancel [wander] end  to wander seth random 360 glide 100 1 end</pre>
<p><b>towards</b></p> <p><i>turtle-name</i></p>	<p>Sets the heading of the current turtle to aim towards the turtle whose name is given as input.</p> <p>See <b>distance</b> and <b>seth</b>.</p>	<p>Given that t1 and t2 exist on the page:</p> <pre>to go t1, forever [fd 1 check] end  to check if 30 &lt; distance "t2 [towards "t2] end</pre>
<p><b>turtlesown</b></p> <p><i>word</i></p>	<p>Assigns a state variable to all the turtles in the current project. This variable can then be set to a specific value for each turtle. This command creates a command-reporter pair of primitives that can be used in the current project only: the word <b>set</b> followed by the name of the variable (for example, <b>turtlesown "speed</b> creates a <b>setspeed</b> command) and the name of the variable (in this example, <b>speed</b>).</p> <p>The State Tab of the turtle's backpack displays the <b>turtlesown</b> variables. The value of the variable can also be set by double-clicking on the variable name in the turtle's backpack.</p> <p>After a <b>turtlesown</b> instruction, the value of the variable is empty until it is set.</p> <p>See <b>giveturtle</b> and <b>State Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Given that t1 and t2 exist on the page.</p> <pre>turtlesown "start t1, setstart [-50 -51] t2, setstart [-30 -51] everyone [setpos start]</pre>

<b>unfreezebg</b>	<p>Stands for <b>unfreeze background</b>. Unfreezes the background that was frozen by <b>freezebg</b>. When you click on the page icon in the Project Tab, a message appears in the Status Bar if the background is frozen.</p> <p>See <b>freezebg</b>, <b>snapshot</b> and <b>restore</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>to go setc "orange pd rt 11 fd 9999 wait 15 freezebg setc "yellow rt 11 fd 9999 wait 15 cg wait 15 unfreezebg cg end</pre>
<b>who</b>	<p>Reports the name of the current turtle.</p> <p>See <b>ask</b>, <b>listen</b>, <b>talkto</b>, and <b>Processes and Who</b> in the section <b>More Techniques</b>.</p>	<p>Given that there are many turtles on the page:</p> <pre>everyone [fd 20 * butfirst who]</pre>
<b>xcor</b>	<p>Stands for <b>x coordinate</b>. Reports the x coordinate of the current turtle.</p> <p>See <b>pos</b>, <b>setx</b> and <b>ycor</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 360 [setx xcor + 5 sety 100 * sin xcor]</pre>
<b>ycor</b>	<p>Stands for <b>y coordinate</b>. Reports the y coordinate of the current turtle.</p> <p>See <b>pos</b>, <b>sety</b>, and <b>xcor</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>repeat 360 [sety ycor + 5 setx 100 * sin ycor]</pre>
<b>Turtle name followed by a comma</b>	<p>A turtle name followed by a comma can be used as a command to make this turtle current. It is equivalent to a <b>talkto</b> command with that turtle's name as input.</p>	<p>Given that t1 and myturtle exist on the page:</p> <pre>t1, fd 50 myturtle, bk 50</pre>
<b>Turtle name followed by 's</b>	<p>A turtle name followed by an apostrophe and an s ( 's) is the equivalent of an <b>ask</b> instruction with that turtle's name as input.</p>	<p>Given that t1 and t2 exist on the page:</p> <pre>show ask "t1 [pos] [0 0] show t1's "pos [0 0] t2, setpos t1's "pos</pre>

## Objects

Primitive	Description	Examples
<b>Input(s)</b>		
<b>ask</b>  <i>turtle-or-text-name</i>  <i>instruction-list</i>	<p>Temporarily tells each element in the first input to run the instruction list. The first input can be the name(s) of one or many turtles or text boxes. Ask does not change the current turtle or text box. The apostrophe can be used to ask a turtle to report something.</p>	<p>Given that t1, t2 and the text1 exist on the page:</p> <pre>ask [t1 t2] [clickon] ask "text1 [cleartext] t2, setpos ask "t1 [pos] t2, setpos t1's "pos</pre>
<b>ask</b>  <i>list-of-names</i>  <i>instruction-list</i>	<p>See also <b>talkto</b>.</p>	
<b>freeze</b>  <i>object-name</i>  <b>freeze</b>  <i>list-of-names</i>  <b>freeze</b>  <i>page-name</i>	<p>Freezes objects so that they cannot be moved, resized, or removed with the mouse. The input is the name of an object on the page, or a list containing many object names. A page name can also be used as input to freeze all the elements contained in that page.</p> <p>See <b>unfreeze</b>, <b>freezebg</b> and <b>unfreezebg</b>. See also <b>Freezing Objects</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that these objects exist on the page:</p> <pre>freeze "t1 freeze [button1 text1] freeze "page1</pre>
<b>get</b>  <i>object</i>  <i>property</i>	<p>Reports a property of an object in the current project. The first input is the name of an object, a color, a page or the special word Project. The second input is a property name.</p> <p>Following is a list of the properties each object can have:</p>	<p>Given that these objects exist on the page:</p> <pre>show get "t1 "onclick show get "t1 "on? show get "button1 "onclick show get "text1 "size show get "t1 "own show get "t1 "red show get "question "pos</pre>

**Project:**

presentationmode?  
showtoolbar? showcc?  
showtabs? showstatusbar?  
showtechniques? dialogs

**Page:**

transition turtles texts buttons  
sliders melodies sounds music  
videos checkboxes  
roundbuttonsets listboxes  
dropdowns colordemons  
hyperlinks

**Turtle:**

visible? frozen? menu notes  
procedures onclick ontick  
ontouching onmessage onevent  
own on? *colorname*

**Button:**

visible? pos size onclick on?  
frozen? visible?

**Slider:**

visible? pos showname? limits  
value frozen? vertical? visible?

**Text:**

text visible? transparent?  
showname? frozen? pos size  
visible? onreadline, singleline?

**Public color detection:**

onturtle mouseclick

**Hyperlinks:**

visible? pos showname?  
frozen? link

**Media Objects:**

visible? pos showname?  
frozen? on?

	<p><b>Additional for Melodies:</b></p> <p>instrument volume tempo</p> <p><b>Additional for Video:</b></p> <p>size</p> <p><b>Question and Announce:</b></p> <p>pos</p> <p><b>Choosers (round buttons sets, etc.):</b></p> <p>pos value visible? showname? frozen? labels (except for check boxes)</p> <p>See <b>get</b>.</p>	
<p><b>getlabel</b></p> <p><i>object-name</i></p>	<p>Reports the label (the text) of the current selection in the designated chooser (round button set, list box or drop down menu). The other option for reporting the current selection is to use the object name. <b>show listbox1</b> reports the position of the current selection in the list of selections (reports 0 if nothing is selected) and <b>show getlabel "listbox1"</b> reports the label corresponding to that selection, as a long word.</p> <p>See <b>Choosers and Dialog Boxes</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that listbox1 exist on the page or in a dialog box:</p> <pre>show getlabel "listbox1 if (getlabel "radio1) = "Yes [fd 50] setcolor getlabel "listbox1</pre>
<p><b>newbutton</b></p> <p><i>name</i></p> <p><i>[x y]</i></p> <p><i>instruction-list</i></p>	<p>Creates a new button with the name and instruction specified, at the position <i>[x y]</i> indicated. The name cannot be more than 32 characters (including spaces). The position <i>[x y]</i> is the top, left corner of the button. The button is created in the Once mode. It is sized to fit the instruction-list. At the time of creation, the label of the button is the same as its instruction. Use set to change the label.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newbutton "mybutton [5 60] [note 65 5]</pre> <p>The button shows its instruction as its label. Do this to set the label:</p> <pre>set "mybutton "label "GO!</pre>



<b>newcheckbox</b>  <i>name</i>  <i>[x y]</i>  <i>label</i>	<p>Creates a new check box at the position indicated, with the label provided. The name of the check box reports its current state: <b>true</b> if it is checked, <b>false</b> otherwise.</p>	<p>Given that this object doesn't already exist on the page and doodle is in the turtle's OnClick field in Forever mode:</p> <pre>newcheckbox "pen [0 0] "Draw to doodle ifelse pen [pd] [pu] fd 50 rt random 360 end</pre>
<b>newdropdown</b>  <i>name</i>  <i>[x y]</i>  <i>list-of-labels</i>	<p>Creates a new drop down menu at the position indicated and containing the list of labels provided. The name of the drop down menu reports the position of the current selection in the list of selections. The other option for reporting the current selection is to use <b>getlabel</b>. <b>Show dropdown1</b> reports the position of the current selection (reports 0 if nothing is selected) and <b>show getlabel</b> "dropdown1 reports the label (text) corresponding to that selection as a word.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newdropdown "colselect [0 0] [Red Green Bleu] if colselect = 0 [announce [Choose one]]</pre>
<b>newlistbox</b>  <i>name</i>  <i>[x y]</i>  <i>list-of-labels</i>	<p>Creates a new list box at the position indicated and containing the list of labels provided. The name of the list box reports the position of the current selection in the list of selections. The other option for reporting the current selection is to use <b>getlabel</b>. <b>Show listbox1</b> reports the position of the current selection (reports 0 if nothing is selected) and <b>show getlabel</b> "listbox1 reports the label (text) corresponding to that selection.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newlistbox "colselect [0 0] [Red Green Bleu] if colselect = 0 [announce [Choose one]]</pre>

<b>newroundbuttonset</b>  <i>name</i>  <i>[x y]</i>  <i>list-of-labels</i>	<p>Creates a new round button set at the position indicated and containing the list of labels provided. The name of the round button set reports the position of the current selection in the list of selections. The other option for reporting the current selection is to use <b>getlabel</b>. <b>Show roundbuttonset1</b> reports the position of the current selection (reports 0 if nothing is selected) and <b>show getlabel "roundbuttonset1"</b> reports the text of the selection.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newroundbuttonset "colselect [0 0] [Red Green Bleu] if colselect = 0 [announce [Choose one]]</pre>
<b>newslider</b>  <i>name</i>  <i>[x y]</i>  <i>[min max current]</i>	<p>Creates a new slider using the specified name and at the position indicated. The position [x y] is the top, left corner of the slider. The last input is a list of three numbers representing the minimum, maximum, and current value of the slider. The minimum and maximum values are -9999 and 9999 respectively.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newslider "step [100 100] [0 8 3] show step 3 setstep 5 setstep [10 20 15]</pre>
<b>newtext</b>  <i>name</i>  <i>[x y]</i>  <i>[xsize ysize]</i>	<p>Creates a new text box using the name and size specified and at the position [x y] indicated. The position is the top, left corner of the box. The maximum [xsize ysize] is the size of the page in the project.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newtext "mynotes [0 0] [50 100] pr "Notes</pre>
<b>newturtle</b>  <i>name</i>	<p>Creates a new turtle with the name indicated. The new turtle appears at the position [0 0] and is hidden. Use <b>st</b> to make it visible. <b>Newturtle</b> makes the turtle that is created the current turtle.</p>	<p>Given that this object doesn't already exist on the page:</p> <pre>newturtle "newborn setx 30 st</pre>

<b>remove</b>  <i>object-name</i>  <b>remove</b>  <i>page-name</i>  <b>remove</b>  <i>variable-name</i>	<p>Deletes an object, page, project variable created with <b>createprojectvar</b> or a turtle variable created with <b>turtlesown</b> or <b>giveturtle</b>. If the named object is not on the current page, MicroWorlds looks for it on the other pages in the project. If the input to <b>remove</b> is <b>procedures</b>, the Public Procedures Tab is cleared. If you remove the only page of a project, a new page called Page1 is created. You can also remove objects with the <b>Remove</b> option in the object's right-click menu on the page or in the Project Tab.</p>	<p>Given that t1 exists on the page:</p> <pre>remove "t1</pre>
<b>rename</b>  <i>object-name</i>  <i>new-object-name</i>	<p>Sets a new name for the object or the page.</p>	<p>Given that these objects exist:</p> <pre>rename "t1 "myfriend rename "text1 "mynotes rename "page1 "intro</pre>
<b>resetdialog</b>  <i>name-of-dialog-box</i>	<p>Resets all the choosers in the named dialog box to their default values. You can set the default value or round button sets, list boxes and drop down menus in their own dialog boxes. Without a <b>resetdialog</b>, the values previously set when you last used the dialog box are maintained when the dialog box is reopened.</p> <p>See <b>Dialog Boxes</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that dialog1 exists:</p> <pre>dialog1</pre> <p>Make some changes to the choosers. Click on Cancel.</p> <pre>dialog1</pre> <p>The selections you made earlier are still present in the dialog box. Click on OK.</p> <pre>resetdialog "dialog1 dialog1</pre> <p>The values are reset.</p>
<b>resetvideo</b>  <i>name-of-video</i>	<p>Resets the video to the beginning.</p>	<p>Given that this object exists on the page:</p> <pre>resetvideo "video1</pre>

<p><b>set</b></p> <p><i>object</i></p> <p><i>property</i></p> <p><i>value</i></p>	<p>Sets a property for an object to the specified value. The first input is the name of an object. The second input is a property name and the last one is the value.</p> <p><b>Project:</b></p> <p>presentationmode? showtoolbar? showcc? showtabs? showstatusbar? showtechniques?</p> <p><b>Page:</b></p> <p>transition</p> <p><b>Turtle:</b></p> <p>visible? frozen? menu notes procedures onclick ontick ontouching onmessage onevent own on? <i>colorname</i></p> <p><b>Button:</b></p> <p>visible? pos size onclick on? frozen? visible?</p> <p><b>Slider:</b></p> <p>visible? pos showname? limits value frozen? vertical? visible?</p> <p><b>Text:</b></p> <p>text visible? transparent? showname? frozen? pos size visible? singleline?</p> <p><b>Public color detection:</b></p> <p>mouseclick, onturtle</p> <p><b>Hyperlinks:</b></p> <p>visible? pos showname? frozen? on? link</p>	<p>Given that these objects exist on the page:</p> <pre> set "text1 "visible? "false set "t1 "onclick [once [seth random 360 fd 50]] set "t1 "red [once [rt 180]] set "slider1 "showname? "true set "brown "mouseclick [silly-sound] set "blue "onturtle [once [announce [You win!]]] set "announce "pos [0 0] set "page1 "transition 2 </pre>
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	<p><b>Media Objects:</b></p> <p>visible? pos showname? frozen? on?</p> <p><b>Additional for Video:</b></p> <p>size</p> <p><b>Question and Announce:</b></p> <p>pos</p> <p><b>Choosers (round buttons sets, etc.):</b></p> <p>pos value visible? showname? frozen? labels (except for checkboxes)</p> <p>See set.</p>	
<p><b>talkto (tto)</b></p> <p><i>turtle-name</i></p>	<p>Makes the turtle(s) or text box current. This command has the same effect as typing the name of a turtle or text box followed by a comma. This is the only way of making many turtles do the same thing at the same time.</p>	<p>Given that t1, t2 and t3 exist on the page:</p> <pre>tto [t1 t2 t3] repeat 7 [fd 10 wait 1]</pre>
<p><b>talkto (tto)</b></p> <p><i>text-box-name</i></p>	<p>See ask, and <b>Processes and Who</b> in the section <b>More Techniques</b> in the Help System.</p>	
<p><b>talkto (tto)</b></p> <p><i>list-of-names</i></p>		

<b>unfreeze</b>	Unfreezes the button, text box, turtle, slider, or any object on a page, so they can be changed using the mouse. A page name can also be used as input to unfreeze all the elements contained on that page. This command corresponds to the <b>Unfreeze</b> menu item accessible by right-clicking on object icons (previously frozen) in the Project Tab area. The eye tool can be used to move frozen objects. See <b>freeze</b> , <b>freezebg</b> and <b>unfreezebg</b> .	Given that these objects exist on the page:
<i>object-name</i>		<code>unfreeze "t1</code> <code>unfreeze [button1</code> <code>text1]</code> <code>unfreze "page1</code>
<b>unfreeze</b>		
<i>list-of-names</i>		
<b>unfreeze</b>		
<i>page-name</i>	See also <b>Freezing Objects</b> in the section <b>Fundamentals</b> in the Help System.	

## Text Boxes and Text Editing

Primitive	Description	Examples
<b>Input(s)</b>		
<b>ask</b>  <i>turtle-or-text-name</i>  <i>instruction-list</i>	<p>Temporarily tells each element in the first input to run the instruction list. The first input can be the name(s) of one or many turtles or text boxes. Ask does not change the current turtle or text box. The apostrophe can be used to ask a turtle to report something.</p> <p>See <b>talkto</b>.</p>	<p>Given that text1 exists on the page:</p> <pre>ask "text1 [cleartext]</pre>
<b>ask</b>  <i>list-of-names</i>  <i>instruction-list</i>		
<b>bottom</b>	<p>Puts the cursor (insertion point), in the current text box, at the end of the text. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>top</b>, <b>sol</b>, <b>eol</b>, and <b>eot</b>?</p>	<p>Given that there is a text box on the page:</p> <pre>pr "hello top pr "say bottom pr "there</pre>
<b>cb</b>	<p>Stands for <b>cursor back</b>. Moves the cursor (insertion point) in the current text box to the previous character. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>cf</b>, <b>cd</b>, and <b>cu</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>bottom repeat 5 [cb insert "x cb]</pre>
<b>cd</b>	<p>Stands for <b>cursor down</b>. Moves the cursor (insertion point) in the current text box to the next physical line. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>cu</b>, <b>cf</b>, and <b>cb</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top repeat 5 [cd insert "x ]</pre>
<b>cf</b>	<p>Stands for <b>cursor forward</b>. Moves the cursor (insertion point) in the current text box to the next character. Try using this command in a button so that you can see the effect on the cursor. See <b>cb</b>, <b>cd</b>, and <b>cu</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top repeat 5 [cf insert "x ]</pre>

<b>cleartext (ct)</b>	Clears the text in the current text box.	Given that there is a text box on the page:  repeat 5 [pr "line] cleartext
<b>clipboard</b>	Reports the contents of the text clipboard. The clipboard contains the last text that has been cut or copied using the <b>cut</b> or <b>copy</b> command, or the equivalent Edit menu items or Toolbar buttons. The <b>Clear</b> menu item and the Delete/Backspace keys do not affect the clipboard.  See also <b>select</b> and <b>paste</b> .	Given that there is a text box containing some text on the page:  top select bottom cut repeat 2 [pr clipboard]
<b>copy</b>	Puts a copy of the selected text in the clipboard. It unselects the current selection.  See <b>cut</b> , <b>paste</b> and <b>select</b> .	Given that there is a text box containing some text on the page:  top select bottom copy paste wait 20 ct
<b>cu</b>	Stands for <b>cursor up</b> . Moves the cursor (insertion point) in the current text box to the previous physical line. Try using this command in a button so that you can see the effect on the cursor.  See <b>cd</b> , <b>cb</b> , and <b>cf</b> .	Given that there is a text box containing some text on the page:  bottom repeat 5 [cu insert "x ]
<b>cut</b>	Deletes the text selection in the current text box and puts a copy in the clipboard.  See <b>select</b> , <b>copy</b> and <b>paste</b> .	Given that there is a text box containing some text on the page:  top select bottom cut wait 20 paste
<b>delete</b>	Deletes the character to the right of the cursor (insertion point) in the current text box.	Given that there is a text box on the page:  ct pr "unfair top delete delete



<b>eol</b>	<p>Stands for end of line. Moves the cursor (insertion point) in the current text box to the end of the current logical line. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>sol</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>top eol insert "!!!</pre>
<b>eot?</b>	<p>Stands for end of text. Reports <b>true</b> if the cursor (insertion point) in the current text box is at the end of the text. <b>Eot?</b> is generally used to stop a procedure that processes information in a text box using cursor (insertion point) commands like <b>cd</b>, <b>eol</b>, etc.</p> <p>See <b>bottom</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>to addhyphens top doall end to doall sol insert "- eol if eot? [stop] cd doall end</pre>
<b>exporttext</b>  <i>pathname</i>  <i>text-name</i>	<p>Exports the text found in the designated text box, the Command Center or a public Procedures Tab to the file named indicated, in a text file format.</p> <p>For the <b>pathname</b>, use a simple file name to save the file in the current directory or full or relative pathname to save the file in a different directory. If the file name has no extension, the resulting file is a txt (plain text) file. Add a rtf extension to the file name to get a Rich Text Format file.</p> <p>The second input, <b>text-name</b>, must be a text box name or the special word cc (to export the text in the Command Center) or procedures (to export the text in the public Procedures Tab).</p> <p>This command is equivalent to the Export Text item in the File menu.</p> <p>See a <b>loadtext</b> and <b>importtext</b>. See also <b>Exporting Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that text1 exists on the page.</p> <pre>exporttext "story.rtf "text1 exporttext "C:\mydir\cmds "cc exporttext "procs "procedures</pre>

<b>fontsize</b>	<p>Reports the font size used at the insertion point in the current text box. If text that has more than one font size is selected, <b>fontsize</b> reports the size of the text that was selected last.</p> <p>See <b>setfontsize</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>pr "hello setfontsize fontsize + 10 pr "there</pre>
<b>found?</b>	<p>Reports true if the last <b>search</b> instruction was successful.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>to replaceall :this :bythat search :this if not found? [stop] insert :bythat replaceall :this :bythat end</pre>
<b>hidetext</b>	<p>Hides the current text box. You cannot type in a hidden text box, but primitives such as <b>print</b>, <b>insert</b>, and <b>cleartext</b> still work. This command is equivalent to the <b>Hide</b> function in the text box's right-click menu on the page and in the Project Tab. Text boxes can also be made invisible and visible through their dialog boxes. Use the eye tool to see all hidden text boxes, as well as open their dialog boxes.</p> <p>See <b>showtext</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>hidetext wait 20 showtext</pre>

<b>importtext</b>  <i>pathname</i>  <i>text-name</i>	<p>Imports the text from the named file into the text box, Procedures Tab, or Command Center.</p> <p>For the <b>pathname</b>, use a simple file name to import a file from the current directory or full or relative pathname to import a file in a different directory.</p> <p>The input for <b>text-name</b> must be the name of a text box or the special words <b>cc</b> (Command Center) or <b>procedures</b> (public Procedures Tab).</p> <p>This command is equivalent to the <b>Import Text</b> item in the File menu.</p> <p>See <b>exporttext</b>, <b>loadtext</b> and <b>Importing Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that text1 exists on the page and that such files exist:</p> <pre>importtext "story.rtf "text1 importtext "C:\mydir\cmds "cc importtext "brain "procedures</pre>
<b>insert</b>  <i>word-or-list</i>	<p>Inserts the input at the cursor position, in the current text box. The text is NOT followed by a carriage return or a line feed.</p> <p>See <b>print</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>settc "violet insert "w settc "red insert "o settc "orange insert "w</pre>
<b>loadtext</b>  <i>pathname</i>	<p>Loads the text file in the current text box. For the <b>pathname</b>, use a simple file name to import a file from the current directory or full or relative pathname to import a file in a different directory.</p> <p>See <b>importtext</b> and <b>Importing Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a text box on the page and that such files exist:</p> <pre>loadtext "story loadtext "c:\projects\story</pre>
<b>newtext</b>  <i>name</i>  <i>[x y]</i>  <i>[xsize ysize]</i>	<p>Creates a new text box using the name and size specified at the position <i>[x y]</i> indicated. The position is the top, left corner of the box. The maximum <i>[xsize ysize]</i> is the size of the page in the project.</p>	<p>Given that this text box doesn't exist on the page:</p> <pre>newtext "mynotes [0 0] [50 100] pr "Notes</pre>
<b>opaque</b>  <i>text-box-name</i>	<p>Makes the designated text box opaque. This is equivalent to selecting <b>Opaque</b> in the text box's right-click menu, on the page or in the Project Tab. It is also equivalent to unchecking the box <b>Transparent</b> in the text box's dialog box. See <b>transparent</b>.</p>	<p>Given that text1 exists on the page and it contains some text:</p> <pre>transparent "text1 opaque "text1</pre>

<p><b>paste</b></p>	<p>Pastes a copy of the clipboard in the current text box. The clipboard contains the last text that has been cut or copied using the <b>cut</b> or <b>copy</b> command, or the equivalent Edit menu items and Toolbar buttons.</p> <p>See also <b>select</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom cut wait 5 paste paste</pre>
<p><b>print (pr)</b></p> <p><i>word-or-list</i></p>	<p>Prints a word or list in the current text box. The text is followed by a carriage return and line feed sequence.</p> <p>See <b>insert</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>bottom pr " print [The End]</pre>
<p><b>savetext</b></p> <p><i>pathname</i></p>	<p>Saves the text found in the current text box in a text file format.</p> <p>The input can be a file name with or without an extension (and the file will be saved in the current directory) or a full or relative path. This command is equivalent to the <b>Export Text</b> item in the File menu. To save the Procedures Tab or the content of the Command Center as a text file, see <b>exporttext</b>.</p> <p>See <b>loadtext</b> and <b>textlist</b>. See also <b>Exporting Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that this text box exists on the page:</p> <pre>savetext "story savetext "C:\proj\story savetext "story.rtf</pre>
<p><b>search</b></p> <p><i>word</i></p>	<p>Tells MicroWorlds EX to search and select (highlight) the word in the current text box. Nothing happens if the word is not found., except for the fact that <b>found?</b> is set to <b>false</b>. <b>Search</b> starts searching at the insertion point. Use <b>unselect</b> to undo the highlighting effect of search.</p> <p>See also <b>found?</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>to replaceall :this :bythat search :this if not found? [stop] insert :bythat replaceall :this :bythat end</pre>
<p><b>select</b></p>	<p>Tells MicroWorlds EX to start selecting text at the cursor position in the current text box. Any cursor motion (<b>top</b>, <b>bottom</b>, <b>cu</b>, <b>cd</b>, <b>cf</b>, and <b>cb</b>) will select text.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom</pre>

<b>selected</b>	<p>Reports as a word a copy of the characters in the block of selected text in the active text box. If no block of characters is selected, <b>selected</b> reports the empty word. Use <b>parse</b> to convert the block of characters into a list.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom make "selection selected show :selection</pre> <p>The content of the text box is reprinted in the Command Center.</p>
<b>setfont</b>  <i>word</i>	<p>Sets the font for the selected text in the current text box. If no text is selected, <b>setfont</b> sets the cursor to use that font for typing. The input must be the name of a font in your system. If the name of the font has spaces, for example, Times New Roman, you must enclose the whole name in vertical bars. You can also set the text font by choosing Font from the Text menu.</p> <p>See <b>settc</b>, <b>setfontsize</b>, and <b>setstyle</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom setfont "arial setfont " times new roman </pre>
<b>setfontsize</b>  <i>number</i>	<p>Sets the font size for the selected text in the current text box. If no text is selected, <b>setfontsize</b> sets the cursor to use that font size for typing. You can also set the text size by choosing Font from the Text menu. We recommend using "True Type Fonts" (those with the symbol in the font dialog box). True type fonts allow many font sizes.</p> <p>See <b>setfont</b>, <b>settc</b>, and <b>setstyle</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom setfontsize fontsize + 10</pre>
<b>setstyle</b>  <i>word-or-list</i>	<p>Sets the font style for the selected text in the current text box. If no text is selected, <b>setstyle</b> sets the cursor to use that style for typing. The input must be the name of a style (<b>regular</b>, <b>bold</b>, <b>italic</b>, <b>underline</b>). Multiple styles can be applied by inserting styles in a list. You can also set the text style by choosing Font from the Text menu.</p> <p>See <b>setfont</b>, <b>setfontsize</b>, and <b>settc</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>top select bottom setstyle "italic setstyle [bold italic]</pre>

<b>settc</b>  <i>color-name-or-number</i>	<p>Stands for <b>set</b> text color. Sets the color for the selected text in the current text box. If no text is selected, <b>settc</b> sets the cursor to use that color for typing. The input can be the name of a color or a number. The original text color is black, or color number 9. You can also set the text color by choosing <b>Color</b> in the Text menu.</p> <p>See <b>setfont</b>, <b>setfontsize</b>, and <b>setstyle</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>settc "violet insert "w settc "15 insert "o settc "orange insert "w</pre>
<b>show</b>  <i>word-or-list</i>	<p>Prints a word or a list in the Command Center. The outer level of brackets in a list are not shown.</p>	<p>Given that t1 exists on the page:</p> <pre>show "hello <b>hello</b> show [hello there] <b>hello there</b> show pos 0 0</pre>
<b>showtext</b>	<p>Makes the current text box visible.</p> <p>See <b>hidetext</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>hidetext wait 20 showtext</pre>
<b>sol</b>	<p>Stands for <b>start of line</b>. Brings the cursor (insertion point) in the current text box to the beginning of the current logical line. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>eol</b>.</p>	<p>Given that there is a text box containing some text on the page:</p> <pre>sol delete insert "I</pre>
<b>stamptext</b>  <i>text-box-name</i>	<p>Leaves a copy of the designated transparent text box on the background. This is equivalent to using the Stamper tool on a transparent text box.</p> <p>See <b>transparent</b>.</p>	<p>Given that text1 exists on the page and it contains some text:</p> <pre>transparent "text1 stamptext "text1</pre> <p>Drag the text box away.</p>

<b>talkto (tto)</b>  <i>turtle-name</i>	<p>Makes the turtle(s) or text box current. This command has the same effect as typing the name of a turtle or text box followed by a comma.</p> <p>See <b>ask</b>, and <b>Processes and Who</b> in the Help System.</p>	<p>Given that text1 exists on the page and it contains some text:</p> <pre>tto [text1] cleartext</pre>
<b>talkto (tto)</b>  <i>text-box-name</i>		
<b>talkto (tto)</b>  <i>list-of-names</i>		
<b>tc</b>	<p>Stands for text color. Reports the number of the text color used in the current text box at the insertion point. If text that has more than one color is selected, <b>tc</b> reports the color of the last character that has been selected. See <b>settc</b>.</p>	<p>Given that text1 exists on the page.</p> <pre>to rainbow settc "violet pr tc settc "red pr tc settc "orange pr tc end</pre>
<b>textcount</b>  <i>text-box-name</i>	<p>Reports the number of lines in the named text box. Lines are delimited by carriage returns and line feed sequences (they are logical lines, not physical lines). Empty lines are taken into account. The number that <b>textcount</b> reports is the maximum number that can be used with <b>textitem</b>.</p> <p>See <b>textpick</b>, <b>count</b>, and <b>Programming With Texts</b> in the <b>Programing</b> section in the Help System.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show textcount "text1 33</pre>
<b>textitem</b>  <i>line-number</i>  <i>text-box-name</i>	<p>Reports the designated "line" of the named text box. Lines are delimited by carriage returns and line feed sequences (they are logical lines, not physical lines). Empty lines are taken into account. The first input must be between 1 and the number of lines in the text box. The line reported by <b>textitem</b> is a long word (a sequence of characters including spaces). Use <b>parse</b> to turn a long word into a list.</p> <p>See <b>textpick</b>, <b>textcount</b>, and <b>Programming With Texts</b> in the <b>Programing</b> section in the Help System.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show textitem 2 "text1 This is the second line</pre>

<b>textlist</b>	<p>Reports a list containing the names of text files in the current directory. Only text type files (extensions txt or rtf) are shown.</p> <p>See <b>files</b>, <b>projectlist</b>, and <b>pictlist</b>.</p>	<p>The result is just an example.</p> <pre>show textlist</pre> <p><b>mytext.txt</b> <b>listoffriends.rtf</b></p>
<b>textpick</b> <i>text-box-name</i>	<p>Reports the text of a randomly-chosen line from the named text box. Lines are delimited by carriage returns and line feed sequences (they are logical lines, not physical lines). <b>Textpick</b> can pick empty lines. The line reported by <b>textpick</b> is a long word (a character string including spaces). Use <b>parse</b> to turn a long word into a list.</p> <p>See <b>textitem</b>, <b>textcount</b>, and <b>Programming With Texts</b> in the <b>Programming</b> section in the Help System.</p>	<p>Given that text1 and text2 exists on the page and text1 contains some text. One of the lines of text1 is printed in text2.</p> <pre>settext2 textpick "text1</pre>
<b>textwho</b>	<p>Reports the name of the current text box. You can change the current text box using the text box name followed by a comma or with <b>talkto</b>.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show textwho <b>text1</b> if textwho = "text1 [ct]</pre>
<b>top</b>	<p>Moves the cursor (insertion point) to the beginning of the text in the current text box. Try using this command in a button so that you can see the effect on the cursor.</p> <p>See <b>bottom</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>pr "there! top print "Hello</pre>
<b>transparent</b> <i>text-box-name</i>	<p>Makes the designated text box transparent. This is equivalent to selecting Transparent in the text box's right-click menu, on the page or in the Project Tab. An empty text box cannot be made transparent.</p> <p>See <b>opaque</b>.</p>	<p>Given that text1 exists on the page and it contains some text:</p> <pre>transparent "text1 opaque "text1</pre>
<b>unselect</b>	<p>Undoes the highlighting effect of <b>select</b> or <b>search</b>.</p>	<p>Given that there is a text box on the page and it contains some text:</p> <pre>top select bottom setfont " Comic Sans MS  unselect</pre>



<b>Text box name followed by a comma</b>	A text box name followed by a comma can be used as a command to make this text box current. It is equivalent to a <b>talkto</b> command with that page's name as input.	Given that these text boxes exist on the page:  <pre>text1, pr "hello mytext, pr "there</pre>
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## Words and Lists

Primitive <i>Input(s)</i>	Description	Examples
<b>ascii</b> <i>char</i>	<p>Stands for American Standard Code for Information Interchange. Reports the ASCII number which represents the character.</p> <p>See <b>char</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>to encoder top repeat count text1 [encode] end  to encode select cf cut insert char (ascii clipboard) + 3 end</pre>
<b>butfirst (bf)</b> <i>word-or-list</i>	<p>Reports all but the first component of a word or list.</p> <p>See <b>butlast</b>, <b>first</b>, and <b>last</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>to triangle :word if :word = " [stop] pr :word triangle butfirst :word end</pre>
<b>butlast (bl)</b> <i>word-or-list</i>	<p>Reports all but the last component of a word or list.</p> <p>See <b>butfirst</b>, <b>first</b>, and <b>last</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>to revprint :word if :word = " [pr " stop] insert last :word revprint butlast :word end</pre>

<b>char</b>  <i>number</i>	<p>Stands for <b>character</b>. Reports the character represented by the ASCII <b>number</b> given as input. The number must be between 32 and 255. An exception is <b>char</b> 9, the tab character.</p> <p>See <b>ascii</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>to decoder top repeat count text1 [decode] end</pre> <pre>to decode select cf cut insert char (ascii clipboard) - 3 end</pre>
<b>count</b>  <i>word-or-list</i>	<p>Reports the number of components in the word or the list.</p> <p>See <b>item</b> and <b>textcount</b>.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show count "hello 5 show count [hello there] 2 show count text1 42</pre>
<b>empty?</b>  <i>word-or-list</i>	<p>Reports <b>true</b> if the input is an empty word or empty list.</p>	<p>Given that text1 exists on the page and it contains some text:</p> <pre>show empty? " <b>true</b> show empty? [] <b>true</b> show empty? text1 <b>false</b></pre> <pre>to insist question [Your name please...] if empty? answer [insist] end</pre>
<b>equal?</b>  <i>word-or-list1</i>  <i>word-or-list2</i>	<p>Reports true if the two inputs are equal. The inputs may be words, numbers, or lists.</p> <p>See <b>identical?</b> and <b>=</b>.</p>	<pre>show equal? "A "a <b>true</b></pre>

<b>first</b>  <i>word-or-list</i>	<p>Reports the first component of the word or list.</p> <p>See <b>butfirst</b>, <b>butlast</b>, and <b>last</b>.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show first "hello <b>h</b> show first [Hello there] <b>Hello</b> show first text1 <b>T</b></pre>
<b>fput</b>  <i>word-or-list</i>  <i>list</i>	<p>Stands for first <b>put</b>. Reports the list created by adding the first input at the beginning of the second input. The second input has to be a list.</p> <p>See <b>lput</b>.</p>	<pre>show fput "a [e i o u y] <b>a e i o u y</b></pre>
<b>identical?</b>  <i>word-or-list1</i>  <i>word-or-list2</i>	<p>Reports <b>true</b> if both inputs are identical. A word and a list containing the same word are not identical. Corresponding characters of each input must match in terms of uppercase and lowercase letters. (Style, font, and text color are ignored.)</p> <p>See <b>equal?</b>.</p>	<pre>show identical? "a "a <b>true</b> show identical? "Hello "hello <b>false</b></pre>
<b>item</b>  <i>number</i>  <i>word-or-list</i>	<p>Reports the specified element of a word or a list. The first input must be between 1 and the number of elements in the word or the list.</p>	<p>Given that text1 exists on the page and it contains some text. The result is just an example.</p> <pre>show item 2 "hello <b>e</b> show item 2 [Hello there] <b>there</b> show item 2 text1 <b>h</b></pre>
<b>last</b>  <i>word-or-list</i>	<p>Reports the last component of the word or list.</p> <p>See <b>first</b> and <b>butlast</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>to revprint :word if :word = " [pr " stop] insert last :word revprint butlast :word end</pre>

<b>list</b> <i>word-or-list1</i> <i>word-or-list2</i>  <b>(list</b> <i>word-or-list1</i> <i>word-or-list2</i> <i>word-or-list3....)</i>	<p>Reports one list made by combining the inputs (words or lists). If more than two inputs are used (or only one input), <b>list</b> and its inputs must be enclosed in parentheses. <b>List</b> maintains the structure of its input elements.</p> <p>See <b>sentence</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>show list 2 3 2 3 show list "a [b] a [b] show (list "a "b "c "d) a b c d make "x 10 make "y 20 setpos list :x :y</pre>
<b>list?</b> <i>word-or-list</i>	<p>Reports true if the input is a list.</p> <p>See <b>word?</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>show list? pos true show list? heading false</pre>
<b>lput</b> <i>word-or-list</i>  <i>list</i>	<p>Stands for last <b>put</b>. Reports the list created by adding the first input at the end of the second.</p> <p>See <b>fput</b>.</p>	<pre>show lput "y [a e i o u] a e i o u y</pre>
<b>member?</b> <i>word-or-list1</i>  <i>word-or-list2</i>	<p>Reports <b>true</b> if the first input is a component of the second. Note that a list cannot be a component of a word.</p>	<p>Given that there is a text box on the page and it contains some text:</p> <pre>to quiz question [Washington is in...] ifelse member? answer [U.S.A. US USA U.S.  United States ] [announce [Congrats!]] [announce [Oops]] end</pre>
<b>number?</b> <i>word-or-list</i>	<p>Reports <b>true</b> if the input is a number.</p> <p>See <b>word?</b> and <b>list?</b>.</p>	<pre>to insist question [How old are you?] if not number? answer [insist] end</pre>

<p><b>parse</b></p> <p><i>word</i></p>	<p>Turns character strings into plain lists. Spaces and carriage returns, and linefeed sequences contained in the character string become separators in the list. <b>Parse</b> can be used to turn the long word (a sequence of characters including spaces) reported by text boxes into lists of words.</p>	<p>The result is just an example.</p> <pre>question [Type in a sentence] show answer <b>This is a sentence</b> show count answer 18 show count parse answer 4</pre>
<p><b>pick</b></p> <p><i>word-or-list</i></p>	<p>Reports an element chosen randomly from the <b>word</b> or the <b>list</b>. Picking from a word reports a character, picking from a list reports an element of the list (a word or a list).</p> <p>See <b>textpick</b>.</p>	<p>Given that these turtles exist on the page. The result is just an example.</p> <pre>show pick "hello e talkto pick [t1 t2 t3 t4] fd 30</pre>
<p><b>sentence (se)</b></p> <p><i>word-or-list1</i></p> <p><i>word-or-list2</i></p> <p><b>(sentence</b></p> <p><i>word-or-list1</i></p> <p><i>word-or-list2</i></p> <p><i>word-or-list3...)</i></p>	<p>Reports a list which is made up of its inputs (words or lists). <b>Sentence</b> can take more than 2 inputs when <b>sentence</b> and the inputs are enclosed in parentheses.</p> <p>See <b>list</b>.</p>	<p>Given that these turtles exist on the page:</p> <pre>show se "Hello "there <b>Hello there</b> to middle t2, setpos sentence ((t1's "xcor)+(t3's "xcor)) / 2 ((t1's "ycor)+(t3's "ycor)) / 2 end</pre>

<b>word</b> <i>word-or-list1</i> <i>word-or-list2</i>  <b>(word</b> <i>word-or-list1</i> <i>word-or-list2</i> <i>word-or-list3...)</i>	<p>Combines its inputs into one word and reports the word. <b>Word</b> can be used to make a list into a word. <b>Word</b> can take one input or more than 2 inputs when <b>word</b> and the inputs are enclosed in parentheses.</p> <p>See <b>list</b> and <b>word?</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>to oneup :word   print sentence [You   may be] :word   print sentence   [But I am]   word butlast :word   "ier end</pre> <p>Try:</p> <pre>oneup "happy</pre>
<b>word?</b> <i>word-or-list</i>	<p>Reports <b>true</b> if the input is a word.</p> <p>See <b>number?</b> and <b>list?</b></p>	<pre>show word? "hello true</pre>

## Screen Management

Primitive	Description	Examples
<b>Input(s)</b>		
<b>cc</b>	Stands for clear the Command Center. Clears the text in the Command Center.	repeat 5 [show "flash wait 5 cc]
<b>getpage</b> <i>page-name</i>	Displays the page. The input must be the name of a page in the current project. Typing the page name alone has the same effect.	Given that there are several pages in the project (click on the page before you start because readchar works when the page is the current "active" area):  to gotopagewhenkey :page let [a readchar] getpage :page end
<b>getproject</b> <i>pathname</i>	Gets the project indicated (the current project is not saved). The input must be the name of a project in the current directory or a full or relative path to access another directory.  <b>Getproject</b> can load projects with extensions mwx (MicroWorlds EX), mw2 (MicroWorlds Pro uncompressed) or mwz (MicroWorlds Pro compressed).  See <b>saveproject</b> .	Given that these files exist:  getproject "sunset getproject "  My Project



<b>merge</b>  <i>pathname</i>  <i>word-or-list-of-types</i>	<p>Imports pages, procedures, or shapes from another project into the current project. The first input must be the name of a project in the current folder or a full or relative path to access a different folder. This is the project you want to import from.</p> <p>The second input can be the name of a specific page, a list of page names, the word <b>procedures</b> (to import the procedures from the project Procedures Tab and project variables), <b>pages</b> (to import all the pages), or <b>shapes</b> (to replace all the shapes in the current project's Shapes Tab). Instead of using <b>merge</b>, we highly recommend using Import Turtle to import shapes and/or procedures included in a turtle's backpack. If there are names in the source project that are the same as those in the current project, the new names will be renamed with a number.</p>	<p>Given that these files exist:</p> <pre>merge "clocks "procedures</pre> <p>Imports the procedures and project variables.</p> <pre>merge "clocks "pages</pre> <p>Imports all the pages.</p> <pre>merge "clocks [page1 page3]</pre> <p>Imports individual pages.</p> <pre>merge "C:\projects\scene "shapes</pre> <p>Replaces all the public shapes in the current project.</p>
<b>namepage (np)</b>  <i>page-name</i>	<p>Names the page being displayed with the input. <b>Namepage</b> corresponds to the <b>Name Page</b> function in the Pages menu. Once the page is named, the <b>page-name</b> is a command that displays that page.</p>	<p>Given that this page doesn't already exist:</p> <pre>namepage "presentation</pre>
<b>newpage</b>	<p>Opens a new page called Page<i>x</i> (<i>x</i> is the next available number).</p>	<pre>newpage</pre>

<p><b>newprojectsize</b></p> <p>[xsize ysize]</p>	<p>Sets the page size on the computer screen for new projects. The input is a list of two numbers: the width and the height of the page in turtle steps. Before using <b>newprojectsize</b>, there must be an empty project on the screen. The page size of a project is saved with the project. The minimum size is 40 by 40 and the maximum size is 2000 by 2000. The default project size is 744 by 426 when the display setting (in the Control Panel) is 1024 x 768 and 592 by 322 when the display setting (in the Control Panel) is 800 x 600. This command corresponds to the <b>New Project Size</b> function in the File menu.</p> <p>See <b>File Menu</b> in the section <b>Fundamentals</b> and <b>Posting Projects on the Web</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Choose New Project from the File menu so there is a perfectly empty project on the screen.</p> <pre>newprojectsize [40 40] newprojectsize "standard</pre> <p>Resets the project size to the default size.</p>
<p><b>nextpage</b></p>	<p>Displays the next page in the page list. Pages are listed alphabetically in the page list. Rename your pages to create the desired sequence.</p> <p>See <b>pagelist</b>, <b>prevpage</b> and <b>Pages Menu</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there are several pages in the project:</p> <pre>repeat count pagelist [nextpage wait 10]</pre>
<p><b>pagelist</b></p>	<p>Reports a list containing the names of all the pages in the current project. The first name reported by <b>pagelist</b> is always the current page. The remaining pages in the project are listed alphabetically.</p>	<p>Given that there are several pages in the project:</p> <pre>repeat count pagelist [nextpage wait 10]</pre>
<p><b>prevpage</b></p>	<p>Stands for <b>previous page</b>. Displays the previous page in the page list. Pages are listed alphabetically in the page list. Rename your pages to create the desired sequence.</p> <p>See <b>pagelist</b>, <b>nextpage</b> and <b>Pages Menu</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there are several pages in the project:</p> <pre>repeat count pagelist [prevpage wait 10]</pre>

<b>presentationmode</b>	Hides the Tabs, Command Center, Toolbar, Status Bar, and MicroWorlds EX menus. The project is centered on the screen and the background is filled in. <b>Presentationmode</b> is used to display completed projects. To return to MicroWorlds EX's regular mode, use <b>presentationmode</b> again (using a button or another clickable object), press <b>Esc</b> or double-click in the area surrounding your project. This command corresponds to the <b>Presentation Mode</b> item in the View menu and button in the Toolbar.	<code>presentationmode</code>
<b>projectsize</b>	Reports the current project size, in turtle steps.  See <b>newprojectsize</b> .	<code>show projectsize</code>
<b>setfooter</b> <i>word-or-list</i>	Sets the contents of the footer on printouts. Normally, the footer is empty. Use the empty list as input if you do not want any footer after using <b>setfooter</b> .	<code>setfooter [MicroWorlds Lovers, Grade 4]</code> <code>setfooter []</code>
<b>wallpaper</b>	Displays the Wallpaper page. See <b>The Wallpaper</b> in the section <b>Fundamentals</b> in the Help System.	Given that page1 exists in the project:  <code>wallpaper pd fd 100</code> <code>page1 cg</code>

## Disk Access

Primitive	Description	Examples
<b>Input(s)</b>		
<b>chdir</b>  <i>pathname</i>	<p>Stands for <b>change directory</b>. Changes the current drive and/or subdirectory name to <b>pathname</b>. To return to the desktop, use the volume name alone as input to <b>chdir</b>. Use vertical bars if the name contains spaces.</p> <p>See <b>currentdir</b> and <b>directories</b>.</p>	<p>Given that these directories exist.</p> <pre>chdir "Media chdir "  C:\MicroWorlds\My Work </pre>
<b>currentdir</b>	<p>Stands for <b>current directory</b>. Reports the current directory that was set.</p> <p>See <b>chdir</b>.</p>	<p>The result is just an example.</p> <pre>show currentdir C:\MicroWorldsEX\projects</pre>
<b>directories</b>	<p>Reports a list of subdirectory names. To change directories through a command, use <b>chdir</b>.</p> <p>See <b>chdir</b>.</p>	<p>The result is just an example.</p> <pre>show directories Media My Work Projects</pre> <p>A directory name made up of more than one word will look like two files in the list. Use <b>make</b> and <b>names</b> so that the actual names are enclosed in vertical bars. In this example, "My Work" is the name of one directory.</p> <pre>make "dirs directories show names make "dir [Media  My Work  Projects]</pre>

<b>erfile</b>  <i>pathname</i>	<p>Stands for <b>erase file</b>. Erases any type of file if it is not locked. The input must be the name of a file in the current directory or a full pathname. Use vertical bars if the name contains spaces.</p>	<p>Given that these files exist:</p> <pre>erfile "farm erfile "C:\projects\farm</pre> <p>If one of the elements of the path has spaces, vertical bars must enclose the whole path:</p> <pre>erfile " C:\My projects\farm </pre> <p>When there is more than one file with the same name, you need to add the extension.</p> <pre>erfile "quake.mw2</pre>
<b>exporttext</b>  <i>pathname</i>  <i>text-name</i>	<p>Exports the text found in the designated text box, the Command Center or public Procedures Tab to the file named indicated, in a Unicode text file format.</p> <p>For the <b><i>pathname</i></b>, use a simple file name to save the file in the current directory or full or relative pathname to save the file in a different directory. If the file name has no extension, the resulting file is a txt (plain text) file. Add a rtf extension to the file name to get a Rich Text Format file.</p> <p>The second input, <b><i>text-name</i></b>, must be a text box name or the special word cc (to export the text in the Command Center) or procedures (to export the text in the public Procedures Tab).</p> <p>This command is equivalent to the Export Text item in the File menu.</p> <p>See a <b>loadtext</b> and <b>importtext</b>. See also <b>Exporting Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that text1 exists on the page.</p> <pre>exporttext "story.rtf "text1 exporttext "C:\mydir\cmds "cc exporttext "procs "procedures</pre>

<b>exportturtle</b>  <i>pathname</i>	<p>Saves the current turtle on disk. The turtle file contains the turtle and all the contents of its backpack. If the <b>pathname</b> is just a word, the turtle is saved in the current directory with the extension mwa. An exported turtle can be imported or dragged and dropped into a different project, or emailed.</p> <p>See <b>importturtle</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>exportturtle "model"</pre>
<b>files</b>  <i>filetype</i>	<p>Outputs a list of files of the given <b>filetype</b> in the current directory. If the input is "*", all file types are taken into account.</p> <p>See <b>chdir</b> and <b>currentdir</b>.</p>	<p>Given that these files exist:</p> <pre>show files "txt" My Work report</pre> <p>A file name made up of more than one word will look like two files in the list. Use <b>make</b> and <b>names</b> so that the actual names are enclosed in vertical bars. In this example, "My Work" is the name of one text file.</p> <pre>make "texts files "txt show names make "texts [  My Work  report]</pre>
<b>importtext</b>  <i>pathname</i>  <i>text-name</i>	<p>Imports the text from the named file into the text box, Procedures Tab, or Command Center.</p> <p>For the <b>pathname</b>, use a simple file name to import a file from the current directory or full or relative pathname to import a file in a different directory.</p> <p>The input for <b>text-name</b> must be the name of a text box or the special words <b>cc</b> (Command Center) or <b>procedures</b> (public Procedures Tab).</p> <p>This command is equivalent to the <b>Import Text</b> item in the File menu.</p> <p>See <b>exporttext</b>, <b>loadtext</b> and <b>Importing Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that these files exist and text1 exists on the page:</p> <pre>importtext "story.rtf" "text1 importtext "C:\mydir\cmds" "cc importtext "brain" "procedures"</pre>

<p><b>importturtle</b></p> <p><i>pathname</i></p>	<p>Imports the turtle file on the current page. The turtle file contains all the characteristics of the turtle (the contents of its backpack). A turtle file is created by the command <b>exportturtle</b>, or by the options <b>Export</b> and <b>Mail</b> it in the turtle's right-click menu.</p> <p>See <b>exportturtle</b> and <b>Exporting, Importing and Mailing Turtles</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that this turtle file exists:</p> <pre>importturtle "model</pre>
<p><b>loadpict</b></p> <p><i>pathname</i></p>	<p>Stands for <b>load picture</b>. Loads the picture on the current page. The input must be the name of a picture file that MicroWorlds EX supports in the current directory or a full or relative path.</p> <p>See <b>savepict</b> and <b>Importing Pictures</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that these files exist:</p> <pre>loadpict "scene loadpict "c:\projects\scene loadpict "media\tornado1.jpg</pre>
<p><b>loadshape</b></p> <p><i>pathname</i></p> <p><i>shape-number</i></p>	<p>Loads the specified picture file into the specified shape spot in the public Shapes Tab. The picture file name becomes the name of the shape if there is no other shape with that name in that Tab.</p> <p>The file must be the name of a picture file that MicroWorlds EX supports in the current directory or a full or relative path. The shape-number can be any number from 1 to 128.</p> <p>See <b>saveshape</b> and <b>Importing and Exporting Pictures</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that these files exist:</p> <pre>loadshape "volcano 20 loadshape "c:\picts\volc.gif 20</pre>

<b>loadtext</b>  <i>pathname</i>	<p>Loads the text file in the current text box. For the <i>pathname</i>, use a simple file name to import a file from the current directory or full or relative pathname to import a file in a different directory.</p> <p>See <b>importtext</b> and <b>Importing Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that these files exist and there is a text box on the page:</p> <pre>loadtext "story loadtext "c:\projects\story loadtext "media\quake- Italy</pre>
<b>merge</b>  <i>pathname</i>  <i>word-or-list-of-types</i>	<p>Imports pages, procedures, or shapes from another project into the current project. The first input must be the name of a project in the current folder or a full or relative path to access a different folder. This is the project you want to import from.</p> <p>The second input can be the name of a specific page, a list of page names, the word <i>procedures</i> (to import the procedures from the project Procedures Tab and project variables), <i>pages</i> (to import all the pages), or <i>shapes</i> (to replace the shapes in the current project's Shapes Tab). Instead of using <b>merge</b>, we highly recommend using Import Turtle to import shapes and/or procedures included in a turtle's backpack. If there are names in the source project that are the same as those in the current project, the new names will be renamed with a number.</p>	<p>Given that these files exist:</p> <pre>merge "clocks "procedures</pre> <p>Imports the procedures and project variables.</p> <pre>merge "clocks "pages</pre> <p>Imports all the pages.</p> <pre>merge "clocks [page1 page3]</pre> <p>Imports individual pages.</p> <pre>merge "C:\projects\scene " shapes</pre> <p>Replaces public shapes in the current project (shape numbers that were not blank in the imported file).</p>



<p><b>pictlist</b></p>	<p>Stands for <b>picture list</b>. Reports a list containing the names of picture files in the current directory. Only the files with picture formats that MicroWorlds EX supports (created using <b>savepict</b> or other applications) are shown.</p> <p>See <b>textlist</b>, <b>projectlist</b>, and <b>files</b>. See also Importing and exporting Pictures in the section <b>Fundamentals</b> in the Help System.</p>	<p>The result is just an example.</p> <pre>show pictlist mybackground.bmp MW.gif</pre> <p>A file name made up of more than one word will look like two files in the list. Use <b>make</b> and <b>names</b> so that the actual names are enclosed in vertical bars. In this example, "autumn scene.gif" is the name of one file.</p> <pre>make "picts pictlist show names make "picts [mybackground.bmp  autumn scene.gif  ]</pre>
<p><b>placepict</b></p> <p><i>pathname</i></p> <p><i>[x y]</i></p> <p><i>size</i></p>	<p>Stands for <b>place picture</b>. Imports a picture file, places it at the designated position, and adjusts its size to fit the size indicated. The first input is the file name in the current directory or a full or relative pathname; the second input is the position for the top, left corner of the picture, and the third input is the size of the image on the page, in x and y turtle steps.</p>	<p><b>placepict "cat [0 0] [100 100]</b></p>

<p><b>projectlist</b></p>	<p>Reports a list containing the names of MicroWorlds EX and MicroWorlds Pro projects in the directory (mwX, mw2, mwz files)</p> <p>See <b>textlist</b>, <b>pictlist</b>, and <b>files</b>.</p>	<p>The result is just an example.</p> <pre>show projectlist maze.mwz my adventure.mmwX</pre> <p>A file name made up of more than one word will look like two files in the list. Use <b>make</b> and <b>names</b> so that the actual names are enclosed in vertical bars. In this example, "my adventure" is the name of one project.</p> <pre>make "projects projectlist show names make "projects [maze.mwz  my adventure.mwX  ]</pre>
<p><b>savepict</b></p> <p><i>pathname</i></p>	<p>Stands for <b>save picture</b>. Saves the current page and its background as a picture file. The default file format (if you don't specify a format using an appropriate graphic file extension) is PNG.</p> <p>When you use the <b>savepict</b> command, the turtles, buttons, text boxes, and other objects are not part of the background. Stamped images and stamped text are part of the background. Use the File menu function <b>Export Page Image</b> to save the picture of the page including all objects.</p> <p><b>Savepict</b> saves the file in the current directory unless you use a full or relative pathname. See <b>Importing and Exporting Pictures</b> in the section <b>Fundamentals</b> in the Help System.</p>	<pre>savepict "scene savepict "C:\projects\scene savepict "scene.jpg</pre>
<p><b>saveproject</b></p>	<p>Saves the current project without closing it. The project must have a name in order for this command to work. This is equivalent to the <b>Save</b> item in the File menu. Use this primitive if you want to save your project before getting another project with <b>getproject</b>.</p>	<pre>saveproject</pre>

<p><b>saveshape</b></p> <p><i>pathname</i></p> <p><i>number</i></p>	<p>Saves the specified shape from the project Shapes Tab as a picture file. Use a simple file name to save the file in the current directory or full or relative pathname to save the file in a different directory.</p> <p>If the file name has no extension, the resulting file is a bmp image. Add a jpg, gif or png extension to the file name to get a specific file format.</p>	<p>Given that there is a turtle on the page with shapes in the spot 1.</p> <pre>saveshape "moon 1 saveshape "moon.jpg 1 saveshape "c:\graph\moon.jpg 1</pre>
<p><b>savetext</b></p> <p><i>pathname</i></p>	<p>Saves the text found in the current text box in a Unicode text file format.</p> <p>The input can be a file name with or without an extension (and the file will be saved in the current directory) or a full or relative path. This command is equivalent to the <b>Export Text</b> item in the File menu. To save the Procedures Tab or the content of the Command Center as a text file, see <b>exporttext</b>.</p> <p>See <b>loadtext</b> and <b>textlist</b>. See also <b>Exporting Text</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that there is a text box on the page and it contains some text:</p> <pre>savetext "story savetext "C:\proj\story savetext "story.rtf</pre>
<p><b>textlist</b></p>	<p>Reports a list containing the names of text files in the current directory. Only text type files (extensions txt or rtf) are shown.</p> <p>See <b>files</b>, <b>projectlist</b>, and <b>pictlist</b>.</p>	<p>The result is just an example.</p> <pre>show textlist mytext.txt listoffriends.rtf</pre> <p>A file name made up of more than one word will look like two files in the list. Use <b>make</b> and <b>names</b> so that the actual names are enclosed in vertical bars. In this example, telephone numbers is the name of one file.</p> <pre>make "texts textlist show names</pre>

## Control, Logic, Events, and Processes

Primitive <i>Input(s)</i>	Description	Examples
<b>and</b> <i>true-or-false1</i> <i>true-or-false2</i>  <b>(and</b> <i>true-or-false1</i> <i>true-or-false2</i> <i>true-or-false3...)</i>	<p>Reports <b>true</b> if all its inputs report true. If more than two inputs are used, <b>and</b> and its inputs must be enclosed in parentheses.</p> <p>See <b>or</b> and <b>not</b>.</p>	<p>The result is just an example.</p> <pre>show and pos = [0 0] heading = 0 true</pre>
<b>cancel</b> <i>instruction-list</i>	<p>Stops the process given as input. The process must have been launched using <b>launch</b>, <b>when</b>, <b>forever</b>, buttons, or clickable turtles. The input must be the exact same instruction list that started the process.</p> <p>See <b>Stopping Processes</b> in the section <b>More Techniques</b> in the Help System .</p>	<p>Given that mytune is an existing audio object:</p> <pre>to delay   launch [mytune]   wait random 200   cancel [mytune] end</pre>
<b>carefully</b> <i>word-or-list-to-run1</i> <i>word-or-list-to-run2</i>	<p>Runs the first input, a word or list of instructions. If the first input contains an error, <b>carefully</b> runs the second input, a word or list of instructions and sets <b>errorMessage</b> to the error that occurred. If there is no error in the first input, the second input is ignored.</p> <p>See <b>Carefully</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>To be tried twice.</p> <pre>to createifdoesntexist   carefully   [newturtle "newborn"]   []   setx 30 st end</pre>
<b>clickoff</b>	<p>Simulates a mouse click on the current turtle, turning it off if it was on. This command has an effect only if the turtle is programmed to react to a mouse click. See <b>clickon</b>, <b>listen</b>, and <b>Turtles and Clickon</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that there are several turtles on the page, with <b>OnClick</b> instructions:</p> <pre>everyone [clickon] t1, clickoff everyone [clickoff]</pre>

<b>clickon</b>	<p>Simulates a mouse click on the current turtle, turning it on if it was off. This command has an effect only if the turtle is programmed to react to a mouse click.</p> <p>See <b>clickoff</b>, <b>listen</b>, and <b>Turtles and Clickon</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that there are several turtles on the page with OnClick instructions:</p> <pre>t1, clickon everyone [clickon]</pre>
<b>dolist</b> <i>range</i> <i>instruction-list</i>	<p>Runs the instruction list for each item in a list. The first input, <b>range</b>, is a list with a temporary variable name and a list of items. The second input is a list of instructions that uses the variable name included in the first input. Be careful about the absence or presence of the ":" before the "i".</p> <p>See <b>dotimes</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>dolist [i [15 25 35]] [setc :i wait 4]]</pre>
<b>done?</b> <i>instruction-list</i>	<p>Reports <b>true</b> if the process indicated is completed. The process must have been launched using <b>launch</b> or <b>forever</b>. The input must be an exact copy of the instruction list that started the process. <b>Done?</b> can be used as an input to <b>waituntil</b> in order to synchronize events.</p>	<p>Given that jazz is an existing audio object and t1 is a turtle with an OnClick instruction:</p> <pre>to dance launch [jazz] everyone [clickon] waituntil [done? [jazz]] everyone [clickoff] end</pre>
<b>dotimes</b> <i>maximum</i> <i>instruction-list</i>	<p>Runs the instruction list for all values starting with 0 up to the specified <b>maximum</b> value. The first input is a list with a temporary variable name and a maximum number. The second input is a list of instructions that uses the variable name included in the first input. Be careful about the absence or presence of the ":" before the "i".</p> <p>See <b>dolist</b>.</p>	<p>Given that there is a text box on the page:</p> <pre>dotimes [i 4] [pr se :i sqrt :i]</pre>
<b>errormessage</b>	<p>Reports the last error message trapped by <b>carefully</b>. If <b>errormessage</b> reports an empty word, it means that the last operation using <b>carefully</b> did not report an error.</p> <p>See <b>carefully</b> and <b>Carefully</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>To be tried twice.</p> <pre>to create carefully [newturtle "newborn] [show errormessage] setx 30 st end</pre>

<b>everyone</b>  <i>instruction-list</i>	<p>Makes all the turtles on the current page run the instruction, one after the other.</p> <p>See <b>ask</b> and <b>talkto</b>.</p>	<p>Given that there are several turtles on the page:</p> <pre>everyone [glide -80 2]</pre>
<b>forever</b>  <i>word-or-list-to-run</i>	<p>Runs the input repeatedly as an independent parallel process. Use <b>cancel</b>, the <b>Stop All</b> menu item (Edit menu) or button (Toolbar), or <b>Ctrl+Break</b> to stop the process.</p> <p>See <b>launch</b> and <b>Timing and Synchronization</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that these turtles exist on the page:</p> <pre>t1, forever [fd 5 / 4 rt 2] t2, forever [fd 1 rt 2]</pre>
<b>if</b>  <i>true-or-false</i>  <i>list-to-run</i>	<p>Runs the instruction list only if the <b>true-or-false</b> condition (first input) reports <b>true</b>.</p> <p>See <b>ifelse</b>.</p>	<p>Given that these turtles exist on the page:</p> <pre>to go t1, forever [fd 1 check] end  to check if 30 &lt; distance "t2 [towards "t2] end</pre>
<b>ifelse</b>  <i>true-or-false</i>  <i>list-to-run1</i>  <i>list-to-run2</i>	<p>Runs the first instruction list if the <b>true-or-false</b> condition (first input) is <b>true</b>. Runs the second instruction list if the <b>true-or-false</b> condition is <b>false</b>.</p> <p>See <b>if</b>.</p>	<pre>to quiz question [Washington is in...] ifelse member? answer [U.S.A. US USA U.S.] [announce [Congrats!]] [announce [Oops]] end</pre>
<b>launch</b>  <i>word-or-list-to-run</i>	<p>Runs the input as an independent parallel process. If the process is launched from the Command Center, the cursor reappears immediately. Use <b>cancel</b>, the <b>Stop All</b> menu item (Edit menu) or button (Toolbar), or <b>Ctrl+Break</b> to stop the process.</p> <p>See <b>forever</b> and <b>Timing and Synchronization</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that chopin is an existing audio object and fly is a procedure:</p> <pre>launch [chopin] fly cancel [chopin]</pre>

<b>listen</b>	<p>Sets the global "turtle who" (the turtle obeying instructions from the Command Center). This command allows you to change the global "turtle who" within a process that has been launched (for example, from a button).</p> <p>See also <b>talkto</b> and <b>ask</b>. See also <b>Processes and Who</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that these turtles exist on the page:</p> <pre>t2, clickon fd 30 t1, listen (inside a button)</pre>
<b>not</b>  <i>true-or-false</i>	<p>Reports the logical inverse of its input.</p> <p>See <b>and</b> and <b>or</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>ifelse not xcor &gt; 0 [setc "red] [setc "blue]</pre>
<b>onreadline</b>  <i>text-box-name</i>  <i>instruction</i>	<p>Sets the designated text box to the instruction, which will then be run when appropriate text is entered in the text box and Enter is pressed. The text box name tag changes to blue to show that an <b>onreadline</b> instruction is active. The second input is a procedure or MicroWorlds primitive that requires a number, word or long word (a sequence of characters including spaces) as input. Whatever text is typed into the text box becomes the input for this primitive or procedure. Pressing Enter runs the complete instruction.</p> <p>To turn off the effect of <b>onreadline</b>, make the second input an empty word as in:</p> <p><b>onreadline <i>text-box-name</i> "</b></p> <p>Onreadline is particularly useful for "faking" a Command Center in projects for the Web. For more information, see <b>Making a Text Box into a Command Center</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that text1 exist on the page:</p> <pre>onreadline "text1 "run</pre> <p>Type fd 50 in that text box and press <b>Enter</b>.</p>

<b>or</b> <i>true-or-false1</i> <i>true-or-false2</i>	<p>Reports true if any of its inputs report <b>true</b>. If more than two inputs are used, <b>or</b> and its inputs must be enclosed in parentheses.</p> <p>See <b>and</b> and <b>not</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>ifelse or xcor &gt; 30 xcor &lt; -30   [setc "red]   [setc "blue]</pre>
<b>(or</b> <i>true-or-false1</i> <i>true-or-false2</i> <i>true-or-false3...)</i>		
<b>output (op)</b> <i>word-or-list</i>	<p>Stops the procedure and reports a word or list. <b>Output</b> can only be used in a procedure.</p>	<pre>to double :x op :x + :x end  show double 10 20</pre>
<b>repeat</b> <i>number</i> <i>instruction-list</i>	<p>Runs the list of instructions the specified <b>number</b> of times.</p> <p>See <b>dotimes</b> and <b>dolist</b> for more advanced features.</p>	<p>Given that there is a turtle on the page:</p> <pre>pd repeat 96 [bk 40 fd 40 rt 4]</pre>
<b>run</b> <i>word-or-list-to-run</i>	<p>Runs (executes) a word or an instruction list.</p> <p>See <b>onreadline</b>.</p>	<p>Given that text1 exists on the page and it contains a MicroWorlds EX instruction:</p> <pre>run text1</pre>
<b>setinstruction</b> <i>word-to-run</i> <i>setinstruction</i> <i>instruction-list</i>	<p>Sets the instruction for the current turtle. This is equivalent to typing the instructions in the turtle's OnClick instruction field in its backpack. If the list includes the word <b>forever</b> or <b>launch</b>, the instruction's mode is set to Forever or Once, accordingly. If these words are not included, the mode is unchanged. If the turtle is running an instruction when <b>setinstruction</b> is used, the turtle will click off.</p> <p>See <b>set</b> and <b>get</b></p>	<p>Given that there is a turtle on the page:</p> <pre>to turnoff setsh "off setinstruction "on end  to turnon setsh "on setinstruction "off end</pre>



<b>startup</b>	<p>Startup is a special name for a public procedure. If your project has a procedure named startup, this startup procedure is executed automatically when you open the project. Use this feature to setup your project: display the right page and start the presentation mode for example.</p>	<p>Given that there is such a page in the project. Save the project with a different page showing, close and reopen the project.</p> <pre>to startup   intropage   presentationmode end</pre>
<b>stop</b>	<p>Stops the procedure that is running. <b>Stop</b> can only be used in a procedure.</p> <p>See <b>stopall</b>, <b>stopme</b>, and <b>output</b>.</p>	<p>Given that there is text box on the page:</p> <pre>to countup :number   if :number &gt; 100 [stop]   print :number   countup :number + 5 end</pre>
<b>stopall</b>	<p>Stops all running procedures and processes, including turtles and buttons. <b>Stopall</b> can be used as a button, from the Command Center, or in a stop rule in a procedure. This primitive sets the Stop All button in the Toolbar. All the processes are stopped, and the OnTick processes are paused. The OnTick processes resume immediately when a new process is launched.</p> <p>See <b>stop</b> and <b>stopme</b>.</p>	<p>Given that there are several turtles running towards a red area:</p> <pre>to race   everyone [if 15 =     colorunder     [announce se who "wins     stopall]] end</pre>
<b>stopme</b>	<p>Stops the process in which this command was run. <b>Stopme</b> cannot be used to stop a turtle inside a color instruction. In this case, use <b>clickoff</b> instead.</p> <p>See <b>stop</b> and <b>stopall</b>.</p>	<p>Given that these turtles exist on the page and that they are close to one another:</p> <pre>t1, forever [fd 1 if   (distance "t2) &gt; 150   [stopme]]</pre>
<b>waituntil</b> <i>true-or-false-list-to-run</i>	<p>Tells MicroWorlds EX to wait until <b>true-or-false-instruction-list</b> is true before running another instruction. The input must be an instruction list that reports either <b>true</b> or <b>false</b> when it is run.</p> <p>See <b>done?</b>.</p>	<p>Given that these turtles exist on the page:</p> <pre>waituntil [touching?   "t1 "t2]</pre>

<p><b>when</b></p> <p><i>true-or-false-</i></p> <p><i>instruction-list</i></p> <p><i>instruction-list</i></p>	<p>Starts an independent parallel process that repeatedly tests whether the first instruction list reports <b>true</b> or <b>false</b>. If it reports true, the second instruction list is run. To stop a <b>when</b> instruction, use <b>cancel</b> (only on the true-or-false-instruction-list), Stop All, or press <b>Ctrl+Break</b>.</p> <p>Note: we strongly recommend using the Turtle events in backpack (When this - Do that) instead of this command.</p> <p>See <b>Stopping Processes</b> in the section <b>More Techniques</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>when [ycor &gt; 0] [bk 40]</pre>
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## Variables

Primitive	Description	Examples
<b>Input(s)</b>		
<b>clearname</b>  <i>word</i>	<p>Clears a global variable from memory.</p> <p>See <b>clearnames</b>, <b>names</b>, <b>make</b>, and <b>name</b>.</p>	<pre>make "speed 5 make "direction "right show :speed 5 clearname "speed show :speed <b>speed has no value</b></pre>
<b>clearnames</b>	<p>Clears all the global variables from memory. MicroWorlds EX doesn't clear the variables when you open or create a new project. Therefore, it may be necessary to use <b>clearnames</b> when you start a new project.</p> <p>See <b>names</b>, <b>clearname</b>, <b>make</b>, and <b>name</b>.</p>	<pre>make "speed 5 make "direction "right show :speed 5 clearnames show :speed <b>speed has no value</b> show :direction <b>direction has no value</b></pre>
<b>createprojectvar</b>  <i>word-or-list</i>	<p>Stands for <b>create project variable</b>. Creates a project variable represented by a command and a reporter. For example, if the project variable "amount" is created, the command <b>setamount</b> sets the variable's value, and <b>amount</b> reports its value. Project variables are saved with your project.</p> <p>The Project Tab shows the project variables. Individual variables can be removed with the right-click menu item <b>Remove</b>. You can also use the <b>remove</b> command to remove a project variable.</p> <p>See <b>projectvars</b>, <b>make</b>, <b>remove</b> and <b>name</b>. See also <b>Local Variables</b> and <b>Global Variables</b> in the section <b>Programming</b> in the Help System.</p>	<pre>createprojectvar "amount setamount 22 show amount 22 createprojectvar [friends foes]</pre>

<p><b>giveturtle</b></p> <p><i>word</i></p>	<p>Assigns a state variable to the current turtle and creates a command-reporter pair of primitives that can be used in the current project only: the word <b>set</b> followed by the name of the variable (for example, <b>giveturtle "speed</b> creates a <b>setspeed</b> command) and the name of the variable (in this example, the reporter <b>speed</b>).</p> <p>The State Tab of the turtle's backpack displays the <b>giveturtle</b> variables. The value of the variable can also be set by double-clicking on the variable name in the turtle's backpack.</p> <p>After a <b>giveturtle</b> instruction, the value of the variable is empty until it is set.</p> <p>See <b>turtlesown</b> and <b>State Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Given that there is a turtle on the page:</p> <pre>giveturtle "hasrun sethasrun "false fd 50 sethasrun "true ifelse hasrun [announce [I'm tired]] [fd 50]</pre>
<p><b>let</b></p> <p><i>list-of-names-and-values</i></p>	<p>Creates one or many temporary variables. The variables exist only while the procedure containing the <b>let</b> instruction and procedures called by this procedure are running. The input is a list of paired variable names and values. <b>Let</b> can only be used in a procedure. Use <b>let</b> when you know in advance the value of the variable.</p> <p>See <b>local</b> and <b>Local Variables</b> in the section <b>Programming</b> in the Help System.</p>	<pre>to pythagore :x :y let [sqr x * :x sqry :y * :y] op sqrt sum :sqr :sqry end</pre>

<b>local</b>  <i>word-or-list</i>	<p>Makes the specified variable local to the procedure in which <b>local</b> is used. <b>Local</b> can only be used in a procedure. Use <b>local</b> when you have to perform some calculations on a variable within a procedure.</p> <p>See <b>let</b>, <b>make</b>, and <b>name</b>.</p>	<p>Given that there are several pages in the project.</p> <pre>to slideshow local "pictures make "pictures files "jpg slideone :pictures end  to slideone :list if empty? :list [stop] cg loadpict first :list wait 30 slideone bf :list end</pre>
<b>make</b>  <i>word</i>  <i>word-or-list</i>	<p>Creates a variable named <b>word</b> and gives it the value <b>word-or-list</b>. These variables keep their values as long as you don't clear them or quit MicroWorlds EX. They are not saved with your project. If you want your variables to have specific values each time the project is loaded, you should have a <b>startup</b> procedure. To get the variable's value, use the colon in front of the variable name.</p> <p>See <b>name</b>, <b>thing</b>, <b>clearname</b>, <b>names</b>, and <b>createprojectvar</b>. See also <b>Global Variables</b> in the section <b>Programming</b> in the Help System,</p>	<pre>make "friends [Kim Lea Bob] show :friends <b>Kim Lea Bob</b> show first :friends <b>Kim</b></pre>
<b>name</b>  <i>word-or-list</i>  <i>word</i>	<p>Creates a variable named <b>word</b> and gives it the value <b>word-or-list</b>. These variables keep their values as long as you don't clear them or quit MicroWorlds EX. They are not saved with your project.</p> <p>See <b>name</b>, <b>thing</b>, <b>clearname</b>, <b>names</b>, and <b>createprojectvar</b>. See also <b>Global Variables</b> in the section <b>Programming</b> in the Help System.</p>	<pre>name [Kim Lea Bob] "friends show :friends <b>Kim Lea Bob</b> show first :friends <b>Kim</b></pre>

<b>name?</b>  <i>word</i>	<p>Reports <b>true</b> if the input is the name of a variable.</p> <p>See <b>make</b> and <b>name</b>. See also <b>Global Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Define this procedure. Run the other instructions in the Command Center.</p> <pre>to translate :word if name? :word [op thing :word] end  make "table "mesa make "house "casa show translate "table <b>mesa</b></pre>
<b>names</b>	<p>Reports the names of all the variables with their values.</p>	<pre>make "city "New York  make "friends [Ted Lea] make "age 12</pre>
<b>projectvars</b>	<p>Stands for <b>project variables</b>. Reports the list of currently defined project variables.</p> <p>See <b>createprojectvar</b>.</p>	<pre>createprojectvar "age setage 12 show projectvars age</pre>
<b>thing</b>  <i>name</i>	<p>Reports the value of the named variable. Corresponds to the use of a colon ( : ) preceding a word.</p> <p>See <b>make</b> and <b>name</b>. See also <b>Global Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Define this procedure. Run the other instructions in the Command Center.</p> <pre>to translate :word if name? :word [op thing :word] op "Unknown end  make "table "mesa make "house "casa show translate "table <b>mesa</b></pre>

<p><b>turtlesown</b></p> <p><i>word</i></p>	<p>Assigns a state variable to all the turtles in the current project. This variable can then be set to a specific value for each turtle. This command creates a command-reporter pair of primitives that can be used in the current project only: the word <b>set</b> followed by the name of the variable (for example, <b>turtlesown "speed</b> creates a <b>setspeed</b> command) and the name of the variable (in this example, <b>speed</b>).</p> <p>The State Tab of the turtle's backpack displays the <b>turtlesown</b> variables. The value of the variable can also be set by double-clicking on the variable name in the turtle's backpack.</p> <p>After a <b>turtlesown</b> instruction, the value of the variable is empty until it is set.</p> <p>See <b>giveturtle</b> and <b>State Variables</b> in the section <b>Programming</b> in the Help System.</p>	<p>Given that these turtles exist on the page:</p> <pre>turtlesown "start t1, setstart [-50 -51] t2, setstart [-30 -51] everyone [setpos start]</pre>
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**Math**

Primitive	Description	Examples
<i>Input(s)</i>		
<b>Math Operators</b>	<p>number1 - number2</p> <p>Reports the result of number1 minus number2.</p> <p>number1 * number2</p> <p>Reports the product of number1 multiplied by number2.</p> <p>number1 / number2</p> <p>Reports the result of number1 divided by number2.</p> <p>number1 + number2</p> <p>Reports the sum of number1 and number2.</p> <p>number1 &lt; number2</p> <p>Reports <b>true</b> if number1 is less than number2.</p> <p>word-or-list1 = word-or-list2</p> <p>Reports <b>true</b> if word-or-list1 is equal to word-or-list2.</p> <p>number1 &gt; number2</p> <p>Reports <b>true</b> if number1 is greater than number2.</p> <p>See <b>difference</b>, <b>product</b>, <b>quotient</b>, <b>sum</b>, <b>equal?</b>, <b>less?</b>, <b>equal?</b>, <b>identical?</b>, <b>greater?</b>.</p>	<p>Given that a turtle and these sliders exist on the page. The result is just an example.</p> <pre> show 5 - 3 2 show slider1 - slider2 42 show 5 * 3 15 show 12 / 4 3 show 2 + 4 6 show 2 &lt; 3 true show 5 = 3 false show "A = [A] false show 5 &gt; 3 true if xcor &gt; 100 [rt 180]</pre>
<b>abs</b>  <i>number</i>	<p>Stands for <b>absolute</b>. Reports the absolute value of its input.</p>	<p>Given that there is a turtle on the page:</p> <pre>sety abs xcor</pre>



<b>arctan</b>  <i>number</i>	<p>Stands for <b>arc tangent</b>. Reports the arc tangent (the inverse function of the tangent) of its input.</p> <p>See <b>tan</b> and <b>cos</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>show arctan heading 89.8090147756</pre>
<b>cos</b>  <i>number</i>	<p>Stands for <b>cosine</b>. Reports the cosine of its input.</p> <p>See <b>sin</b> and <b>tan</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>show cos heading 0.5</pre>
<b>difference</b>  <i>number1</i>  <i>number2</i>	<p>Reports the result of subtracting <b>number2</b> from <b>number1</b>.</p> <p>See <b>-</b> and <b>minus</b>.</p>	<p>Given that these turtles exist on the page. The result is just an example.</p> <pre>show difference 30 40 show difference t1's "heading t2's "heading 30</pre>
<b>exp</b>  <i>number</i>	<p>Stands for <b>exponential</b>. Reports the number to the power of the constant e.</p>	<pre>show exp 1 2,71828182846</pre>
<b>greater?</b>  <i>number1</i>  <i>number2</i>	<p>Reports <b>true</b> if the first input is greater than the second input.</p> <p>See <b>less?</b> and <b>&gt;</b>.</p>	<p>Given that a turtle exists on the page:</p> <pre>ifelse greater? xcor ycor [setc "lime] [setc "blue]</pre>
<b>int</b>  <i>number</i>	<p>Stands for <b>integer</b>. Reports the integer portion of its input.</p> <p>See <b>round</b>.</p>	<p>Given that a turtle exists on the page:</p> <pre>to snap setx 30 * int xcor / 30 sety 30 * int ycor / 30 end</pre> <p>Put this procedure in a backpack, and the command snap in the OnClick field. Drag the turtle around and click on it.</p>

<b>less?</b>  <b>number1</b>  <b>number2</b>	<p>Reports <b>true</b> if the first number is less than the second number.</p> <p>See <b>greater?</b> and <b>&lt;</b>.</p>	<p>Given that a turtle exists on the page:</p> <pre>ifelse less? xcor ycor [setc "lime] [setc "blue]</pre>
<b>ln</b>  <b>number</b>	<p>Stands for natural logarithm. Reports the natural logarithm (the logarithm in base e) of the number. Inverse of <b>exp</b>.</p> <p>See <b>log</b> and <b>exp</b>,</p>	<pre>show ln 100 4.60517018599</pre>
<b>log</b>  <b>number</b>	<p>Stands for <b>log</b>arithm. Reports the logarithm of the number.</p> <p>See <b>ln</b> and <b>exp</b>.</p>	<pre>show log 100 2</pre>
<b>minus</b>  <b>number</b>	<p>Reports the additive inverse of its input. <b>Minus</b> must be used to report the additive inverse of a variable (<b>minus :num</b> or <b>minus heading</b> instead of <b>-:num</b> or <b>-heading</b>).</p> <p>See <b>-</b> and <b>difference</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>setx minus ycor -55</pre>
<b>pi</b>	<p>Reports the constant pi.</p>	<pre>show pi 3,14159265359 seth 360 / pi</pre>
<b>power</b>  <b>number1</b>  <b>number2</b>	<p>Reports <b>number1</b> raised to the power of <b>number2</b>.</p>	<p>Given that a turtle exists on the page:</p> <pre>pu home pd dotimes [i 24] [sety (power :i 2) / 10 setx xcor + 1]</pre>
<b>product</b>  <b>number1</b>  <b>number2</b>  <b>(product</b>  <b>number1</b>  <b>number2</b>  <b>number3...)</b>	<p>Reports the result of multiplying its inputs. If more than two inputs are used, <b>product</b> and its inputs must be enclosed in parentheses.</p>	<pre>show product 10 10 100</pre>

<b>quotient</b>  <i>number1</i>  <i>number2</i>	Reports the result of dividing <i>number1</i> by <i>number2</i> .	<pre>show quotient 100 50 2</pre>
<b>random</b>  <i>number</i>	Reports a random non-negative integer (including 0) less than <i>number</i> . The maximum <i>number</i> is 9999.	Given that a turtle exists on the page. The result is just an example.  <pre>fd random 30 rt random 60</pre>
<b>remainder</b>  <i>number1</i>  <i>number2</i>	Reports the remainder after <i>number1</i> is divided by <i>number2</i> . The remainder of a negative number is negative. If <i>number1</i> and <i>number2</i> are non-integers, they are rounded to the nearest integers.	Given that a turtle exists on the page. The result is just an example:  <pre>show remainder 100 3 1 show remainder xcor 10 8</pre>
<b>rerandom</b>	Reproduces the same sequence of numbers generated by <b>random</b> . After running <b>rerandom</b> , <b>random</b> with the same input generates the same sequence of numbers the next time.	<pre>rerandom repeat 2 [show random 10] 8 5 rerandom repeat 2 [show random 10] 8 5</pre>
<b>round</b>  <i>number</i>	Reports the <i>number</i> given as input rounded to the nearest integer. Numbers ending with .5 are rounded to the higher integer.	Given that a turtle exists on the page:  <pre>to snap setx 30 * round xcor / 30 sety 30 * round ycor / 30 end</pre> <p>Put this procedure in a backpack, and the command snap in the OnClick field. Drag the turtle around and click on it.</p>
<b>sin</b>  <i>number</i>	Stands for sine. Reports the sine of <i>number</i> degrees.  See <b>cos</b> and <b>tan</b> .	Given that a turtle exists on the page. The result is just an example.  <pre>show sin 45 0,707106781187 show sin heading -0.866025403784</pre>

<b>sqrt</b> <i>number</i>	<p>Stands for <b>square root</b>. Reports the square root of its input.</p>	<pre>show sqrt 100 10</pre>
<b>sum</b> <i>number1</i> <i>number2</i>  <b>(sum</b> <i>number1</i> <i>number2</i> <i>number3...</i> )	<p>Reports the sum of its inputs. If more than two inputs are used, <b>sum</b> and its inputs must be enclosed in parentheses.</p> <p>See <b>+</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>show sum 10 10 20 show sum xcor ycor 212</pre>
<b>tan</b> <i>number</i>	<p>Stands for <b>tangent</b>. Reports the tangent of its input.</p> <p>See <b>sin</b> and <b>cos</b>.</p>	<p>Given that a turtle exists on the page. The result is just an example.</p> <pre>show tan heading -1.73205080757</pre>

## Input – Output

Primitive <i>Input(s)</i>	Description	Examples
<b>announce</b>  <i>word-or-list</i>	<p>Displays the <b>word-or-list</b> message in an alert box. Clicking OK closes the box. If you drag the alert box to a new position while it is being displayed, this is the position where the next alert box is opened in the project.</p> <p>See <b>question</b> and <b>answer</b>.</p>	<pre>announce [Guess what's in the package...]</pre>
<b>answer</b>	<p>Reports the contents of the last answer typed in the <b>question</b> dialog box. It also reports special values after a dialog box have been used: OK if the OK button was used, the empty list if the Cancel button was used, or the button's label if a different button was used. The value reported by <b>answer</b> is always overwritten by the last usage of a <b>question</b> or a dialog box.</p> <p>See <b>question</b> and <b>Dialog Boxes</b> in the section <b>Fundamentals</b> in the Help System.</p>	<p>Given that <b>question</b> was used with a yes-no answer:</p> <pre>if answer = "yes   [setsh "happy] if answer = "no   [setsh "sad]</pre>
<b>closeworksheet</b>	<p>Closes and saves the current Microsoft Excel file. This is the Excel file that was opened with the command <b>openworksheet</b>.</p> <p>See <b>getcell</b> and <b>setcell</b>.</p>	<p>MicroWorlds EX will create this worksheet if it doesn't exist:</p> <pre>openworksheet "graph "sheet1 setcell 1 2 10 closeworksheet</pre>
<b>getcell</b>  <i>row-number</i>  <i>column-number</i>	<p>Reports the value of the cell specified by the <b>row-number</b> and <b>column-number</b> of the current Microsoft Excel worksheet. Note that the command <b>openworksheet</b> makes an Excel worksheet available to MicroWorlds EX.</p> <p>See also <b>setcell</b> and <b>closeworksheet</b>.</p>	<p>MicroWorlds EX will create this worksheet if it doesn't exist. The result is just an example:</p> <pre>openworksheet "graph "sheet1 show getcell 1 1 50</pre>

<b>key?</b>	<p>Reports <b>true</b> if a key is being pressed on the keyboard. Use <b>stopall</b> to reset <b>key?</b> to false.</p> <p>See <b>readchar</b>.</p>	<p>Given that there are several pages in the project (click on the page before you start because <b>readchar</b> works when the page is the current "active" area:</p> <pre>to flip forever [nextpage wait 10] waituntil [key?] cancel [nextpage wait 10] end</pre>
<b>mousepos</b>	<p>Stands for <b>mouse position</b>. Reports the page coordinates representing the current mouse position on the screen.</p> <p>See <b>setpos</b>.</p>	<p>Given that there is a turtle on the page:</p> <pre>setpos mousepos</pre>
<b>openworksheet</b>  <i>pathname</i>  <i>sheet</i>	<p>Opens the specified file in Microsoft Excel on the specified worksheet. The first input must be the name of an Excel file in the current directory or a full or relative path. The second input must be the name of the sheet.</p> <p>The Excel related primitives only work if you have this program available on your computer.</p> <p>See <b>getcell</b>, <b>setcell</b>, and <b>closeworksheet</b>.</p>	<p>MicroWorlds EX will create this worksheet if it doesn't exist:</p> <pre>openworksheet "cards "sheet1</pre>
<b>question</b>  <i>word-or-list</i>	<p>Opens a dialog box displaying the question and an area to type the answer. <b>Answer</b> reports what was typed in the dialog box. If you write a very long question, only the part that fits is displayed. If you drag the dialog box to a new position while the question is being displayed, this is the position where the next question dialog is opened in the project.</p> <p>See <b>answer</b>.</p>	<pre>question [Are you in a good mood today? (answer yes or no)] question [ Are you in a good mood today? (answer yes or no) ]</pre>

<p><b>readchar</b></p>	<p>Pauses the execution and waits for a character to be typed on the keyboard.</p> <p>See <b>key?</b> and <b>onreadline</b>.</p>	<p>Given that there is a turtle on the page. Click on the page before you start because <b>readchar</b> works when the page is the current "active" area:</p> <pre> to direct let [key readchar] if (ascii :key) = 37   [seth 270] if (ascii :key) = 38   [seth 0] if (ascii :key) = 39   [seth 90] if (ascii :key) = 40   [seth 180] end </pre> <p>Animate the turtle and create a button with the instruction Direct in Forever mode. You can now use the arrow keys to control the turtle.</p>
<p><b>setcell</b></p> <p><i>row-number</i></p> <p><i>column-number</i></p> <p><i>value</i></p>	<p>Sets the <b>value</b> of the specified cell (in <b>row-number</b>, <b>column-number</b>) in the current Microsoft Excel worksheet. Note that the command <b>openworksheet</b> makes an Excel <b>worksheet</b> available to MicroWorlds EX.</p> <p>The Excel related primitives only work if you have this program available in your computer.</p> <p>See <b>getcell</b> and <b>closeworksheet</b>.</p>	<p>Given that this worksheet exists:</p> <pre> openworksheet "cards "sheet1 setcell 1 1 50 setcell 1 2 100 setcell 1 3 " =AVERAGE(A1:B1)  show getcell 1 3 75 </pre>

## Time

Primitive	Description	Examples
<b>Input(s)</b>		
<b>reset</b>	<p>Stands for <b>reset</b> timer. Resets the timer to 0. The timer starts when you start up MicroWorlds EX.</p> <p>See <b>timer</b>.</p>	<p>Define this procedure and run the other instructions in the Command Center.</p> <pre> to reflex   reset   setnum1 1 + random 10   setnum2 1 + random 10   question   (se [What is] num1     "times num2 [?])   ifelse answer = num1 *     num2     [announce se timer /   10 "sec]     [announce [Wrong   answer]] end </pre> <p>Type this in the Command Center:</p> <pre> createprojectvar "num1 createprojectvar "num2 reflex </pre>
<b>timer</b>	<p>Reports a number representing the time elapsed since MicroWorlds EX started, or since the last <b>reset</b> command was run. The number is in tenths of a second.</p> <p>See <b>reset</b>.</p>	<p>Define this procedure and run the other instructions in the Command Center.</p> <pre> to reflex   reset   setnum1 1 + random 10   setnum2 1 + random 10   question   (se [What is] num1     "times num2 [?])   ifelse answer = num1 *     num2     [announce se timer /   10 "sec]     [announce [Wrong   answer]] end </pre> <pre> createprojectvar "num1 createprojectvar "num2 reflex </pre>



<b>wait</b>  <i>duration</i>	Causes a pause in the execution of a program or instruction. <b>Duration</b> is measured in 10ths of a second.	Given that there is a turtle on the page:  forever [fd 1 wait 1]
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## Sound

Primitive	Description	Examples
<b>Input(s)</b>		
<b>note</b>  <i>number-or-list-of-numbers</i>  <i>duration</i>	<p>Plays a note using the current instrument. The first input is the MIDI note number and the second is the duration in tenths of a second. If the first input is a list of numbers, <b>note</b> plays a chord. Middle C is 60. The maximum number for <b>note</b> is 127; the maximum <b>duration</b> is 255. There can be no more than 16 numbers in <b>list-of-numbers</b>.</p> <p>See <b>rest</b>.</p>	<pre>note 60 4 note [72 76 79 84] 15</pre>
<b>rest</b>  <i>duration</i>	<p>Inserts a rest in a sequence of notes. The <b>duration</b> is in tenths of a second, and has a maximum of 255.</p> <p>See <b>note</b>.</p>	<pre>to song note 60 5 note 62 5 note 64 5 rest 10 note 60 5 note 62 5 note 60 15 end</pre>
<b>setinstrument</b>  <i>name-or-number</i>	<p>Sets the instrument for the next <b>note</b> command. There are 7 instrument names: piano, harpsichord, vibraphone, guitar, violin, clarinet, and kalimba. You can also use any number from 1 to 128. This setting is not saved with the project. If needed, put a <b>setinstrument</b> instruction in a <b>startup</b> procedure. See <b>Startup</b> in the Help System.</p>	<pre>setinstrument "violin note 60 10</pre>

## Workspace

Primitive Input(s)	Description	Examples
<b>recycle</b>	<p>Frees up unused MicroWorlds EX memory space. MicroWorlds EX automatically recycles by itself to free up space. Therefore, only use the <b>recycle</b> command when you do not want the automatic recycle to occur when you are running a program.</p> <p>See <b>space</b>.</p>	<pre>show space recycle show space</pre>
<b>space</b>	<p>Reports the amount of free MicroWorlds EX space in bytes.</p> <p>See <b>recycle</b>.</p>	<pre>show space recycle show space</pre>