



LIST OF LYNX PRIMITIVES



List of Lynx Primitives

This Guide contains the entire list of Lynx primitives. The [primitives](#) constitute the permanent Lynx vocabulary: these words are always available, in any project (unlike the [Procedures](#) that you create, which are part of the vocabulary only within the project you are working on).

In addition to these primitives, the Lynx vocabulary also includes some "dynamic" words that exist only in relation to objects that you create. For example, when you create a turtle "t1", the primitive "[t1](#)," also exists. When you create a text box "Text1", the primitives "[text1](#)," and the primitive "[text1](#)" also exist. [Page1](#) is also a primitive and if you add a second page then [page2](#) becomes a primitive.

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Note: This is the complete list of primitives. The primitives that appear in **bold** in the list are those that are present in the Help page of the *Learner mode*.

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Turtle position and orientation

BACK BK	BACK number Moves the turtle backwards. Often used with forward, pd, right, left, wait. repeat 4 [BACK 50 lt 90]
DISTANCE	DISTANCE turtle-name Reports the distance between the current turtle and the turtle indicated. if 50 < DISTANCE "t2 [towards "t2]
FORWARD FD	FORWARD number Moves the turtle forward. Often used with back, pd, right, left, wait. repeat 4 [FORWARD 50 right 90 wait 2]
GLIDE	GLIDE distance speed Makes the turtle glide over the distance indicated at the speed indicated. Often used with left, right, everyone. everyone [GLIDE 50 1]
HEADING	HEADING Reports the current turtle's heading in degrees. setheading HEADING + 180
HOME	HOME Moves the turtle to the center of the page coordinates [0 0], pointing up. Often used with clean, cg. HOME
LEFT LT	LEFT number Turns the turtle to the left. repeat 5 [forward 50 LEFT 144]
POS	POS Reports the position of the turtle. Often used with show, setpos. show POS
RIGHT RT	RIGHT number Turns the turtle to the right. Often used with left, forward, back, random. repeat 5 [forward 50 RIGHT 144]
SETHEADING SETH	SETHEADING number Sets the turtle's heading to the specified direction (in degrees). Often used with forward, back, random, setpos. SETHEADING -90

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SETPOS	SETPOS [x y] Moves the turtle to the designated x y coordinates. Often used with pos, setheading, home, setshape. SETPOS [0 0]
SETX	SETX number Sets the x coordinate of the current turtle. Often used with sety, xcor, home, random. SETX 100
SETY	SETY number Sets the y coordinate of the current turtle. Often used with setx, ycor, home, random. SETY 100
TOWARDS	TOWARDS turtle-name Sets the heading of the current turtle to aim towards the turtle whose name is given as input. if 30 < distance "t2 [TOWARDS "t2]
XCOR	XCOR Reports the x coordinate of the current turtle. Often used with show, pos. repeat 360 [setx XCOR + 5]
YCOR	YCOR Reports the y coordinate of the current turtle. Often used with show, pos. repeat 360 [sety YCOR + 5]

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Turtles and graphics

BG	BG Reports a number representing the colour of the background. repeat 140 [setbg BG + 1]
CG	CG Clears the graphics on the page and returns the current turtle to its home position, facing up. Often used with clean, home, zamboni, sweep. CG
CLEAN	CLEAN Clears the graphics without changing any turtle's position. Often used with cg, home, zamboni, sweep. CLEAN
COLOR	COLOR Reports the turtle's colour as a number. repeat 140 [setc COLOR + 1]
COLORUNDER	COLORUNDER Reports the colour under the current turtle as a number. if COLORUNDER = 9 [setheading 15 forward 15]
FILL	FILL Fills a closed shape or the whole screen with the turtle's pen colour. Often used with setcolour. FILL
FREEZEBG	FREEZEBG Freezes the background graphics in their current state. FREEZEBG
NAMEFROMCOLOR	NAMEFROMCOLOR number Reports the name of the input colour. NAMEFROMCOLOR colourunder
PD	PD Puts down the pen of the current turtle. Often used with forward, back, pu, pe, setpos. repeat 6 [pu forward 10 PD forward 10]
PE	PE Puts down the eraser of the current turtle. Often used with forward, back, pd, pu, setpos. fill PE fd 50

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PENSIZE	PENSIZE Reports a number representing the pen size of the current turtle. setpensize PENSIZE + 20
PU	PU Lifts up the pen of the current turtle. Often used with forward, back, pd, pe, setpos. repeat 6 [PU forward 10 pd forward 10]
SETBG	SETBG colour-name-or-number Sets the background colour for the page. Often used with fill. SETBG 18
SETCOLOR SETC	SETCOLOR colour-name-or-number Sets the colour of the turtle's pen. Often used with setpensize, pd, fill, forward, back. SETCOLOR 54
SETPENSIZE	SETPENSIZE number Sets the turtle's pen size which determines the thickness of the lines it will draw. Often used with pd, setcolour, forward, back. SETPENSIZE 100
STAMP	STAMP Stamps a copy of the turtle on the background. repeat 10 [STAMP forward 40]
UNFREEZEGB	UNFREEZEGB Unfreezes the background that was frozen by freezebg. UNFREEZEGB

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Turtle state

HT	HT Hides the current turtle. Often used with st. repeat 10 [st wait 5 HT wait 5]
INBACK	INBACK Puts the current turtle behind all the other turtles on the page. INBACK
INFRONT	INFRONT Brings the current turtle in front of all the other turtles on the page. INFRONT
OPACITY	OPACITY Returns the opacity of the current turtle. setopacity OPACITY + 10
SETOPACITY	SETOPACITY number Sets the opacity of the turtle and its pen. SETOPACITY 50
SETSHAPE	SETSHAPE shape-name-or-number SETSHAPE list-of-names-or-numbers Sets the shape of the turtle, or sets several shapes for an animation based on the turtle going forward and back. Often used with forward, back, wait, setheading. SETSHAPE 1 SETSHAPE "cat SETSHAPE [1 2 3] SETSHAPE [cat1 cat2 cat3]
SETSIZE	SETSIZE number Sets the size of the turtle. Often used with size, random, setcolour. SETSIZE 15
SHAPE	SHAPE Reports the shape name or number, or a list of shape names or numbers of the current turtle. repeat 4 [setsh SHAPE + 1]
SIZE	SIZE Reports the size of the current turtle. repeat 12 [setsize SIZE + 5 wait 5]
ST	ST Shows the current turtle. Often used with ht. t1, repeat 5 [ht wait 5 ST wait 5]

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Turtle (other)

CLICKOFF	CLICKOFF Simulates a mouse click on the current turtle, turning it off if it was on. t2, CLICKOFF
CLICKON	CLICKON Simulates a mouse click on the current turtle, turning it on if it was off. t2, CLICKON
DUPLICATETURTLE	DUPLICATETURTLE turtle-name Creates a copy of the named turtle. DUPLICATETURTLE "t1
TELL	TELL turtle-name word-or-list TELL list-of-turtle-names word-or-list Sends a message for one or more turtles to hear. Tell triggers the instruction found in the OnMessage field of turtle's backpack, on the Rules tab. TELL "t2 "here TELL [t1 t2 runner] "here
TOUCHING?	TOUCHING? turtle-name turtle-name Reports true if the two turtles are touching each other. waituntil [TOUCHING? "t1 "t2]
WHO	WHO Reports the name of the current turtle. everyone [forward 20 * butfirst WHO]

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Text

ANNOUNCE	ANNOUNCE word-or-list Displays the message in an alert box. Often used with question, answer, if, ifelse. ANNOUNCE [Guess what!]
ASCII	ASCII char Reports the ASCII number which represents the character. show ASCII "a"
BOTTOM	BOTTOM Puts the cursor (insertion point), in the current text box, at the end of the text. BOTTOM
CB	CB Moves the cursor (insertion point), in the current text box, to the previous character. repeat 5 [CB insert "x CB]
CC	CC Clears the text in the Command Center. CC
CD	CD Moves the cursor (insertion point), in the current text box, to the next physical line. repeat 5 [CD insert "x]
CF	CF Moves the cursor (insertion point), in the current text box, to the next character. repeat 5 [CF insert "x]
CHAR	CHAR number Reports the character represented by the ASCII number given as input. show CHAR 65
CLEARTEXT CT	CLEARTEXT Clears the text in the current text box. Often used with print, insert. text1, CLEARTEXT
COPY	COPY Puts a copy of the selected text in the Clipboard. COPY
CU	CU Moves the cursor (insertion point), in the current text box, to the previous physical line. repeat 5 [CU insert "x]

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CUT	CUT Deletes the text selection in the current text box and puts a copy in the Clipboard. CUT
DELETE	DELETE Deletes the character to the right of the insertion point, in the current text box. DELETE
EOL	EOL Brings the cursor (insertion point), in the current text box, to the end of the current logical line. top EOL insert "!!!
EOT?	EOT? Reports true if the cursor (insertion point), in the current text box, is at the end of the text. if EOT? [stop]
HIDETEXT	HIDETEXT Hides the current text box. HIDETEXT wait 30 showtext
INSERT	INSERT word-or-list Prints the input at the cursor position, in the current text box. Often used with print, cleartext. INSERT "Here
PASTE	PASTE Pastes a copy of the Clipboard in the current text box. PASTE
PRINT PR	PRINT word-or-list Prints a word or list in the current text box. Often used with insert, cleartext. PRINT "Welcome
SEARCH	SEARCH word Tells Lynx to search and select (highlight) the word in the current text box. SEARCH "tech
SELECT	SELECT Tells Lynx to start selecting text in the current text box. SELECT
SELECTED	SELECTED Reports as a word a copy of the characters in the block of selected text in the active text box. make "selection SELECTED

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SETFONTSIZE	SETFONTSIZE number Sets the font size for the current text box. SETFONTSIZE fontsize + 12
SHOW	SHOW word-or-list Prints a word or a list in the Command Center. Often used with print, insert. SHOW "hello SHOW [hello there] SHOW pos
SHOWTEXT	SHOWTEXT Makes the current text box visible. SHOWTEXT
SOL	SOL Brings the cursor (insertion point), in the current text box, to the beginning of the current logical line. SOL
TEXTCOUNT	TEXTCOUNT text-name Reports the number of lines in the named text box. show TEXTCOUNT "text1
TEXTITEM	TEXTITEM line-number text-name Reports the designated "line" of the named text box. show TEXTITEM 2 "text1
TEXTPICK	TEXTPICK text-name Reports the text in a randomly-chosen line from the named text box. show TEXTPICK "text1
TEXTWHO	TEXTWHO Reports the name of the current text box. show TEXTWHO
TOP	TOP Moves the cursor (insertion point) to the beginning of the text in the current text box. pr "there! TOP print "Hello
TRANSPARENT	TRANSPARENT text-name Makes the designated text box transparent. TRANSPARENT "text1
UNSELECT	UNSELECT Undoes the highlighting effect of select or search. UNSELECT

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Words and lists

BUTFIRST BF	BUTFIRST word-or-list Reports all but the first component of a word or list. show BUTFIRST "hello show BUTFIRST [one two three]
BUTLAST BL	BUTLAST word-or-list Reports all but the last component of a word or list. show BUTLAST "hello show BUTLAST [one two three]
COUNT	COUNT word-or-list Reports the number of components in the word or the list. show COUNT "hello show COUNT [one two three]
EMPTY?	EMPTY? word-or-list Reports true if the input is an empty word or empty list. show EMPTY? " show EMPTY? []
EQUAL?	EQUAL? word-or-list1 word-or-list2 Reports true if the two inputs are equal. show EQUAL? "A "a
FIRST	FIRST word-or-list Reports the first component of the word or list. show FIRST "hello
FPUT	FPUT word-or-list list Reports the list created by adding the first input at the beginning of the second input. show FPUT "h "ello
IDENTICAL?	IDENTICAL? word-or-list1 word-or-list2 Reports true if both inputs are identical. show IDENTICAL? "a "A
ITEM	ITEM number word-or-list Reports the specified element of a word or a list. show ITEM 5 "hello
LAST	LAST word-or-list Reports the last component of the word or list. show LAST "hello
LIST	LIST word-or-list1 word-or-list2 Reports one list made by combining the inputs (words or lists). show LIST 2 3

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LIST?	LIST? word-or-list Reports true if the input is a list. show LIST? [one two three]
LPUT	LPUT word-or-list list Reports the list created by adding the first input at the end of the second input. show LPUT "o "hell
MEMBER?	MEMBER? word-or-list1 word-or-list2 Reports true if the first input is a component of the second. show MEMBER? "o "hello
NUMBER?	NUMBER? word-or-list Reports true if the input is a number. show NUMBER? 123.456
PARSE	PARSE word Turns character strings into plain lists. show PARSE text1
PICK	PICK word-or-list Reports an element chosen randomly from the word or the list. show PICK [t1 t2 t3]
SENTENCE SE	SENTENCE word-or-list1 word-or-list2 Reports a list which is made up of its inputs (words or lists). show SENTENCE "Let's "go
WORD	WORD word-or-list1 word-or-list2 Combines its inputs into one word and reports the word. show WORD "hel "lo
WORD?	WORD? word-or-list Reports true if the input is a word. show WORD? "hello

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Numbers and Math

ABS	ABS number Reports the absolute value of its input. sety ABS xcor
ARCTAN	ARCTAN number Reports the arc tangent (the inverse function of the tangent) of its input. show ARCTAN 1 / 2
COS	COS number Reports the cosine of its input. show COS heading
DIFFERENCE	DIFFERENCE number1 number2 Reports the result of subtracting number2 from number1. show DIFFERENCE 100 50
EXP	EXP number Reports the number to the power of the constant e. show EXP 10
GREATER?	GREATER? number1 number2 Reports true if the first input is greater than the second input. if GREATER? xcor ycor [setc "lime"]
INT	INT number Reports the integer portion of its input. setx 30 * INT xcor / 30
LESS?	LESS? number1 number2 Reports true if the first number is less than the second number. if LESS? xcor ycor [setc "lime"]
LN	LN number Stands for natural logarithm. Reports the natural logarithm (the logarithm in base e) of the number. show LN 100
LOG	LOG number Reports the logarithm of the number. show LOG 100
MINUS	MINUS number Reports the additive inverse of its input. setx MINUS ycor

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PI	PI Reports the constant pi. show PI
POWER	POWER number1 number2 Reports number1 raised to the power of number2. show POWER 10 2
PRODUCT	PRODUCT number1 number2 Reports the result of multiplying its inputs. show PRODUCT xcor 10
QUOTIENT	QUOTIENT number1 number2 Reports the result of dividing number1 by number2. show QUOTIENT xcor 10
RANDOM	RANDOM number Reports a random non-negative integer (including 0) less than number. Often used with setcolour, forward, back, right, left. fd 20 + RANDOM 30
REMAINDER	REMAINDER number1 number2 Reports the remainder after number1 is divided by number2. show REMAINDER 100 3
ROUND	ROUND number Reports the number given as input rounded to the nearest integer. show ROUND 10.5
SIN	SIN number Reports the sine of number degrees. show SIN heading
SQRT	SQRT number Reports the square root of its input. show SQRT 100
SUM	SUM number1 number2 Reports the sum of its inputs. show SUM xcor ycor
TAN	TAN number Reports the tangent of its input. show TAN heading

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Objects

ASK	ASK turtle-or-text-name list-of-instructions ASK list-of-names list-of-instructions Temporarily tells each element in the first input to run the instruction list. Often used with everyone, talkto. ASK [t1 t2 t3] [clickon]
FREEZE	FREEZE object-or-page-name FREEZE list-of-names Freezes objects so that they cannot be moved, resized, or removed with the mouse. FREEZE "t1 FREEZE [button1 button2] FREEZE "page1
GET	GET object property Reports a property of an object in the current project. show GET "t1 "rule
NEWPAGE	NEWPAGE Opens a new page called NEWPAGE
NEWSLIDER	NEWSLIDER word [x y] [min max current] Creates a new slider using the specified name at the position indicated. NEWSLIDER "step [100 100] [0 8 3]
NEWTEXT	NEWTEXT word [x y] [xsize ysize] Creates a new text box using the name and size specified at the position indicated. NEWTEXT "mynotes [0 0] [50 100]
NEWTURTLE	NEWTURTLE turtle-name Creates a new turtle with the name indicated. NEWTURTLE "jo
REMOVE	REMOVE object-name REMOVE page-name Deletes an object or a page. REMOVE "t1
RENAME	RENAME object-name new-object-name Sets a new name for the object or the page. RENAME "t1 "myfriend
SET	SET object property value Sets a property for an object to the specified value. SET "text1 "visible? "false

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TALKTO	TALKTO turtle-or-text-name TALKTO list-of-names Makes the turtle(s) or text box current. Often used with everyone, who. TALKTO [t1 t2 t3] TALKTO "text1
UNFREEZE	UNFREEZE object-name-or-page-name UNFREEZE list-of-names Unfreezes the button, text box, turtle, slider, or any object on a page, so they can be changed using the mouse. UNFREEZE "t1 UNFREEZE [button1 button2]

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Time

RESETT	RESETT Stands for reset timer. Resets the timer to 0. The timer starts when you start up Lynx. Often used with timer, wait. RESETT repeat 360 [rt 1] show timer
TIMER	TIMER Reports a number representing the time elapsed since the program started, or since the last resett command was run. resett repeat 360 [rt 1] show TIMER

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Variables

CLEARNAME	CLEARNAME word Clears a global variable from memory. CLEARNAME "speed
CLEARNAMES	CLEARNAMES Clears all the global variables from memory. CLEARNAMES
LET	LET list-of-names-and-values Creates one or many temporary variables. LET [family [t1 t2 t3 t4]]
MAKE	MAKE word word-or-list Creates a variable and gives it the value word-or-list. MAKE "age 12
NAME?	NAME? word Reports true if the input is the name of a variable. show NAME? "age
NAMES	NAMES Reports the names of all the variables with their values. show NAMES
THING	THING name Reports the value of the named variable. print THING "speed

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Pages and project

GETPAGE	GETPAGE page-name Displays the page. GETPAGE first pagelist
NAMEPAGE	NAMEPAGE page-name Names the page being displayed with the input. NAMEPAGE "presentation"
NEXTPAGE	NEXTPAGE Displays the next page (alphabetical order). NEXTPAGE
PAGELIST	PAGELIST Reports a list containing the names of all the pages in the current project. show PAGELIST
PREVPAGE	PREVPAGE Displays the previous page (alphabetical order). PREVPAGE
PROJECTSIZE	PROJECTSIZE Reports the current project size, in turtle steps. show PROJECTSIZE

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Logic

AND	AND true-or-false1 true-or-false2 Reports true if all its inputs report true. show AND heading = 0 shape = 0
IF	IF true-or-false list-to-run Runs the instruction list only if the condition (first input) reports true. Often used with ifelse, stop, stopall. IF colourunder = 9 [seth 15 fd 15]
IFELSE	IFELSE true-or-false list-to-run1 list-to-run2 Runs the first instruction list if the condition is true. Runs the second instruction list if the condition is false. Often used with if, stop, stopall. IFELSE heading = 0 [rt 90] [lt 90]
NOT	NOT true-or-false Reports the logical inverse of its input. ifelse NOT xcor > 0 [setc "red] [setc "blue]
OR	OR true-or-false1 true-or-false2 Reports true if any of its inputs report true. if OR xcor > 30 xcor < -3 [setc "red]

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Interaction

ANSWER	ANSWER Reports the contents of the last answer typed in the question dialog box. Often used with announce, question, if, ifelse. if ANSWER = "yes [setsh "happy]
MOUSEPOS	MOUSEPOS Reports the page coordinates representing the current mouse position on the screen. setpos MOUSEPOS
PEEKCHAR	PEEKCHAR Reports the last key pressed. Lynx remembers the key until another key is pressed or until skipchar is executed. Note: you must first click on the page background for this primitive to work. Often used with key?, skipchar. to use_keys forever [use_key] end to use_key if not key? [stop] if PEEKCHAR = "e [seth 90] if PEEKCHAR = "w [seth -90] skipchar end
QUESTION	QUESTION word-or-list Opens a dialog box displaying the question and an area to type the answer. Often used with announce, answer, if, ifelse. QUESTION [How's your day so far]
READCHAR	READCHAR Pauses the execution and waits for a character to be typed on the keyboard. Reports the last key pressed. Note: you must first click on the page background for this primitive to work. if key? [make "choice READCHAR]
SAY	SAY word-or-list Uses the Text-to-speech capability of your computer to "read" the input aloud. Often used with sayas and voices. SAY "hello SAY [Hello world]
SAYAS	SAYAS word-or-list voice Uses the Text-to-speech capability of your computer to "read" the input aloud. Often used with say and voices. SAYAS [Nice to meet you] pick voices

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SKIPCHAR	SKIPCHAR Lynx forgets the last key pressed. Note: you must first click on the page background for this primitive to work. Often used with key? and peekchar. <pre>to use_keys forever [use_key] end to use_key if not key? [stop] if peekchar = "e [seth 90] if peekchar = "w [seth -90] SKIPCHAR end</pre>
VOICES	VOICES Reports the list of voices available. Often used with say and sayas. show VOICES

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Control and events

BROADCAST	BROADCAST word-or-list Sends a message for all the turtles to hear. BROADCAST "here
CANCEL	CANCEL list-of-instructions Stops the process given as input. CANCEL [fd 4 wait 1]
CAREFULLY	CAREFULLY word-or-list-to-run1 word-or-list-to-run2 Runs the first input, a word or list of instructions. If the first input contains an error, CAREFULLY runs the second input and sets errormessage to the error that occurred. If there is no error in the first input, the second input is ignored. To be tried twice: CAREFULLY [newturtle "friend] [announce [It already exists]]
DOLIST	DOLIST range list-of-instructions Runs the instruction list for each item in a list. DOLIST [i [red green yellow orange black]] [setc :i wait 4]
DOTIMES	DOTIMES range list-of-instructions Runs the instruction list for each value specified in the range. DOTIMES [i 4] [pr se :i sqrt :i]
ERRORMESSAGE	ERRORMESSAGE Reports the last error message trapped by carefully. carefully [newturtle "friend][announce ERRORMESSAGE]
EVERYONE	EVERYONE list-of-instructions Makes all the turtles on the current page run the instruction, one after the other. EVERYONE [glide -80 2]
FOREVER	FOREVER word-or-list-to-run Runs the input repeatedly as an independent parallel process. Often used with clickoff, stopall. t2, FOREVER [fd 1 rt 2]
LAUNCH	LAUNCH word-or-list-to-run Runs the input as an independent parallel process. LAUNCH [chopin]
OUTPUT	OUTPUT word-or-list Stops the procedure and reports a word or list. to double :x OUTPUT :x + :x end

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REPEAT	REPEAT number list-of-instructions Runs the list of instructions the specified number of times. Often used with forward, back, right, left, wait. REPEAT 90 [back 40 forward 40 right 4]
RUN	RUN word-or-list-to-run Runs (executes) a word or an instruction list. RUN text1
STOP	STOP Stops the procedure that is running. Can only be used in a procedure. Often used with if, stopall. if :number > 100 [STOP]
STOPALL	STOPALL Stops all running procedures and processes including turtles and buttons. Often used with if, ifelse, stop. STOPALL
STOPME	STOPME Stops the process in which this command was run. t1, forever [forward 1 if (distance "t2) > 50 [STOPME]]
WAIT	WAIT number Causes a pause in the execution of a program or instruction. Often used with forward, back, right, left, repeat. forever [setsize 40 WAIT 2 setsize 20 WAIT 2]