

A Very Basic Introduction to MSW Logo Programming

Below I have reproduced a selection of notes from a course in Logo that I taught several years ago. I hope that the notes are of help to anyone who is interested in learning to use this programming language. The notes are organised into five key areas. It would be good to be familiar with one step before moving to the next one.

1. GETTING STARTED

To get started with MSW Logo, you just need to know a few commands:

Forward __ (Number refers to line length; can be abbreviated to FD __)

Back __ (Number refers to line length; can be abbreviated to BK __)

Right __ (Number always refers to measure of angle; can be abbreviated to RT __)

Left __ (Number always refers to measure of angle; can be abbreviated to LT __)

Home

Clearscreen (CS)

PenUp (PU)

PenDown (PD)

Hideturtle (HT)

ShowTurtle (ST)

Penerase (PE)

PenPaint (PPT)





Try experimenting with these in order to get an idea of what each one does.


2. USING THE REPEAT COMMAND

A next step is to begin using the repeat command. Try typing the following into the command screen:

```
Repeat 3 [fd 50 rt 50]
```

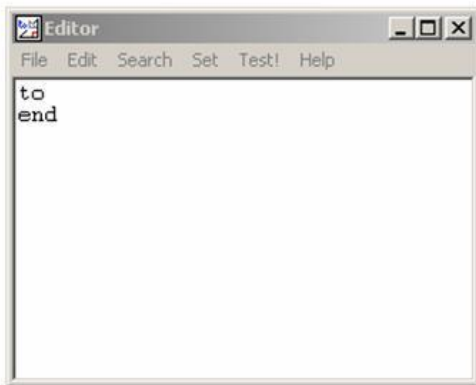
Experiment by making other shapes using the repeat command. This table might help you. Try making these shapes, filling in the details requested:

Polygon	Name	Number of sides	Size of external angles	Size of internal angles	Instructions to the Turtle
	Triangle	3			
	Square				
	Pentagon				
	Hexagon				

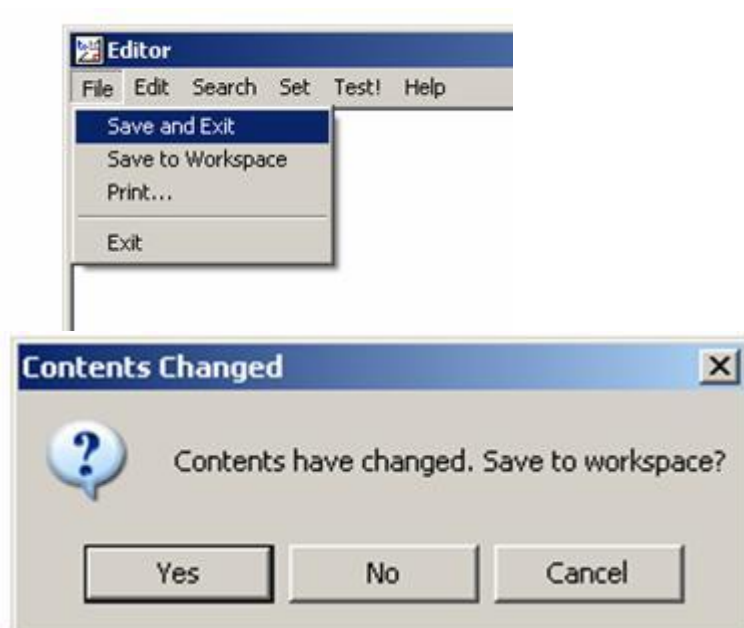
	Octagon				
	Nonagon				
	Decagon				

3. WRITING AND SAVING PROCEDURES

As you get more experience of using logo, you will find that it is beneficial to teach the computer additional commands that it can store and retrieve when you wish. These commands are known as procedures. In order to teach the turtle a new procedure you need to open a new window in MSW Logo. This window is known as the 'editor window.'



The editor window can be opened by typing "edall" in the input box. Try doing this first. Note that the two words that appear "to" and "end" are the first and last words respectively that you will need to use when writing any procedure. Close the window. You can do this by clicking on "File" and then "Save and exit" (see diagram below).



Another way of closing the window is simply clicking on the 'x' button on the top right of the window. When you do this the dialogue box that you see to the left will appear.

Because you have made no changes it doesn't really matter whether you click on yes or no. However, because you will want the turtle to remember things later, it is probably best to get into the habit now of clicking on "YES."

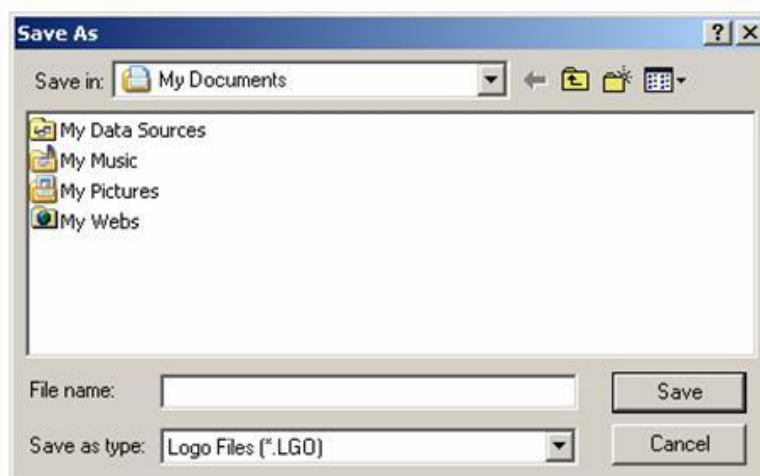
Suppose you want the turtle to be able to draw a square. You need to use the editor window to tell the turtle what to do. Start off by opening the editor window. Then type: "To Square". Next, hit the 'return' key. Type the instructions for drawing a square, using the repeat command (see above). When you have typed the instructions for drawing a square, hit the return key and then type: "end". Close the editor window. Save the changes. Now, it is time to check out if your procedure works. In the input window type: "square". If the turtle draws a square you have written the procedure correctly.

Try writing procedures to draw the shapes named in the table above.

After each of the shapes that you made above, you saved the changes. However, as soon as you exit MSW Logo these procedures will be lost unless you save them to a folder on your own computer. In order to do this, you need to go to File on the top right of the main MSW Logo screen and click on 'SaveAs' (See below).



Doing this will open a dialog box like this:



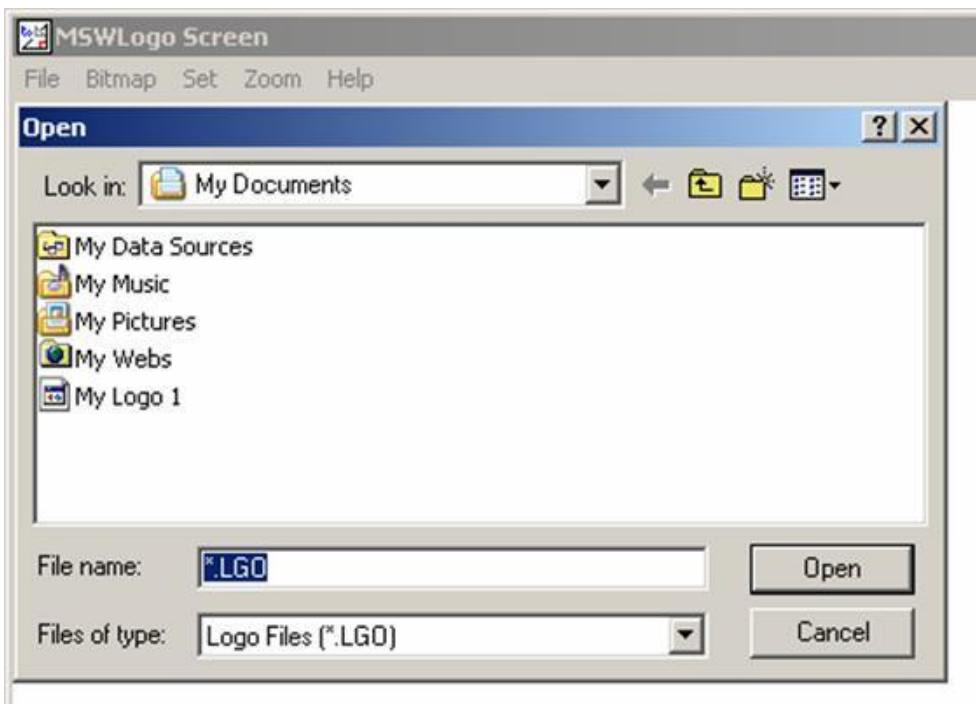
Choose a file in which to save your work. Call it something like "My Logo Projects." The folder name is just random. You can call your file whatever you like as long as you will be able to find the most up to date one quickly.

4. LOADING FILES AND INTRODUCING VARIABLES

Above you learned to save the procedures that you had prepared and typed into the "Edall" window. In order to have the benefit of this work you now need to load the work that you have saved. You do this by launching MSW Logo (if you have not already done this) and going to the File menu and clicking on Load.(See diagram)



This will open up a dialog box, that looks something like this one:



You now need to open the most recent logo file which you saved (this should be the one that contains the most correct procedures). When you have done this you can test if it is working by typing in the names of one of the procedures that you created, such as "pentagon", and see what happens. If the turtle draws a pentagon you have correctly loaded the file. If not, see if you can establish why.

The shapes above can now (hopefully!) be drawn by the computer simply by typing in the shape's name into the Input window and hitting the 'Enter' key. However, there is a problem. If you want to make something more complicated than a square, such as a house, you may need to use squares or rectangles of different sizes. Therefore you need to learn how to write procedures for shapes, so that you can vary, the size of the shape.

Look at the procedure that you wrote to draw a triangle. If you wanted to draw a smaller triangle, what measurements would you have to change? What measurements would stay the same?

In order to be able to draw shapes of different sizes, you need to introduce a variable. In other words, instead of putting in a number for the size when you write the procedure, you put in a letter (e.g. 'x') or a word and then you put in the actual measurement that you want when you type the name of the procedure into the input window.

One other thing, when you give your procedure a name you need to warn it to expect a variable and not a number. This is done by naming the variable and putting a colon before it. It will probably be easier to grasp this using an example:

```
To triangle :size (Notice that the variable is mentioned here with the colon before it)  
Repeat 3 [ fd :size rt 120] (Notice that instead of putting in the length of one side of the triangle you type in a colon and the name of the variable)  
End
```

To test if this works now, save it and type in triangle 50 (Remember in order for the turtle to be able to draw the shape you now have to tell it the value of the variable when you ask the turtle to draw the shape) in the input box. Now, try drawing triangles of different sizes.

Now, go back to all the shapes in your editor window and put variables into them all. Test that each new procedure works by making shapes of different sizes.

Challenge: Write a command for a rectangle, using variables and the repeat command. [Hint: you can use more than one variable provided you give them different names].

5. CHANGING THE COLOUR OF DRAWINGS

It is good to be able to add colour to your shapes. In order to be able to include colour in your pictures, you need to refer to a table where each colour is given a particular code. Here is such a table.

Name	Index	RGB values	Name	Index	RGB values
Black	0	[0 0 0]	Brown	8	[155 96 59]
Blue	1	[0 0 255]	Light brown	9	[197 136 18]
Green	2	[0 255 0]	Mid-green	10	[100 162 64]
Cyan	3	[0 255 255]	Blue-green	11	[120 187 187]
Red	4	[255 0 0]	Salmon	12	[255 149 119]
Magenta	5	[255 0 255]	Blue-ish	13	[144 113 208]
Yellow	6	[255 255 0]	Orange	14	[255 163 0]
White	7	[255 255 255]	Silver	15	[183 183 183]

If you want to change the pen colour to one of the colours above, you simply write the command 'Setpencolor ' followed by the appropriate RGB values into the procedure before the command that tells the turtle what line(s) to draw. E.g. Setpencolor [0 255 255]. (Notice the US spelling of 'color'). Try doing this to some of the procedures for shapes that you have already written. (NOTE: THE RGB VALUES SIMPLY DEFINE THE AMOUNT OF EACH OF THE COLOURS, RED, GREEN AND BLUE THAT YOU WANT TO BE PUT INTO THE MIX. LOOK, FOR EXAMPLE, AT THE VALUE FOR BLUE, THE VALUE IS 0 FOR RED, 0 FOR GREEN AND HIGHEST FOR BLUE)

It is also possible to fill a closed shape with a colour of your choice. In order to do this you first set the colour using the command "setfc" followed by the appropriate RGB values from the table above. This tells the turtle what colour you will fill the shape with.

In order to fill the shape you need to place the turtle inside the shape you want to fill (if the pen colour is different from the 'fill' colour you may need to type 'penup (pu) before moving it). When the turtle is inside the shape you are ready to fill the shape. You simply type the command 'fill' into the procedure.

Good luck!