

Scratch – Simple Programming

Creating Shapes

<http://www.yahmad.co.uk/>

Unit Overview

Objectives

Understand why computer programming scripts are used.

Understand the layout of the Scratch software.

Understand the use of basic motion and repeat commands.

Understand the use of Variables as place holders for information.

Outcomes

Time

Task 1	Create shapes in Scratch using basic commands.	
Task 2	Create shapes in Scratch using the repeat command.	
Task 3	Create a script containing suitable variables.	
Task 4	Create a simple Program to create all the shapes from the previous tasks	

Starter (Feature of Scratch)

The image shows the Scratch 1.4 interface with several annotations. On the left, the 'Scripts' category is highlighted in the 'Variables' section, with an arrow pointing to a 'when clicked' block containing a 'move 10 steps' block. A box labeled 'Scripts' points to this block. Below it, a box labeled 'Different types of Commands' points to the 'Scripts' category. In the center, the 'Stage' area contains the Scratch cat sprite, with a box labeled 'Sprite' pointing to it. At the bottom, the 'New sprite:' area shows a 'Create new Sprite' button, with a box labeled 'Create new Sprite' pointing to it. The interface also shows the 'Motion', 'Looks', 'Sound', and 'Pen' categories on the left, and the 'Costumes' and 'Sounds' tabs for the selected sprite.

Starter (Label the Shapes)



Triangle

Decagon

Dodecagon

Square

Octagon

Heptagon

Pentagon

Hexagon

Starter (Working out Exterior angle)

$360/3$ (Sides)

120 Degrees

Tip: To work out the exterior angle you need to **divide** the number of sides by 360 degrees.

3

Work out the exterior angle for the following **shapes**

4

Degrees

5

Degrees

6

Degrees

Starter – Complete the missing instructions

6 steps



3 steps

Start

3 steps

Start

Steps	Actions
1	3 steps forward
2	Rotate 90 degrees
3	6 steps forward
4	
5	
6	
7	
8	Finish

Steps	Actions
1	Rotate 120 degrees
2	3 steps forward
3	
4	
5	
6	
7	Finish

Task 1 – Create the following shapes

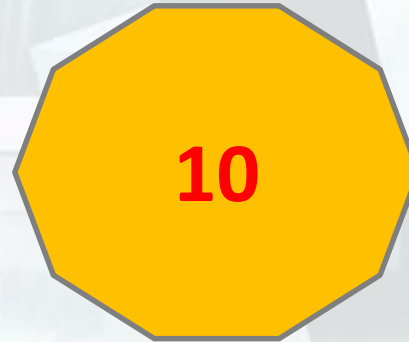
1. Create the following **shapes** in scratch using basic commands.

The image shows four Scratch code snippets for creating different shapes. Each snippet starts with a 'when key pressed' event block, followed by 'clear', 'pen down', and 'set pen color to' blocks. The shapes are defined by a sequence of 'turn' and 'move' blocks.

- Shape 3 (Triangle):** Triggered by 't' key. Sequence: turn 120 degrees, move 100 steps, turn 120 degrees, move 100 steps, turn 120 degrees, move 100 steps.
- Shape 4 (Square):** Triggered by 's' key. Sequence: turn 90 degrees, move 100 steps, turn 90 degrees, move 100 steps, turn 90 degrees, move 100 steps, turn 90 degrees, move 100 steps.
- Shape 5 (Pentagon):** Triggered by 'p' key. Sequence: turn 72 degrees, move 100 steps, turn 72 degrees, move 100 steps, turn 72 degrees, move 100 steps, turn 72 degrees, move 100 steps, turn 72 degrees, move 100 steps.
- Shape 6 (Hexagon):** Triggered by 'h' key. Sequence: turn 60 degrees, move 100 steps, turn 60 degrees, move 100 steps, turn 60 degrees, move 100 steps, turn 60 degrees, move 100 steps, turn 60 degrees, move 100 steps.



Task 2 – Repeat Command



1. Create the following **shapes** in scratch using the **repeat command**.

```
when up arrow key pressed
clear
pen down
set pen color to red
repeat 7
  turn 51.4 degrees
  move 100 steps
```

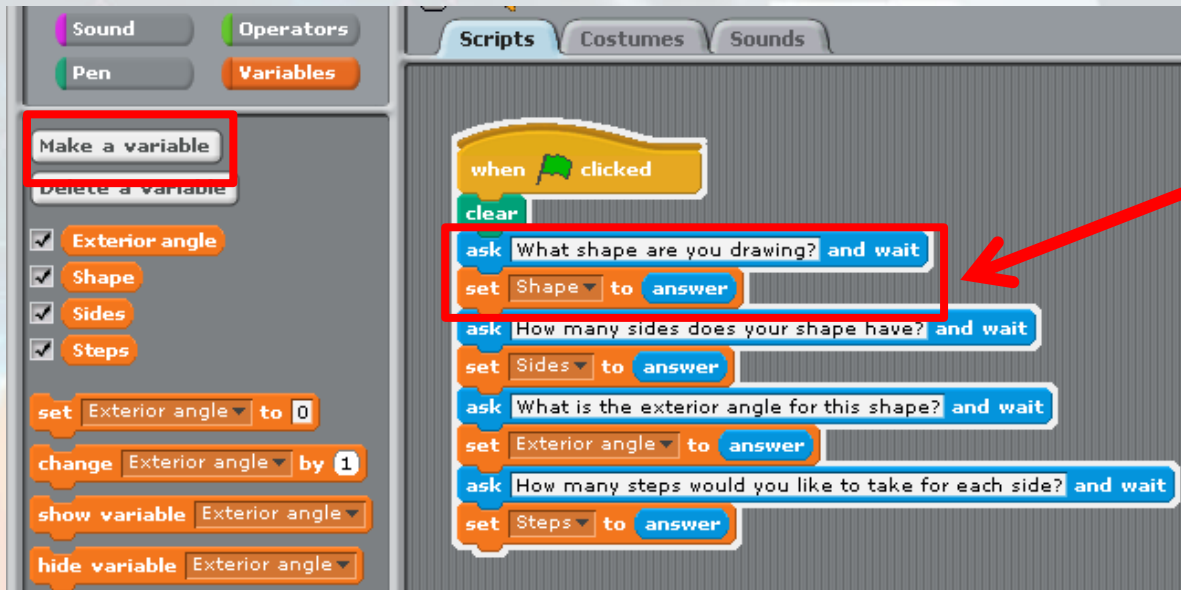
```
when down arrow key pressed
clear
pen down
set pen color to red
repeat 8
  turn 45 degrees
  move 100 steps
```

```
when right arrow key pressed
clear
pen down
set pen color to red
repeat 9
  turn 40 degrees
  move 80 steps
```

```
when left arrow key pressed
clear
pen down
set pen color to red
repeat 10
  turn 36 degrees
  move 80 steps
```


Task 3 – Variables

- **Variables** act as “**place holders**” for data in a computer program.



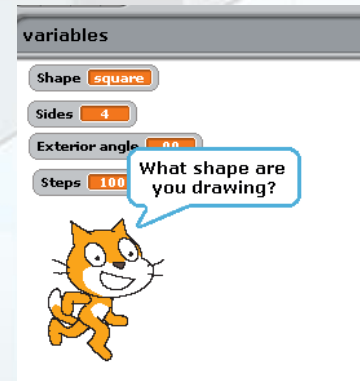
The image shows the Scratch interface. On the left, the 'Variables' category is selected, and the 'Make a variable' button is highlighted with a red box. Below it, several variables are listed: 'Exterior angle', 'Shape', 'Sides', and 'Steps', each with a checkmark. Below the list, there are controls for 'set', 'change', 'show variable', and 'hide variable' for the 'Exterior angle' variable. On the right, the 'Scripts' area shows a script starting with 'when green flag clicked', followed by 'clear', and then four 'ask' blocks with 'and wait' blocks, each followed by a 'set' block. The first 'ask' block is 'What shape are you drawing?' and the 'set' block is 'set Shape to answer'. This first 'ask' and 'set' block pair is highlighted with a red box, and a red arrow points from this box to the yellow text box on the right.

The **answer** to each question will be stored in the **relevant variable**.

The answer to the question “**What shape are you drawing**” will be stored in the **shape variable**.

Task: Create variable to store the answers from the following questions:

- 1) What **shape** are you drawing?
- 2) How many **sides** does your shape have?
- 3) What is the exterior **angle** for this shape?
- 4) How many **steps** would you like to take for each side?



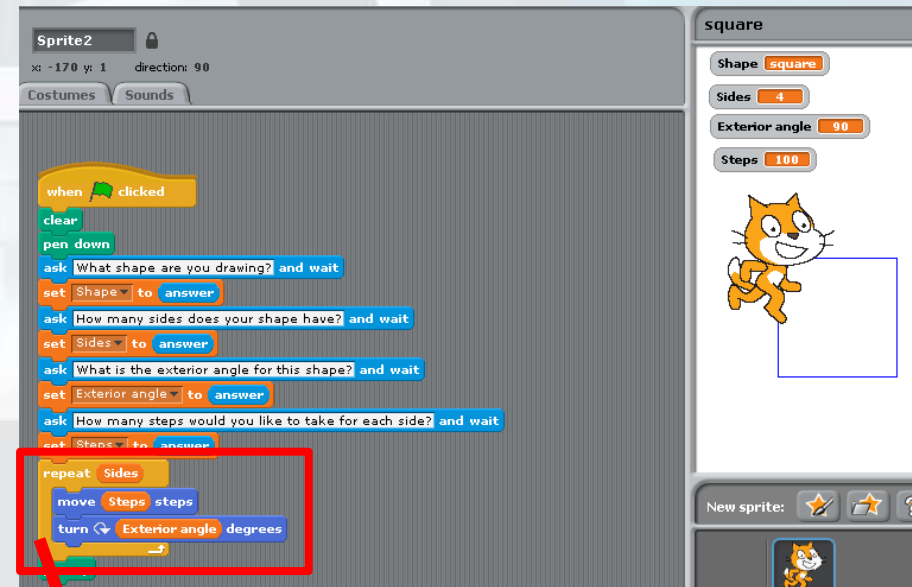
The image shows the 'variables' panel in Scratch. It lists four variables: 'Shape' with a value of 'square', 'Sides' with a value of '4', 'Exterior angle' with a value of '90', and 'Steps' with a value of '100'. Below the panel, the Scratch cat character is shown with a speech bubble that says 'What shape are you drawing?'.

Tasks 4 – Create a simple Program to create all of the shapes from the previous tasks

1. Your program needs to include:

1. Control command to start the script
2. Variables to store information about the shape (shape, sides, angles, steps etc.)
3. Repeat command
4. Pen up and Pen down command

2. You can add additional script to your program.



Plenary – Refer to the Lesson Objectives

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Understand why computer programming scripts are used.

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Plenary Task (Q&A)

Peer assess each other scripts.

Discuss the advantages for creating a program to create shapes.

Questions: Do you know why a repeat commands is used?

Question: What is the purpose of variables?