

# Lesson 3

Introducing Loops

A dark blue diagonal gradient bar that starts from the bottom left corner and extends towards the top right corner, covering the bottom half of the slide.

# Checkpoint 1

- ❖ A pentagon has an interior angle of 108 degrees.
- ❖ The sprite has to move the supplementary 72 degrees in order to make the correct angle.
- ❖ This process needs to be repeated five times

Your code should look like this:



# Checkpoint 1 (continued)

Triangle:



```
move 100 steps
turn 120 degrees
wait 0.5 secs
move 100 steps
turn 120 degrees
wait 0.5 secs
move 100 steps
turn 120 degrees
wait 0.5 secs
```

A Scratch code block for drawing a triangle. It consists of three pairs of 'move 100 steps' and 'turn 120 degrees' blocks, with a 'wait 0.5 secs' block between each pair.

Square:



```
move 100 steps
turn 90 degrees
wait 0.5 secs
move 100 steps
turn 90 degrees
wait 0.5 secs
move 100 steps
turn 90 degrees
wait 0.5 secs
move 100 steps
turn 90 degrees
wait 0.5 secs
```

A Scratch code block for drawing a square. It consists of four pairs of 'move 100 steps' and 'turn 90 degrees' blocks, with a 'wait 0.5 secs' block between each pair.

Pentagon:



```
move 100 steps
turn 72 degrees
wait 0.5 secs
move 100 steps
turn 72 degrees
wait 0.5 secs
move 100 steps
turn 72 degrees
wait 0.5 secs
move 100 steps
turn 72 degrees
wait 0.5 secs
move 100 steps
turn 72 degrees
wait 0.5 secs
```

A Scratch code block for drawing a pentagon. It consists of five pairs of 'move 100 steps' and 'turn 72 degrees' blocks, with a 'wait 0.5 secs' block between each pair.

# The Power of Loops

What have we noticed about our coding?

- Depending on the number of sides a shape has, we use that many sets of steps

What is the purpose of a loop?

- As coding becomes more complex, we often repeat the same steps many times. We can use repeat blocks to condense our script and make it easier to read.

# Checkpoint 2

```
pen down
move 100 steps
turn 60 degrees
wait 0.5 secs
move 100 steps
turn 60 degrees
wait 0.5 secs
move 100 steps
turn 60 degrees
wait 0.5 secs
move 100 steps
turn 60 degrees
wait 0.5 secs
move 100 steps
turn 60 degrees
wait 0.5 secs
move 100 steps
turn 60 degrees
wait 0.5 secs
```



```
pen down
repeat 6
  move 100 steps
  turn 60 degrees
  wait 0.5 secs
```

# Checkpoint 3

Your code should look like this:



The image shows a Scratch script with the following blocks:

- when **x** key pressed
- pen down
- ask "How many sides should the shape have?" and wait
- repeat **answer**
  - move **50** steps
  - turn  $180 - \frac{\text{answer} - 2 * 180}{\text{answer}}$  degrees

A yellow callout box points to the turn block with the following text:

This is the formula for degrees in a shape, divided by how many angles are in that shape, all subtracted by 180, so you turn the supplementary angle.

# Checkpoint 4

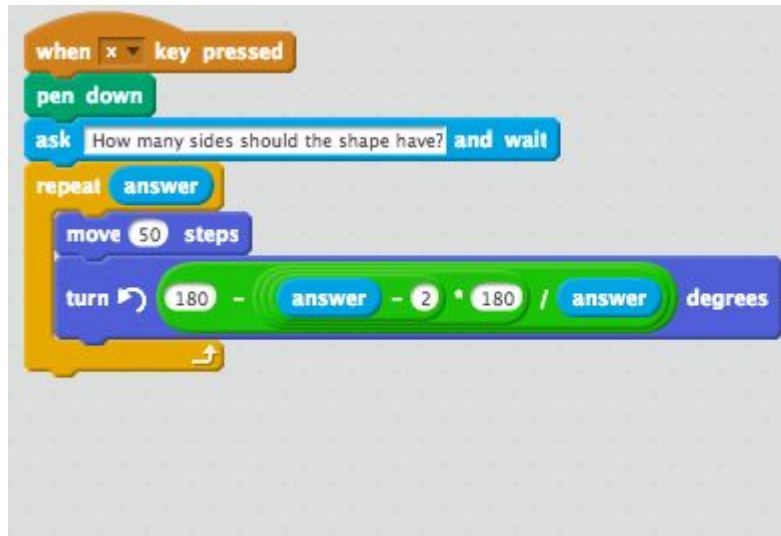
- Conditionals are used when your code relies on other factors.
- They can be used to give different outputs based on what is currently happening, and they can also be used for determining when an action will take place.





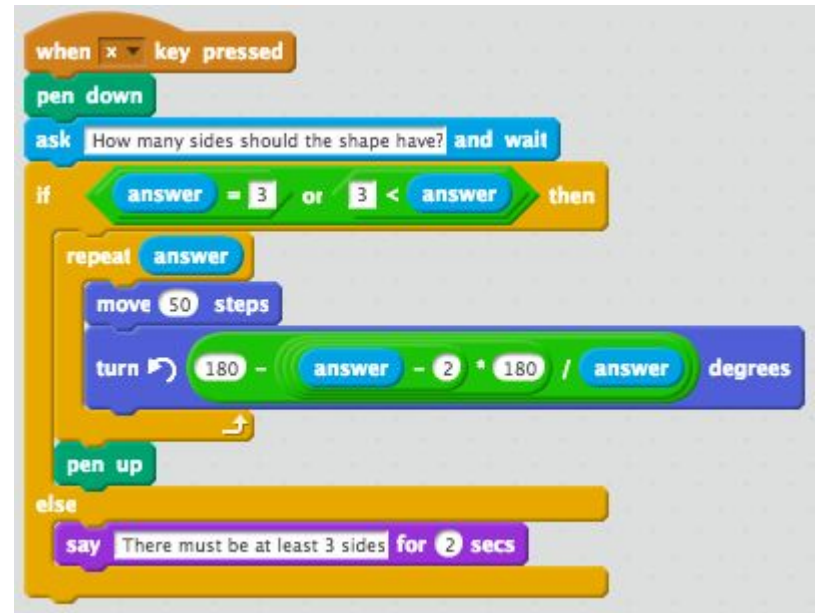
# Checkpoint 4

To correct our code, we must use a conditional like so:



```
when x key pressed
pen down
ask How many sides should the shape have? and wait
repeat answer
  move 50 steps
  turn 180 - (answer - 2 * 180 / answer) degrees
```

The code block on the left shows a sequence of steps: when the 'x' key is pressed, the pen is put down, and the user is asked for the number of sides. A loop then repeats the drawing process for the specified number of sides. Each iteration involves moving 50 steps and turning by an angle calculated as  $180 - \frac{(n - 2) \cdot 180}{n}$ , where  $n$  is the number of sides.



```
when x key pressed
pen down
ask How many sides should the shape have? and wait
if (answer = 3 or 3 < answer) then
  repeat answer
    move 50 steps
    turn 180 - (answer - 2 * 180 / answer) degrees
  pen up
else
  say There must be at least 3 sides for 2 secs
```

The code block on the right introduces a conditional check. It uses an 'if' block with the condition  $(\text{answer} = 3 \text{ or } 3 < \text{answer})$ . If this condition is true, the drawing loop from the previous code is executed. After the loop, the pen is put up. If the condition is false (i.e., the user entered a number less than 3), an 'else' block triggers a 'say' block that displays the message 'There must be at least 3 sides' for 2 seconds.



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