

Scratch – Simple Programming



Simple Game

Unit Overview

Objectives

Understand why computer programming scripts are used.

Understand the use of Variables as place holders for information.

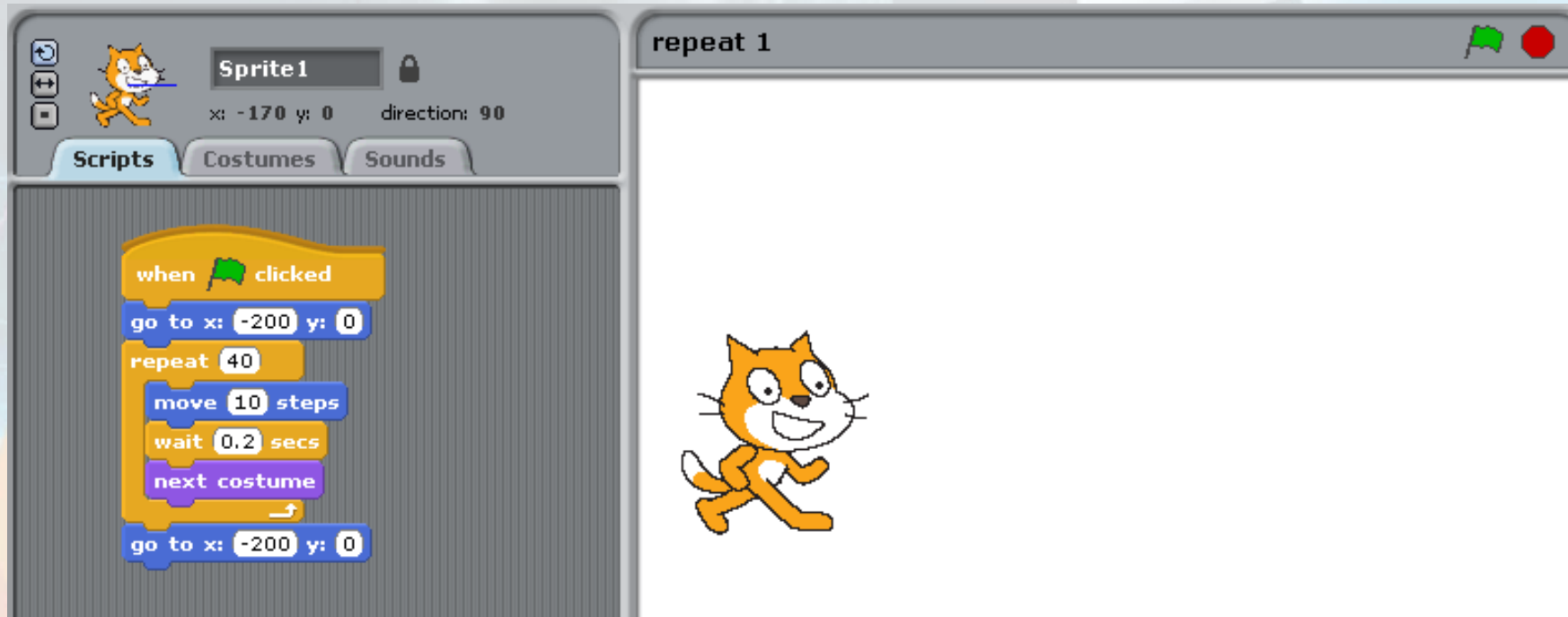
Understand the script required to build simple games.

Outcomes

Time

Task	Description	Time
Task 1	Using Repeat Command for Movement	
Task 2	Variables and Forever If	
Task 3	Keyboard Controls	
Task 4	Maze (Keyboard)	
Task 5	Maze (Keyboard) Extension	
Task 6	Maze (Mouse)	

Starter 1 - Discuss this piece of code



The image shows the Scratch interface. On the left, the 'Sprite 1' panel displays the cat sprite with coordinates x: -170 y: 0 and direction: 90. Below the sprite are tabs for 'Scripts', 'Costumes', and 'Sounds'. The 'Scripts' tab is active, showing a script that starts with 'when green flag clicked', followed by 'go to x: -200 y: 0', a 'repeat' loop of 40 iterations containing 'move 10 steps', 'wait 0.2 secs', and 'next costume', and finally 'go to x: -200 y: 0'. On the right, the 'repeat 1' window shows the cat sprite in a running pose.

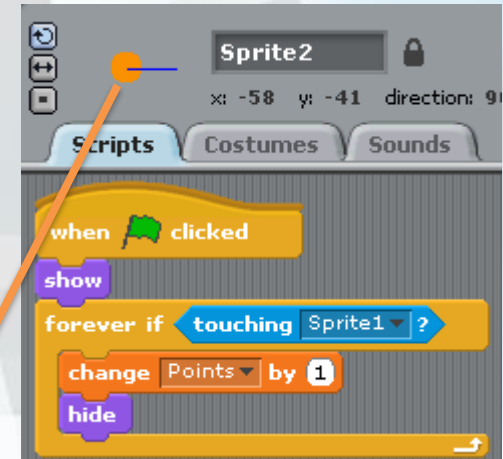


The image shows the 'Costumes' tab in the Scratch interface. It displays two costumes for the cat sprite. The first costume is 'costume1' with a size of 95x111 and a file size of 4 KB. The second costume is 'costume2' with the same size and file size. Each costume has 'Edit', 'Copy', and 'X' buttons.

- 1) What will happen to the cat (sprite) when the script is run?
- 2) What does **next costume** mean?
- 3) What does **go to x:-200 y:0** mean?

Starter 2 - Discuss this piece of code

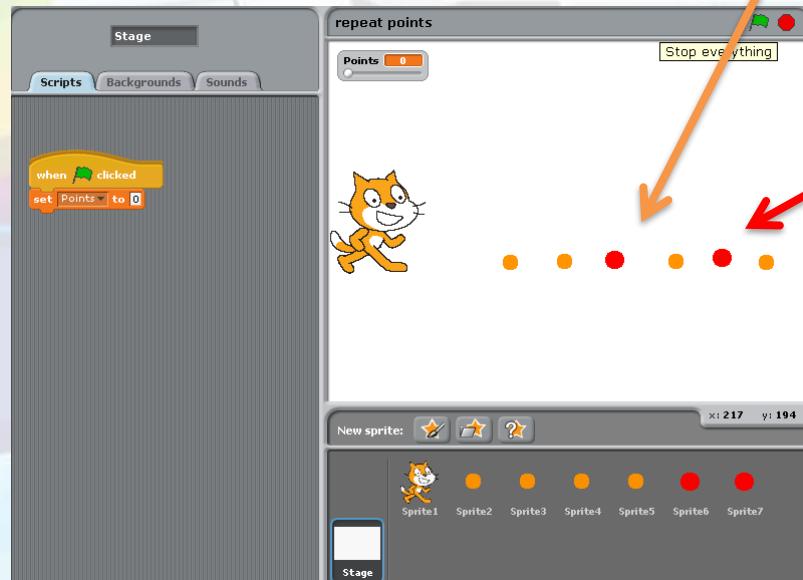
- 1) What will happen to points variable if the cat touches the **orange** ball.
- 2) What will happen to points variable if the cat touches the **red** ball.



Scratch code for Sprite2:

- when green flag clicked
- show
- forever if touching Sprite1?
 - change Points by 1
 - hide

An orange arrow points from the 'touching Sprite1?' block to the red ball in the main stage view.



Scratch code for Sprite6:

- when green flag clicked
- show
- forever if touching Sprite1?
 - change Points by 3
 - hide

A red arrow points from the red ball in the main stage view to the 'change Points by 3' block.

Starter 3 - Discuss this piece of code

1

```
when green flag clicked
  forever loop
    if touching color [red]
      move 10 steps
      wait 0.2 secs
      next costume
```

2

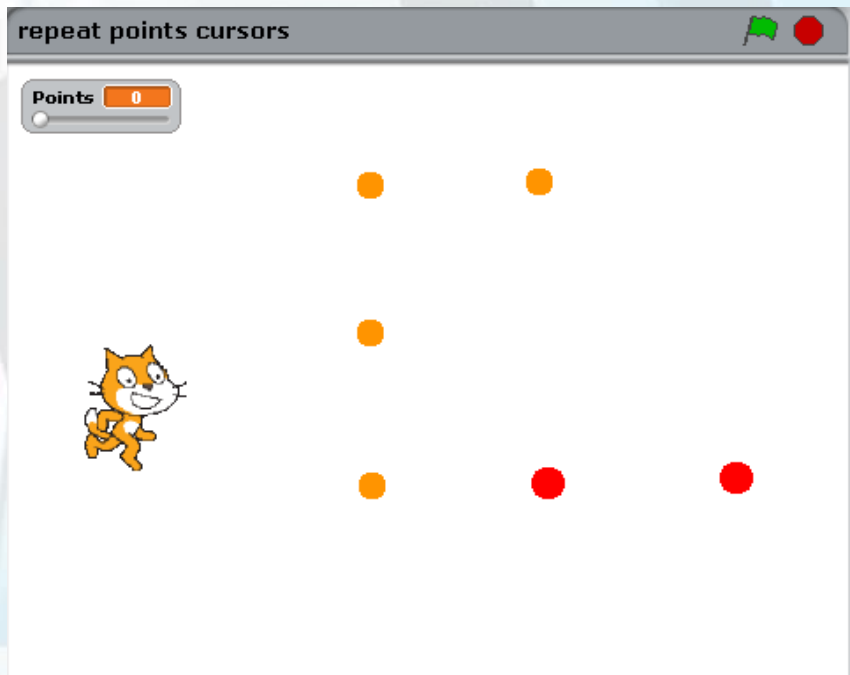
```
when down arrow key pressed
  point in direction 180

when up arrow key pressed
  point in direction 360

when left arrow key pressed
  point in direction -90

when right arrow key pressed
  point in direction 90
```

What is the difference between the 1st and 2nd part of the code?



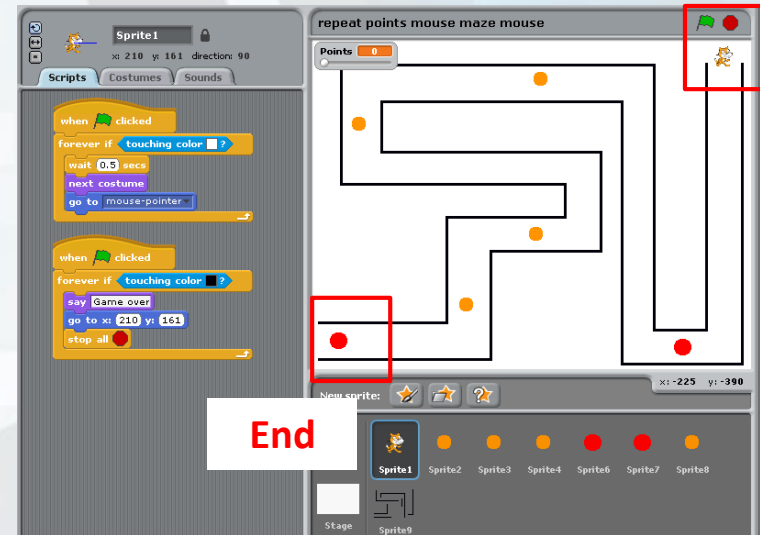
Starter 4 - Discuss this piece of code

```
when clicked
  forever if touching color [ ] ?
    wait 0.5 secs
    next costume
    go to mouse-pointer

when clicked
  forever if touching color [ ] ?
    say Game over
    go to x: 210 y: 161
    stop all
```

```
when clicked
  set Points to 0

when clicked
  forever if Points = 10
    stop all
```



1. What is the purpose of this game.
2. Describe two ways in which the game could end.

The red and orange balls equal 10 points

Task 1 – Using Repeat Command for Movement

1. Create a simple script to move the sprite **across the stage** using a repeat command.
2. The sprite needs to **change costume every 10 steps**.



The script in the Scratch editor is as follows:

```
when green flag clicked
  go to x: -200 y: 0
  repeat 40
    move 10 steps
    wait 0.2 secs
    next costume
  go to x: -200 y: 0
```

The sprite is currently at x: -170 y: 0.

The sprite will repeat the following steps 40 times

- Move 40
- Next costume

The sprite will move across the stage changing costume every ten steps

Go to x: -200 y: 0 – this will move the sprite back to the start point.

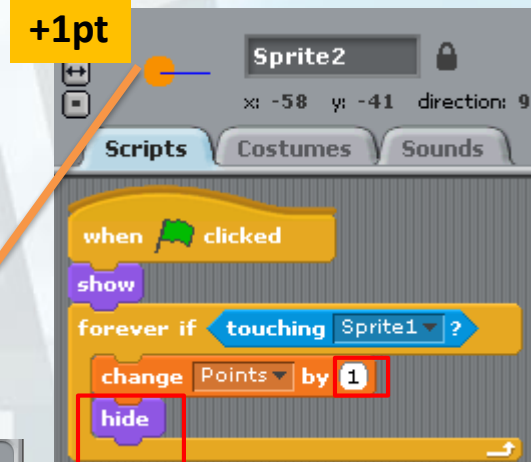
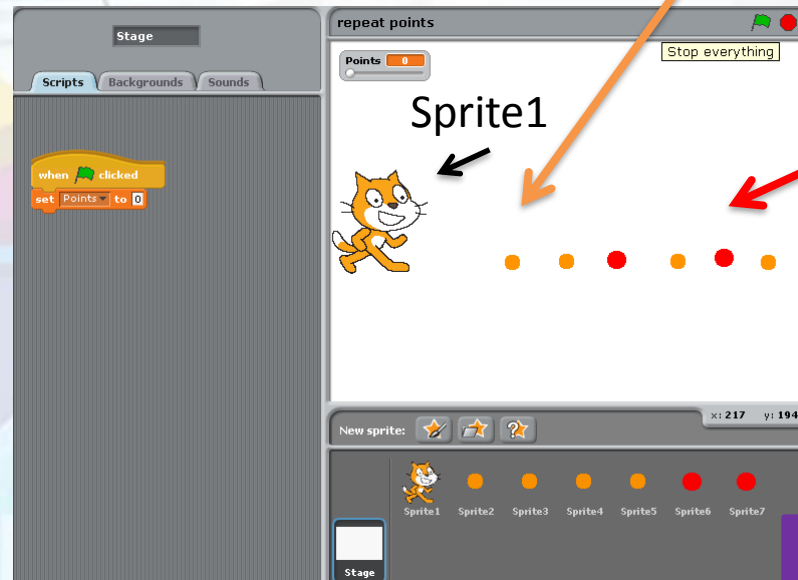
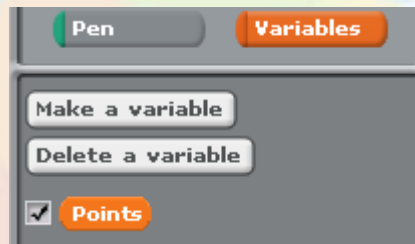


The costume editor shows two costumes for the sprite:

- 1. costume 1 (95x111, 4 KB)
- 2. costume 2 (95x111, 4 KB)

Task 2 – Variables and Forever If

1. Create a **points variable**. Click on the stage and set the points to **0 every time the start flag is clicked**.
2. Create **two** new sprites (**orange** and **red** balls)
3. When Sprite 1 (cat) **touches** the balls the **points counter** will go up. (**Orange – 1 points, Red – 3 points**)
4. The sprite will stop moving once the repeat command has finished.



Balls will hide once they have made contact with sprite 1 (Cat).

Task 3 – Keyboard Controls

1. Create a game where the sprite will collect all the balls using **simple keyboard commands**. The sprite can be made **smaller**.
2. The sprite will keep moving until it has collected each ball and has scored the **maximum score of 10**.



The sprite will keep moving and changing costume if it is touching the white stage. The sprite will change direction when the cursor keys are pressed.

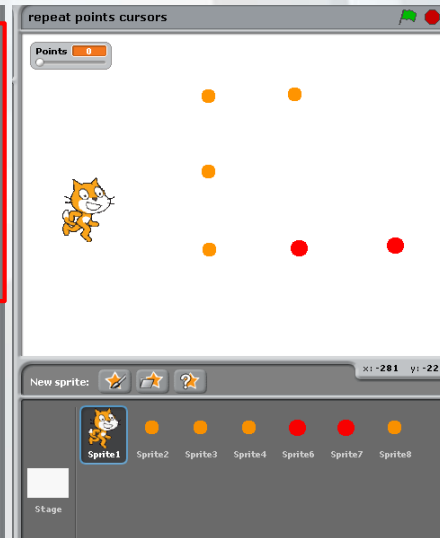
```
when clicked
  forever if touching color white?
    move 10 steps
    wait 0.2 secs
    next costume

when down arrow key pressed
  point in direction 180

when up arrow key pressed
  point in direction 360

when left arrow key pressed
  point in direction -90

when right arrow key pressed
  point in direction 90
```



```
Stage

Scripts
Backgrounds
So

when clicked
  set Points to 0

when clicked
  forever if Points = 10
    stop all
```

- ↓ 180 degrees
- ↑ 360 degrees
- ← -90 degrees
- 90 degrees

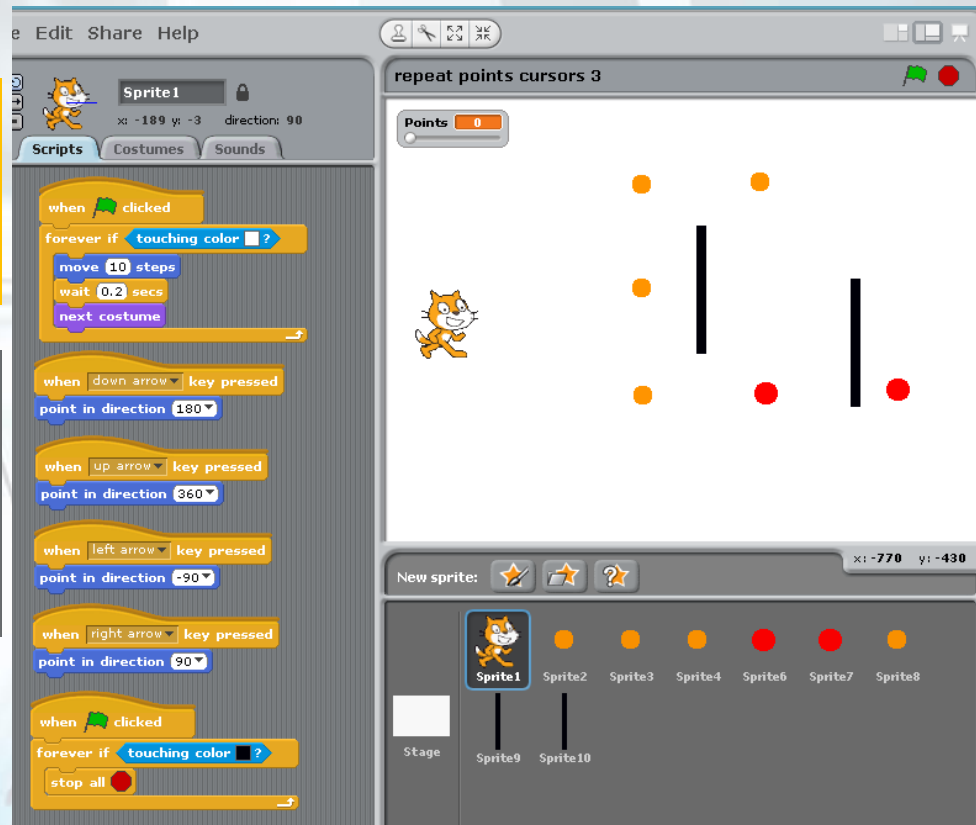
Stage: Script will end once the sprite has touched all the balls and collected the maximum score of 10.

Task 4 – Maze (Keyboard)

You need to create two black barriers if touched by the sprite would end the game.

The code below will stop the game if the sprite 1 (cat) touches any of the black barriers.

```
when clicked
forever if touching color [black]
stop all
```



Task 5 – Maze (Keyboard) Extension

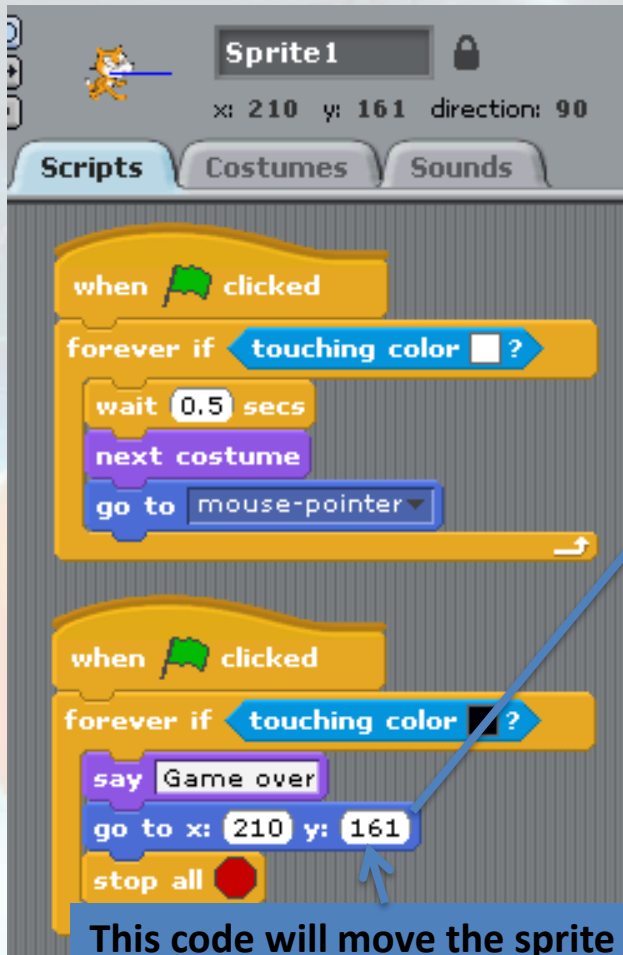
Create a **new maze sprite**. Using the **cursors** you have to move the sprite 1 (cat) around the stage collecting all the balls **without hitting the black walls**.

The screenshot displays the Scratch IDE interface for a maze game extension. The left sidebar shows the 'Scripts' category selected. The main workspace shows a cat sprite named 'Sprite1' with a script area containing several code blocks: 'when clicked' triggers a 'forever if' loop that moves the sprite 10 steps, waits 0.2 seconds, and changes its costume; 'when down arrow key pressed' sets the point in direction to 180; 'when up arrow key pressed' sets the point in direction to 360; 'when left arrow key pressed' sets the point in direction to -90; 'when right arrow key pressed' sets the point in direction to 90; and 'when clicked' triggers a 'forever if' loop that says 'Game over' and stops all. The right side shows a stage with a maze, a cat sprite, and several colored balls (orange and red). A 'Points' variable is set to 0. The bottom right shows a 'New sprite' panel with a list of sprites including 'Sprite1' through 'Sprite8' and 'Stage'.

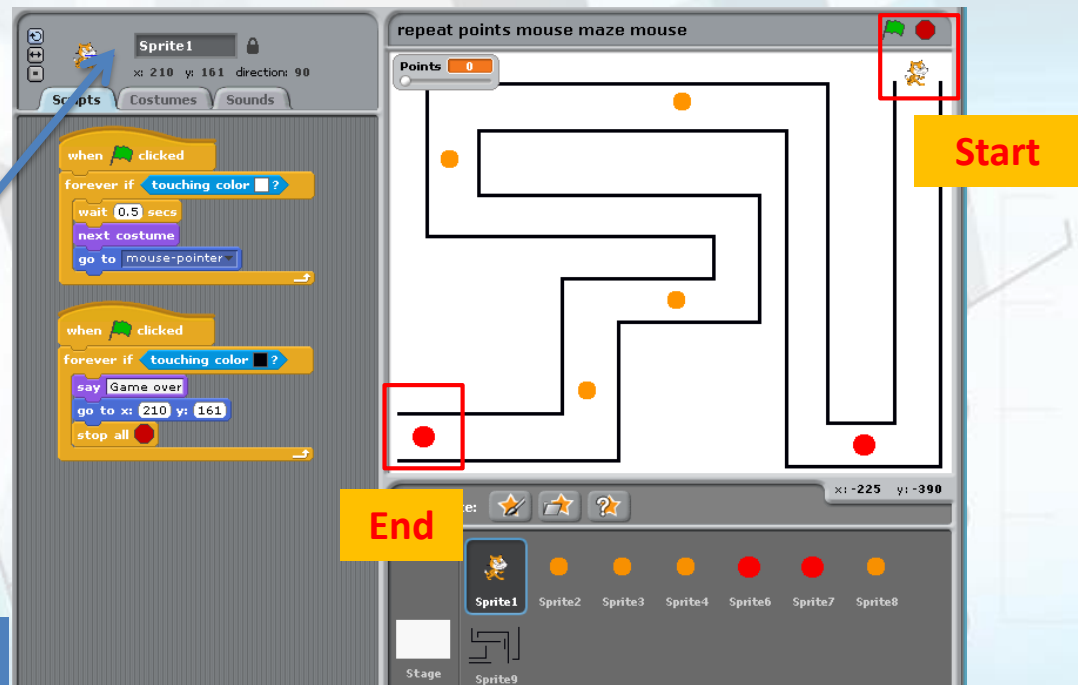
Task 6 – Maze (Mouse)

Create a new maze sprite. Using the **mouse** you have to move the sprite 1 (cat) around the stage collecting all the balls **without hitting the black walls**.

After the game is complete or finished the sprite 1 (cat) will have to move back the start point.



This code will move the sprite 1 (cat) back to the starting point.



Plenary – Refer to the Lesson Objectives

Objectives

Understand why computer programming scripts are used.

Understand the use of Variables as place holders for information.

Understand the script required to build simple games.

Plenary Task (Q&A)

Peer assess each other scripts.

Based on the skills you have learnt think about creating your own game. What type of scripts would you use.