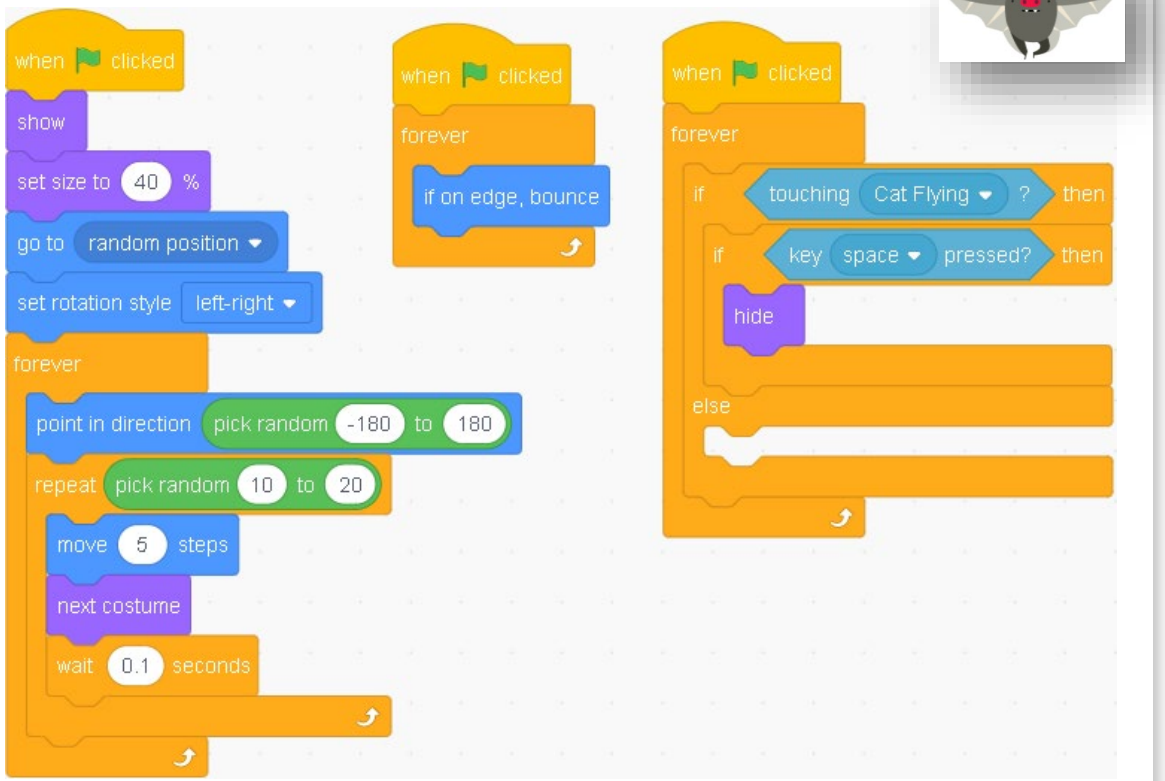
Scratch Programming

Lesson 9

Score & Sensing

Presented by Advaspire Team

Script:



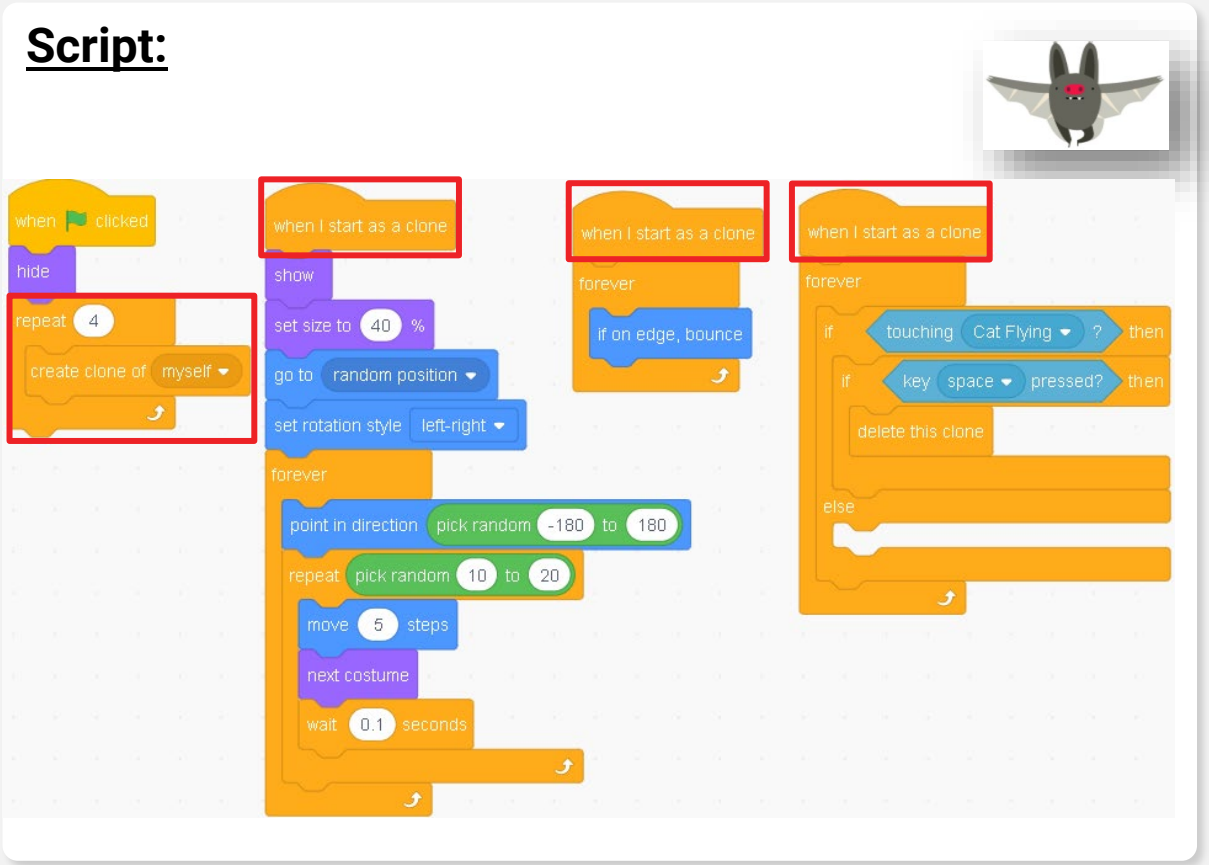
Review - Pick Random Number

Pick random from 1 to 10 means to pick any number within these range. It can be "6", it can be "9", it can be "2" or any number in this range. These 10 numbers hold equal possibility to be picked.

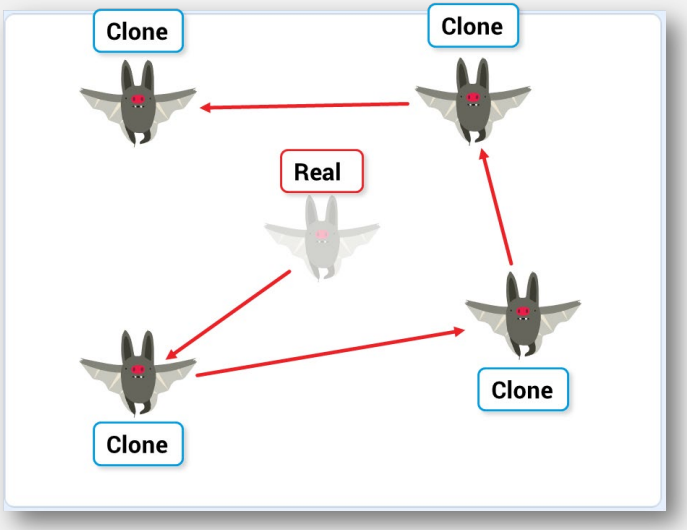
1 2 3 4 5 6 7 8 9 10

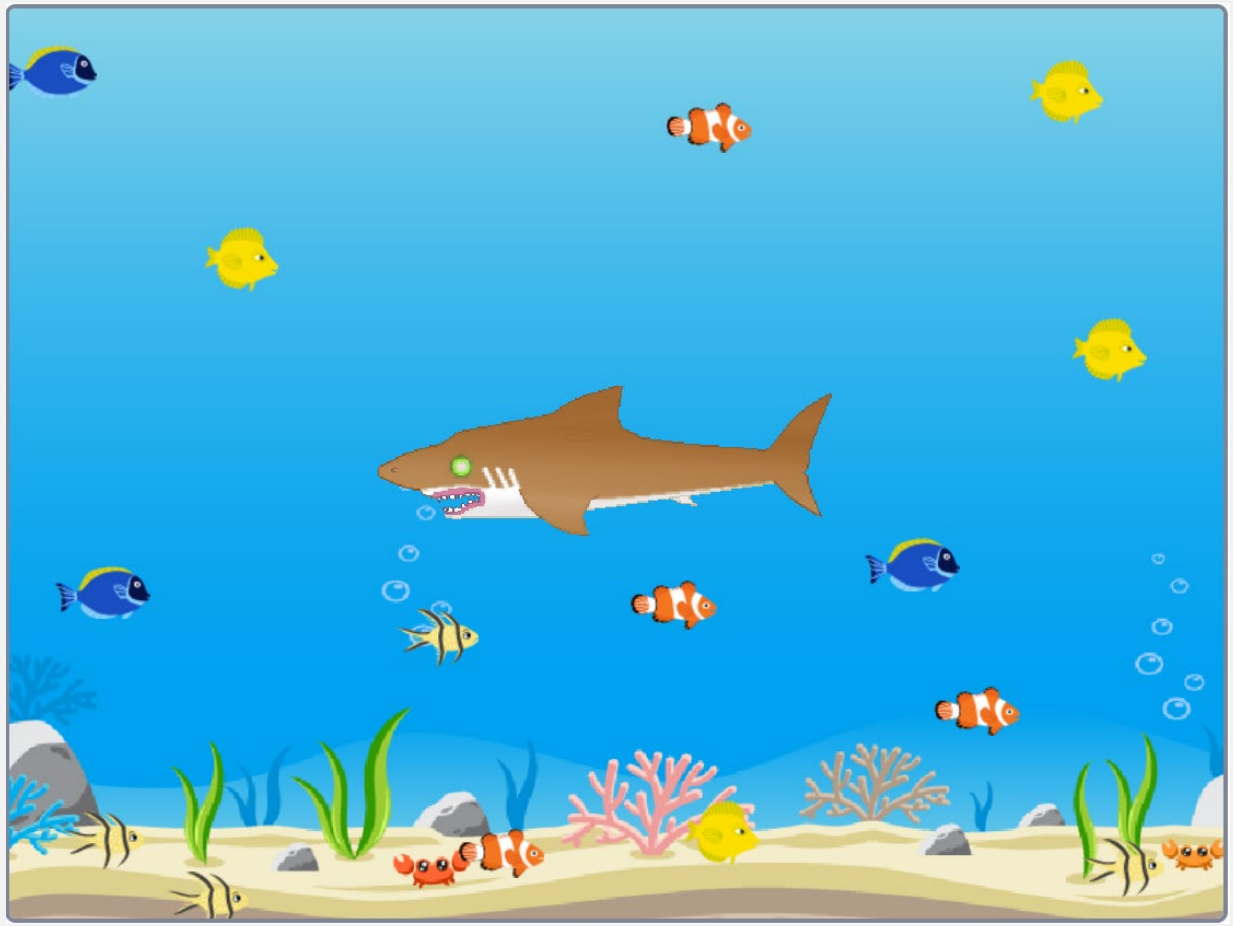
Review – Create Clones

Script:



To control the number of sprites in our scratch, we can create clones for those with same functions (scripts).





L8 – Mission

Create a Shark Game.

The shark can move with arrow keys like the cat in lesson 7, it will open mouth when <space> is pressed.
There will be 12 to 20 fishes (randomly) spawned at start.
The fishes will only be eaten by shark if shark opens its mouth.

game rules on next page>>

L8 – Mission – Game Rules 1

Game Rules (page 1):

1. The sprite “shark” can be downloaded from slack.
2. The backdrop “under the sea” can be downloaded from slack.
3. Fish sprites are from Scratch.
4. Shark size = 60%; Fish = 30%; Backdrop = fullscreen
5. You are able to control your shark with up-down-left-right arrow keys
6. Your shark will start at the centre
7. <space> pressed -> shark-bite
8. <space> not pressed -> shark-swim
9. Shark facing direction: {left pressed = face left; right pressed = face right}
10. Fishes are spawned randomly and with random movement (constant speed).
11. Number of fishes are random, range from 12 to 20.
12. Fish only disappears when touches the open mouth of shark.

L8 – Mission – Game Rules 2

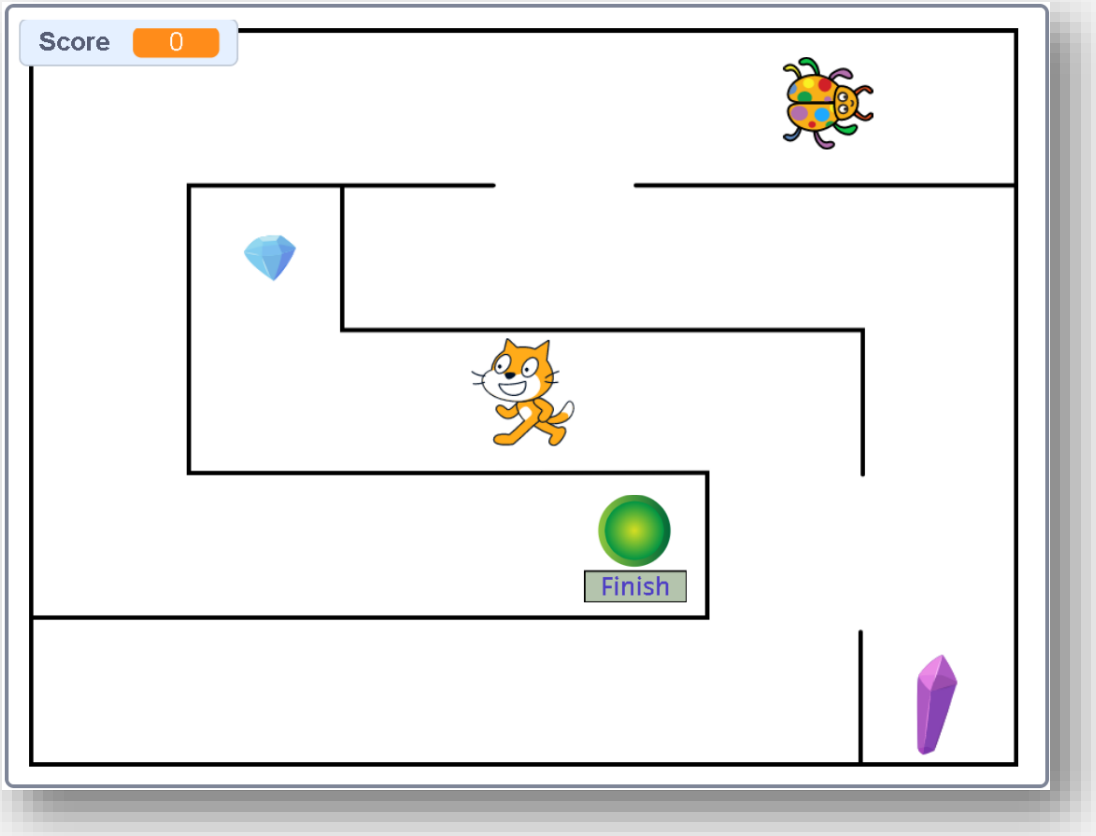
Game Rules (page 2):

13. Your sea must have at least 4 types of fishes
14. Each type of fishes cannot contain 2 more fishes in number than other type. (e.g, fish-a = 4, fish-b = 3, fish-c = 4, fish-d = 3 is great; It can't be fish-a = 5, fish-b = 3, fish-c =2, fish-d =4, cause fish-a has more than 2 fishes than fish-b)
15. The fish will bounce back if hitting the edge.

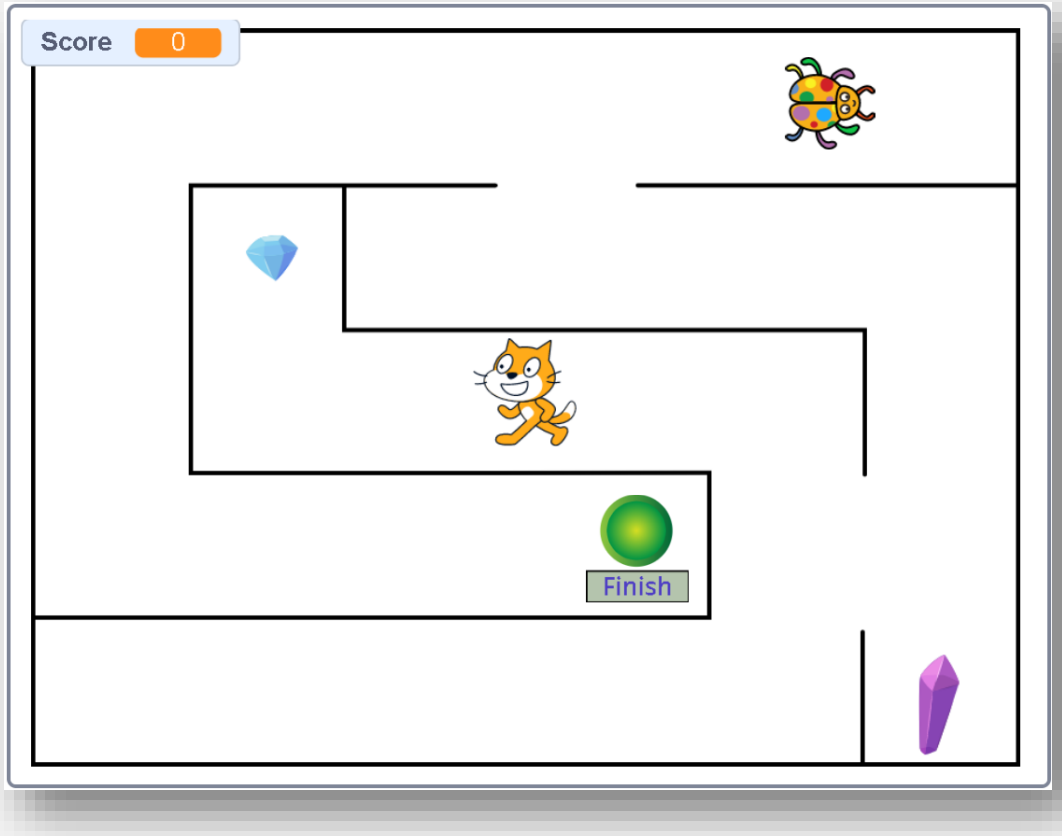
Lesson 8 Mission Explained

***only shared during class**

Create A Maze Game



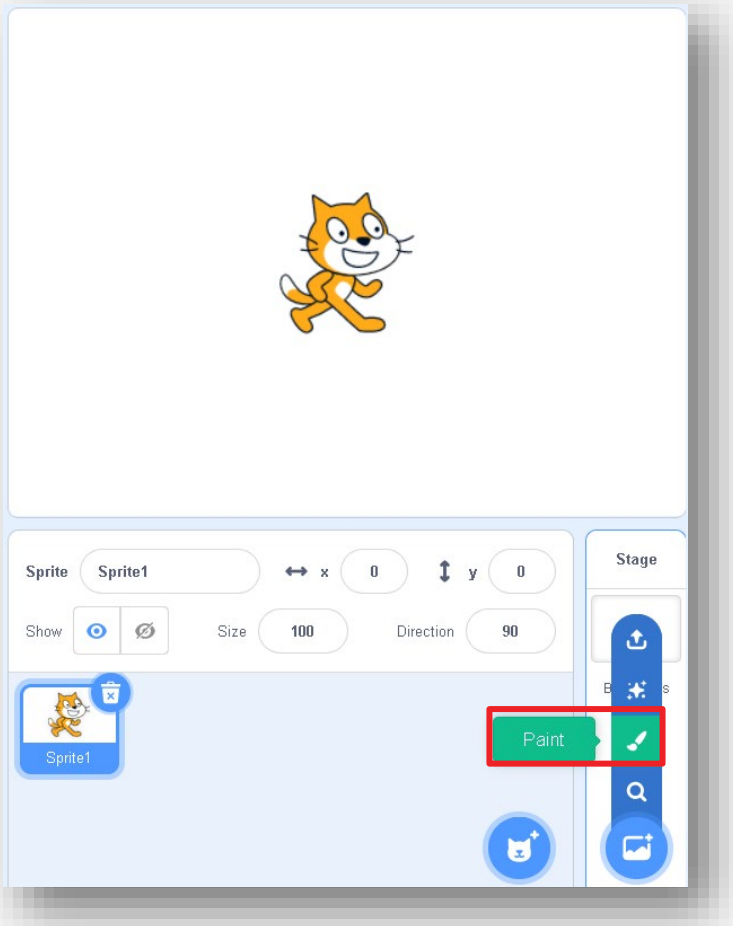
Create a Maze Game – Game Setup



Let's create a maze game with these rules:

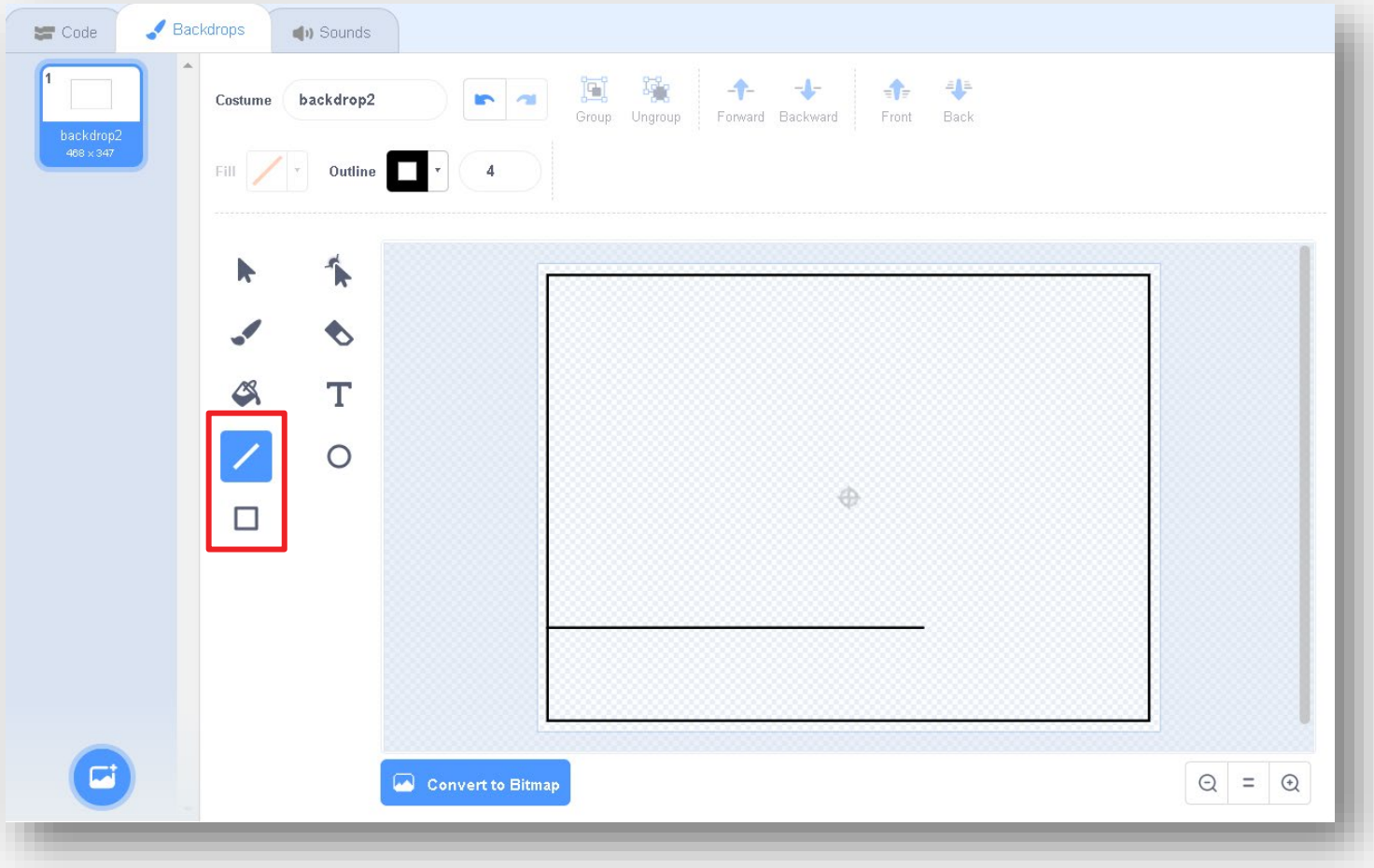
1. **You can control the movement of the cat.**
2. **The cat cannot go through the blackline (wall).**
3. **Cat will need to collect the crystals to earn points (score).**
4. **You (Cat) need to avoid the ladybug, you lose if touch ladybug.**
5. **The ladybug will patrol to the left and right.**
6. **You (Cat) need to touch Green with the "Finish" to complete the mission.**

Draw a Maze



Click "Paint" on the backdrop dropdown list.

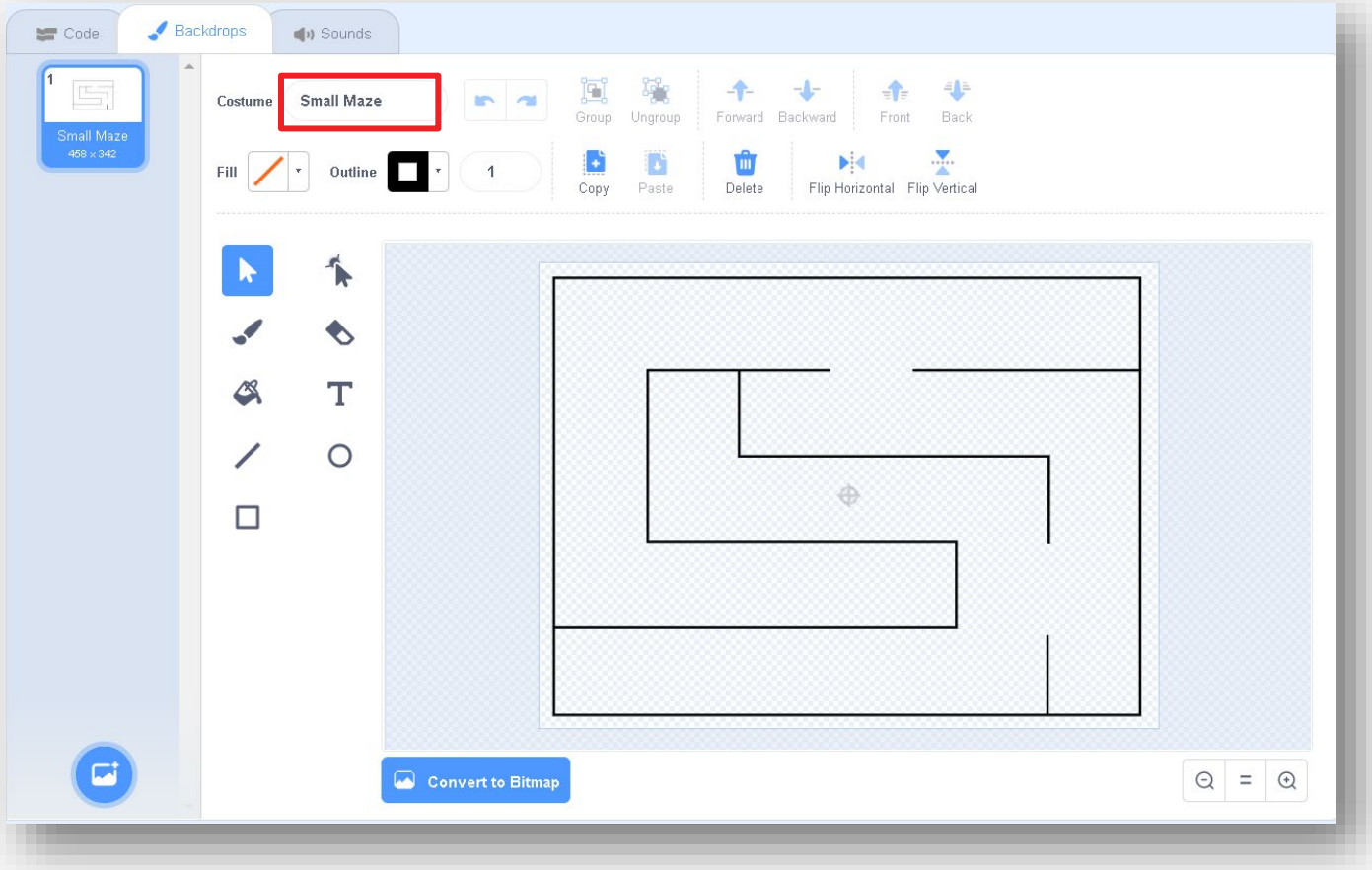
Draw a Maze



Use the "Rectangle" tool to draw the big border of the maze.

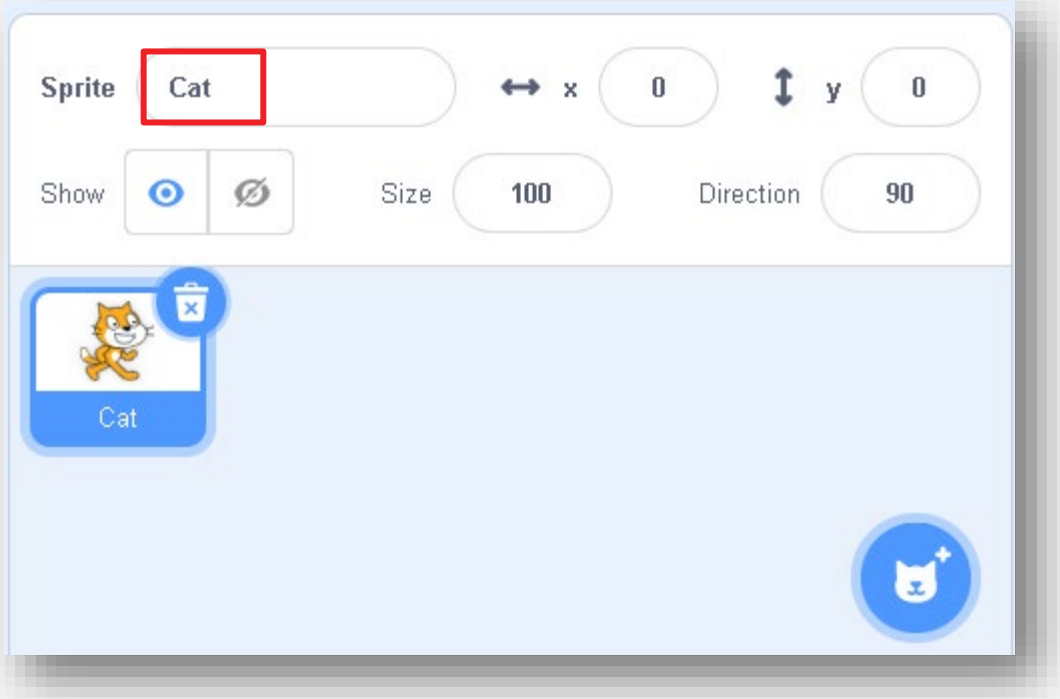
Then use the line to create "wall" of the maze.

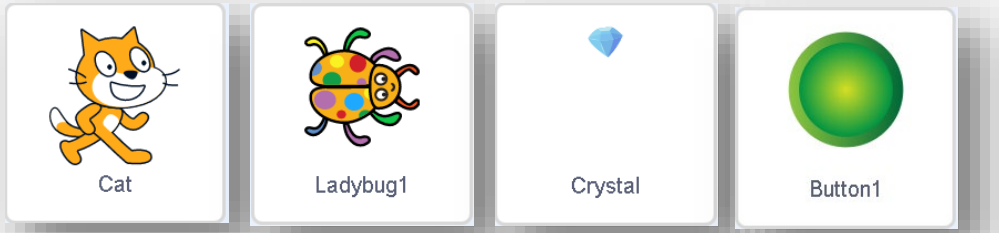
Draw a Maze



Rename the backdrop to "Small Maze".

Upload all needed Sprites

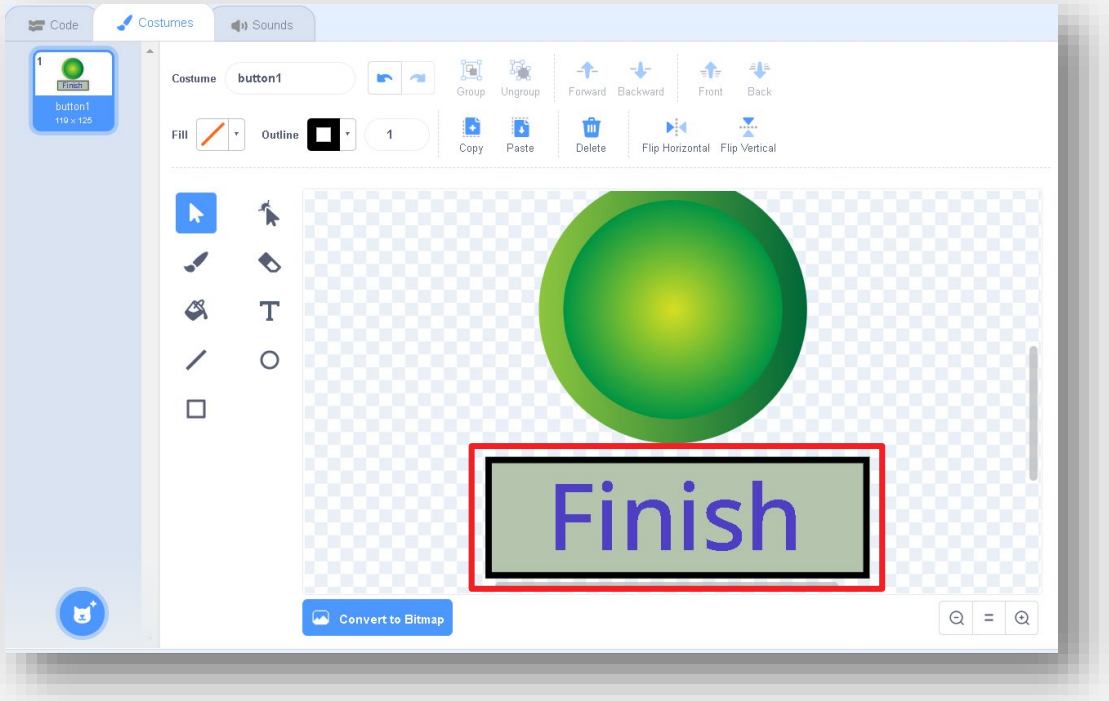




Upload “Cat”, “Ladybug”, “Crystal”, “Button”.

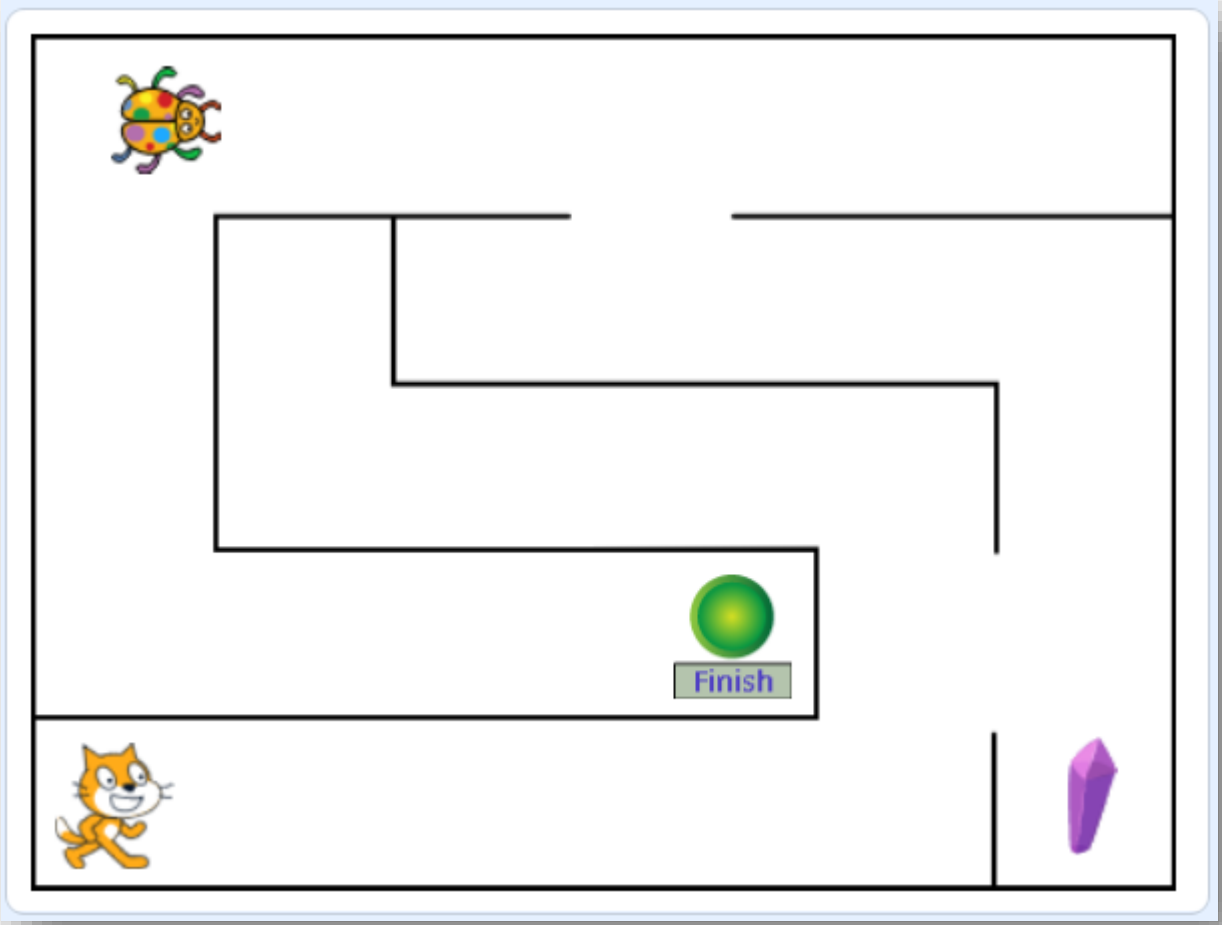
Rename your cat sprite to “Cat”

Finish Point



Add a box with "Finish" word under the Button1 Sprite costume.

Place everything on the Stage

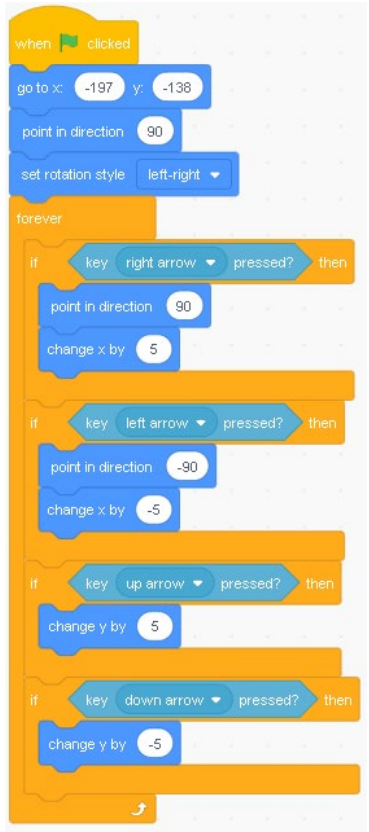


Place everything on the stage including your backdrop and sprites.

We will place 2 crystals in this maze, but we will use create clone for the crystal, therefore we can just place the real crystal anywhere because it will be hidden anyway.

Program your Cat – Movement Control

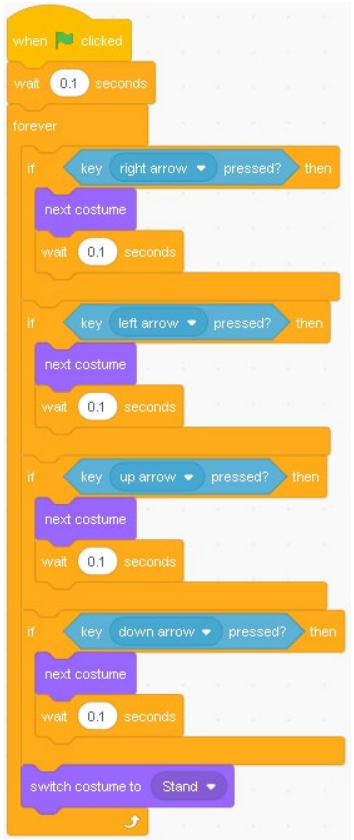
Script:



We will program the cat with the forever-if loop control, which is same concept as previous lesson.

Program your Cat – Movement Animation

Script:



If you want to give animation movement for your cat, you can add a parallel program to do the animation.

It's similar to the movement, just to change what happen if you pressed this and that keys.

Program your Ladybug1 – Repeat movement

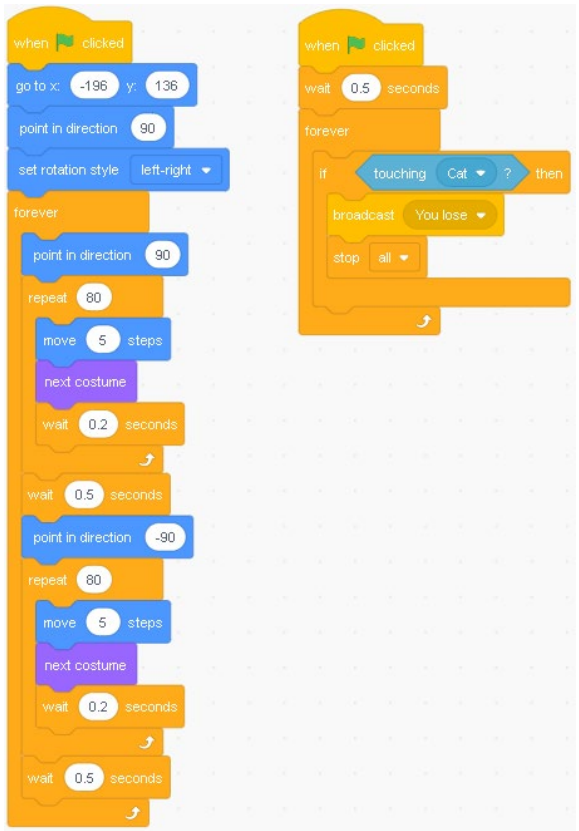
Script:

I want my ladybug to patrol at the top side from the left to right, so I will add the scripts for it to move repeatedly.

To make it look nicer, I adjusted the costumes of the ladybug so that it will be moving in animation too.

Program your Ladybug1 – Repeat movement

Script:

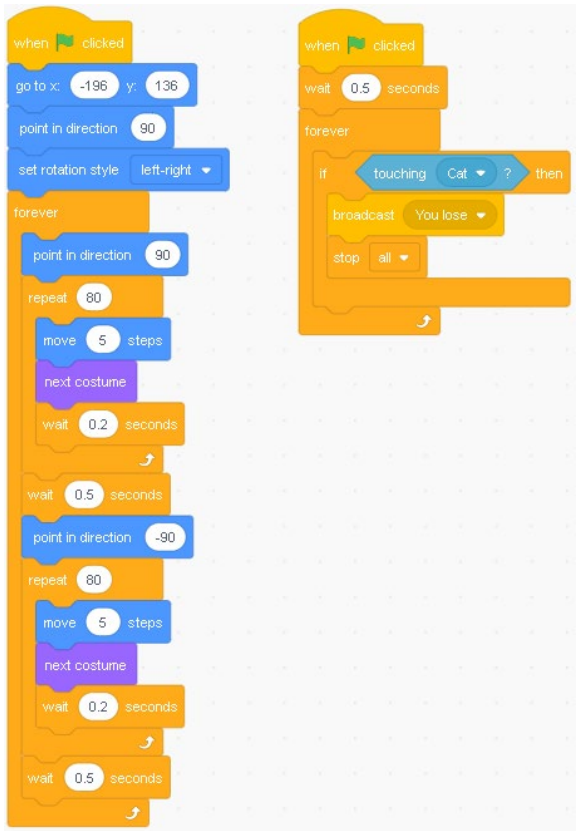


As the ladybug will keep detecting if the cat is touching it or not, if the cat touches the ladybug, then you lose.

Therefore, I will add a broadcast block (“You Lose”) and show a “You Lose” word on the screen, then place a “stop all” in the loop so everything will stop when cat touches the ladybug.

Program your Ladybug1 – Repeat movement

Script:



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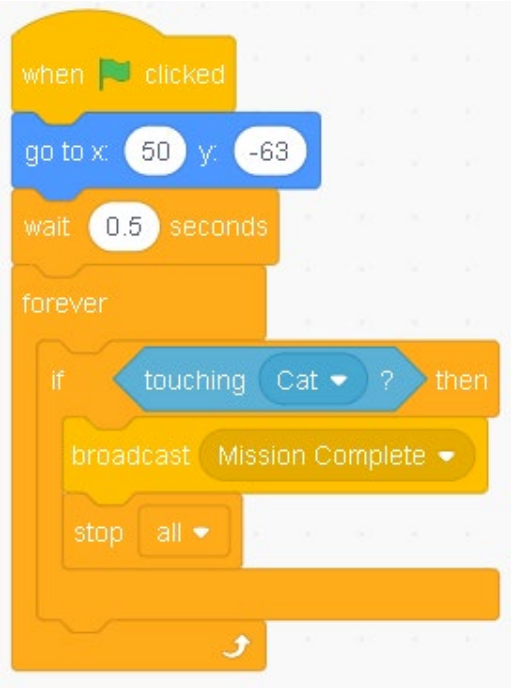
The Finish Point

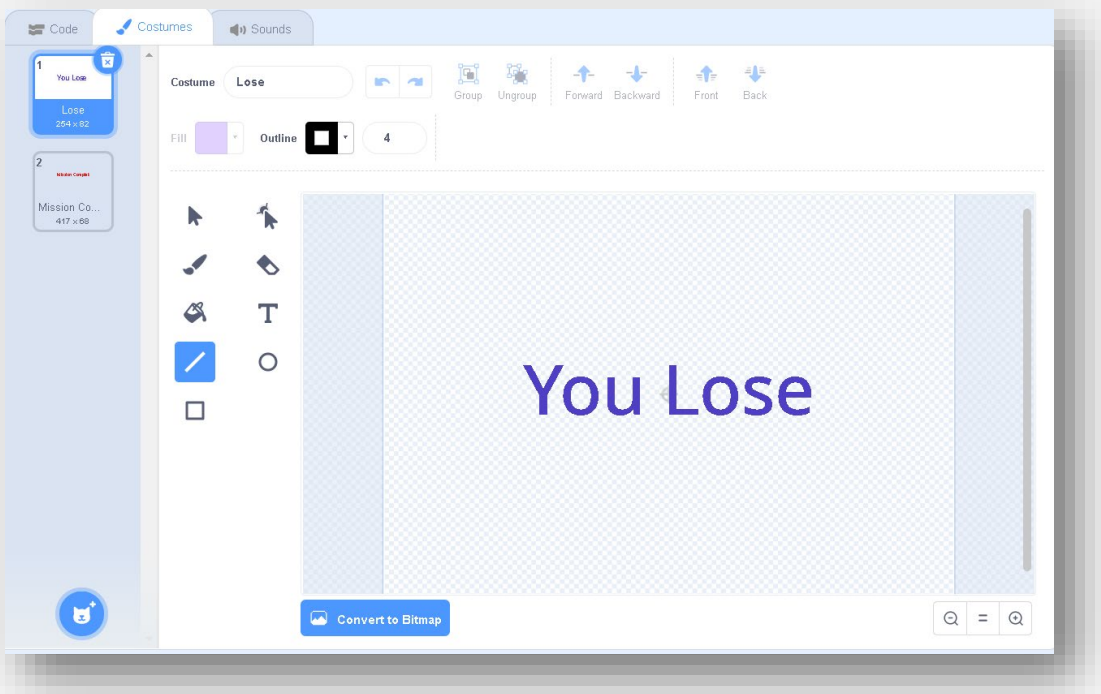
Script:

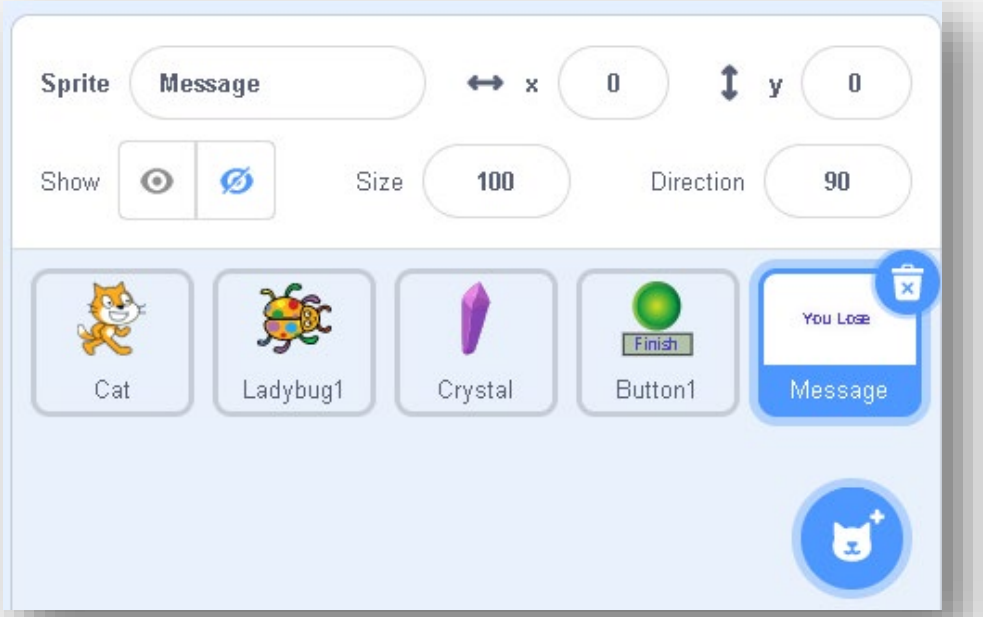


The finish point is very straightforward, just to start at a specific position, then wait for 0.5 seconds as buffering time before setting the detection of the cat.

If the cat touches it, then we will broadcast a message "Mission Complete" then stop all the scripts on the stage.

Lose & Win Messages



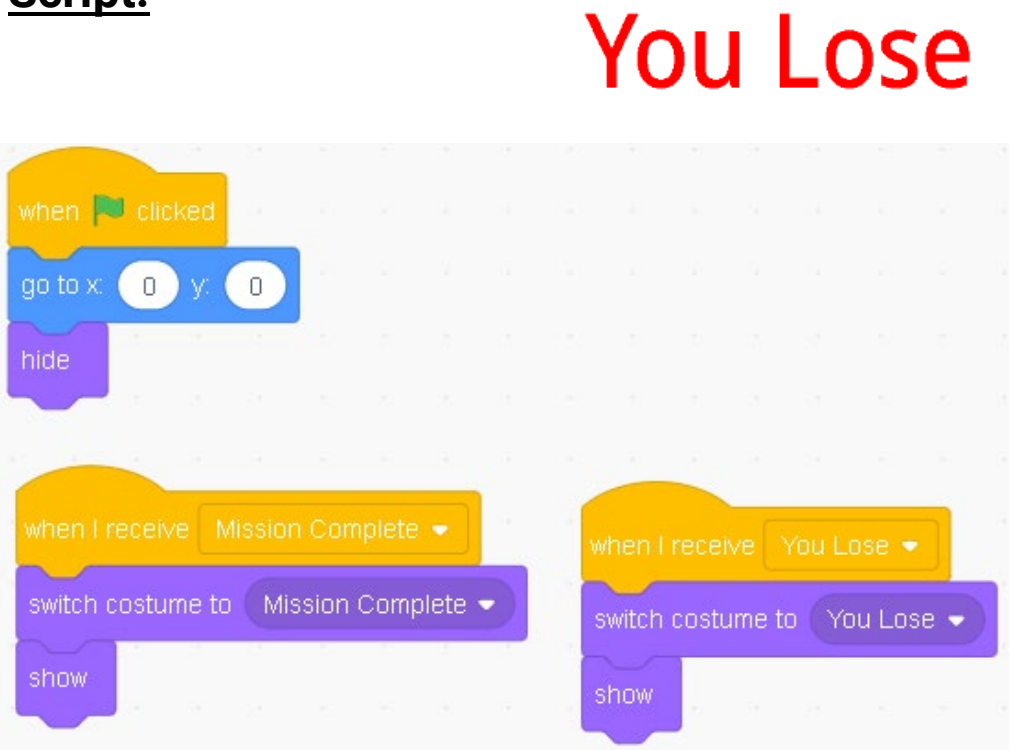


Now we also want to make a lose or win message so that it will tell the player if you win or lose the game.

If win -> “Mission Complete”, if lose -> “You Lose”.

Lose & Win Messages

Script:



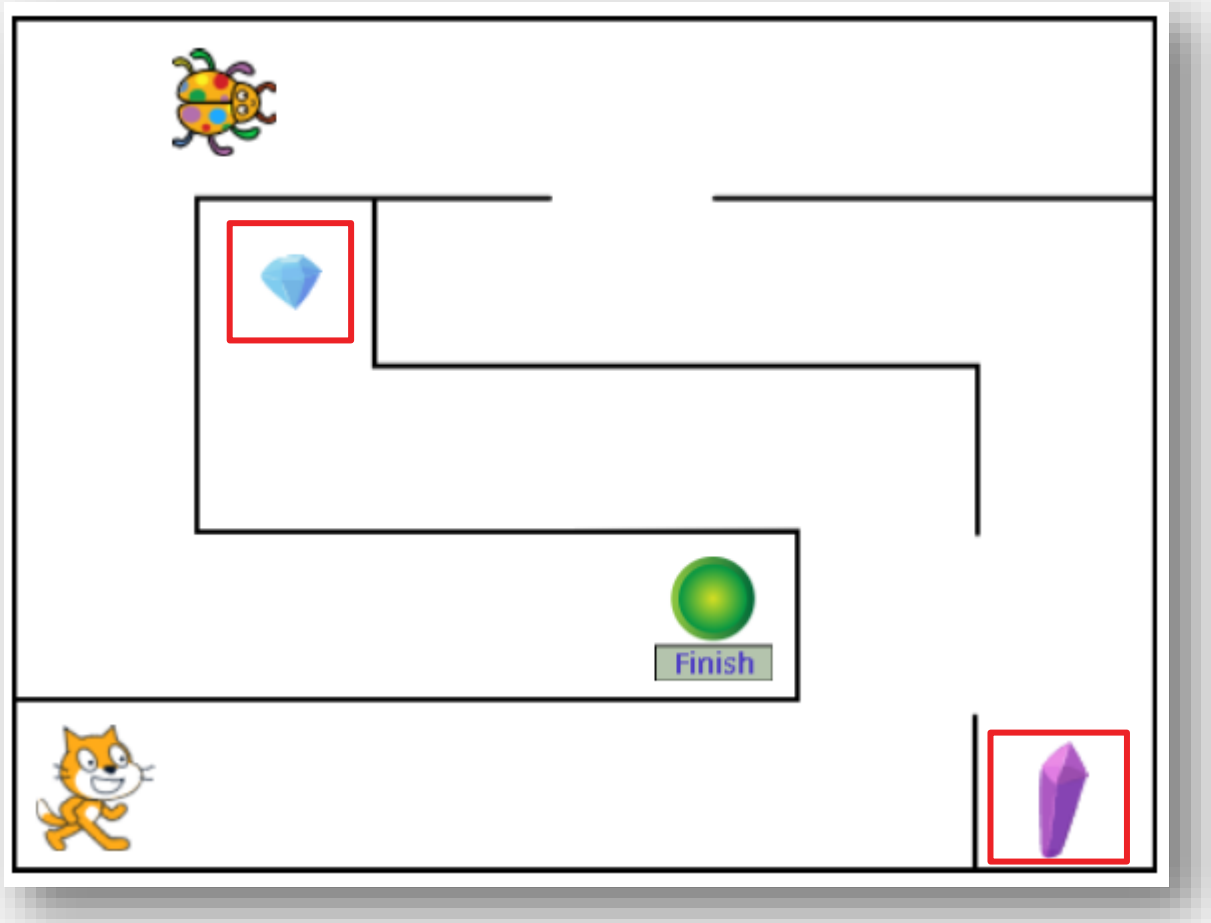
Let's program the broadcast like this:

When start, it will go to centre and hide itself.

If received Mission complete, then switch to costume "Mission Complete", then show itself.

If received You Lose, then switch to costume "You Lose", then show itself.

Crystals Set Up



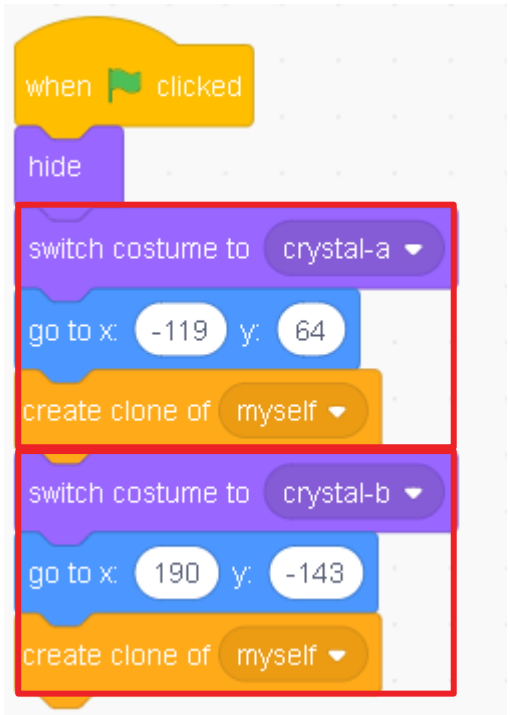
Now you want to set up the crystals for the cat to collect in the game.

Basically, you can use duplicate method to setup these 2 crystals. But if you have few levels in your maze and each of the levels will have different number of crystals to collect, I recommend you to use create clones to do this.

As we just learnt how to create clones, let's use create clones block for our crystals.

Program Your Crystals

Script:

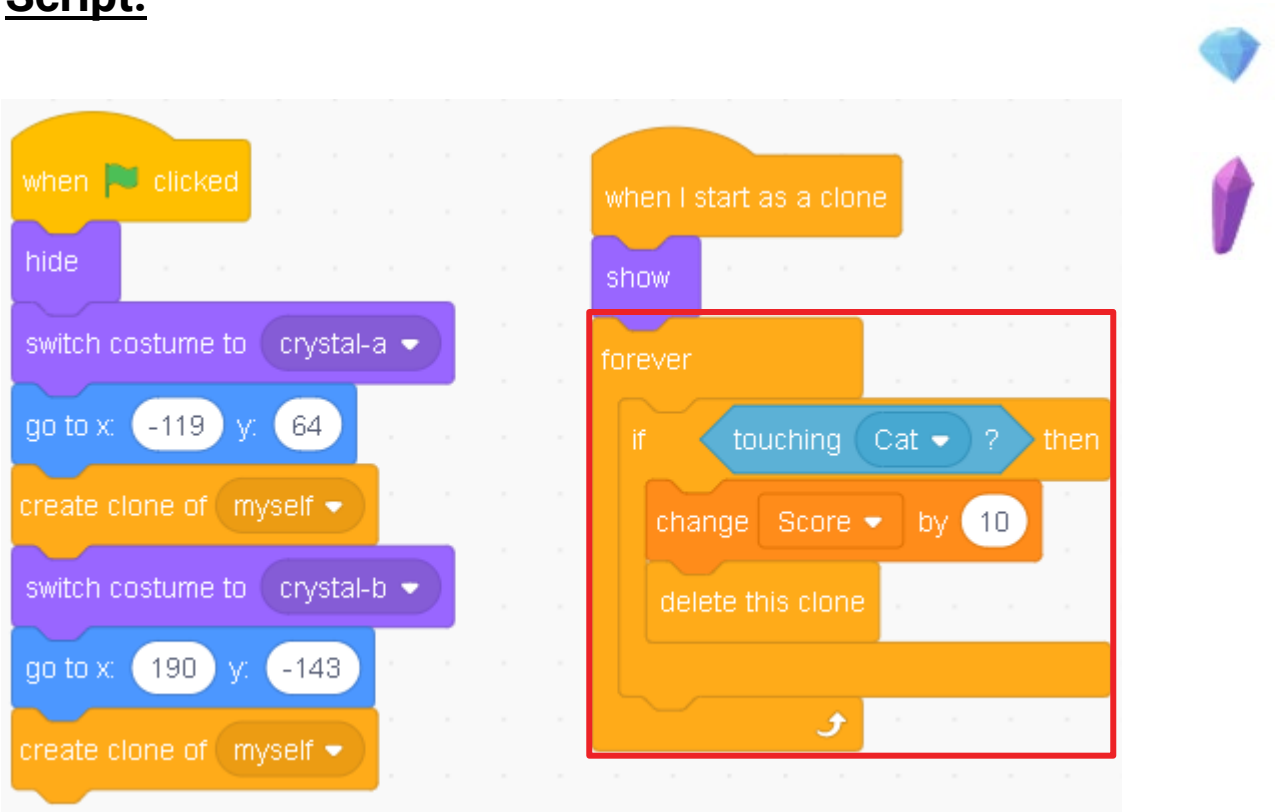


You may notice that we have 2 types of crystals in the costumes, so I will create 2 crystals in my maze with different costumes.

And my real body remains hidden and with no functions expect creating clones.

Program Your Crystals

Script:

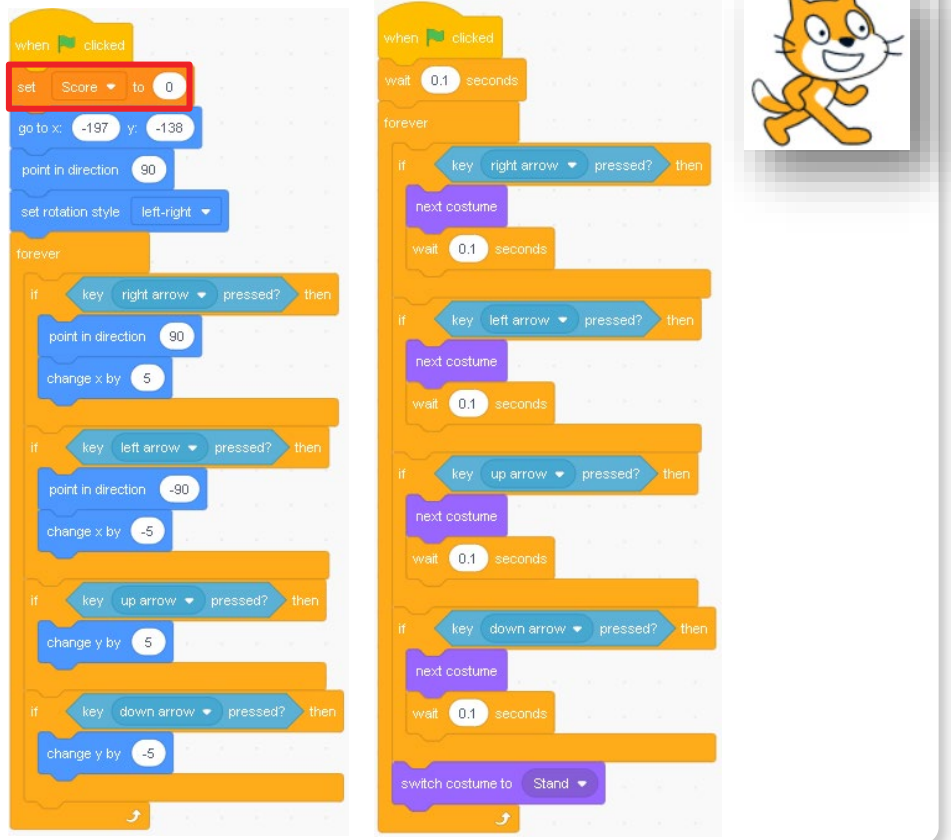


Then I want to program the clone of the crystal to make the cat get the crystals to collect points.

I will need to set a forever-if loop to detect if it touches the cat, if yes then it will increase the score by 10 points, then remove the crystal from the screen.

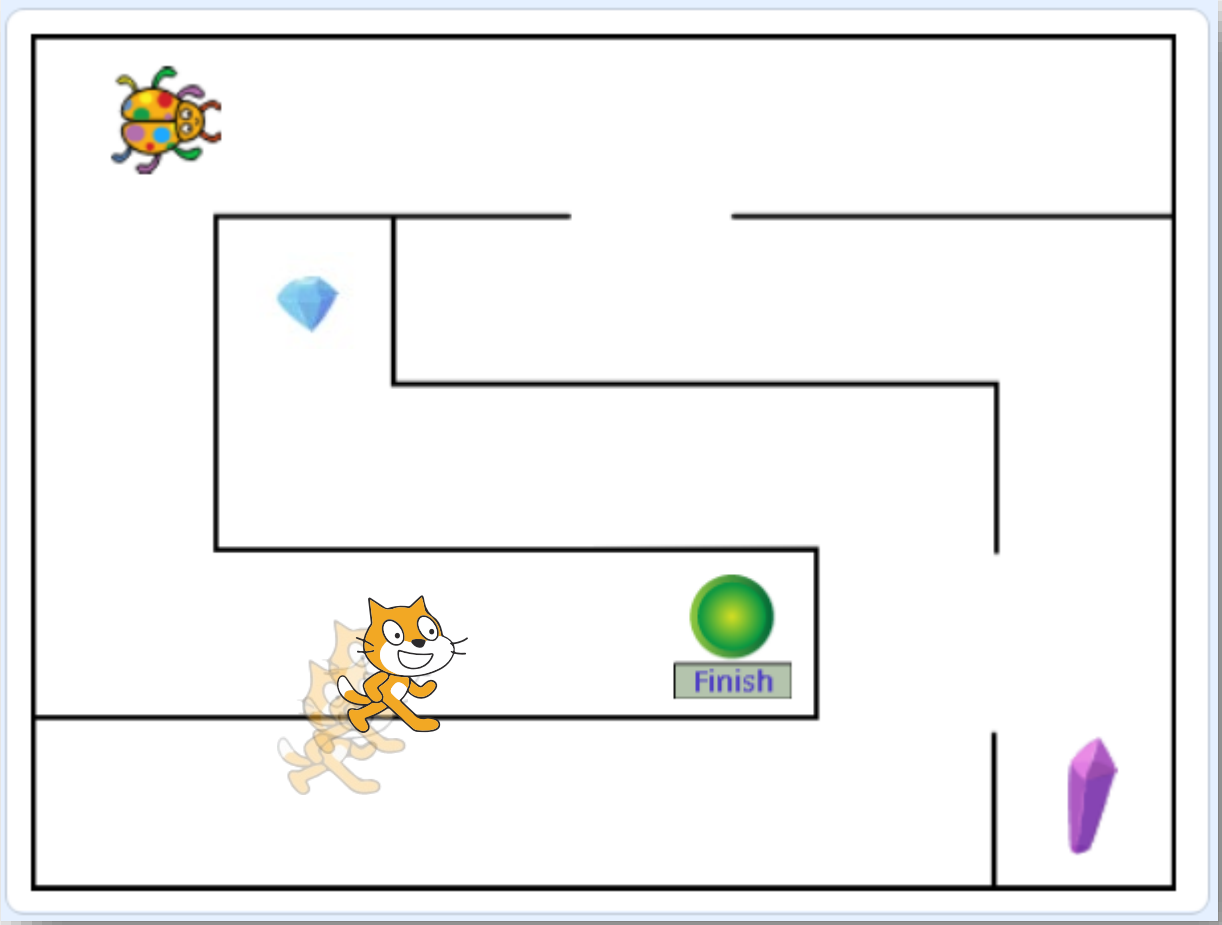
Program your Cat – Set Starting Score

Script:



As we will score points when collecting the crystal, therefore we need to add a "set score to 0" at start to make sure our score starts from zero every time.

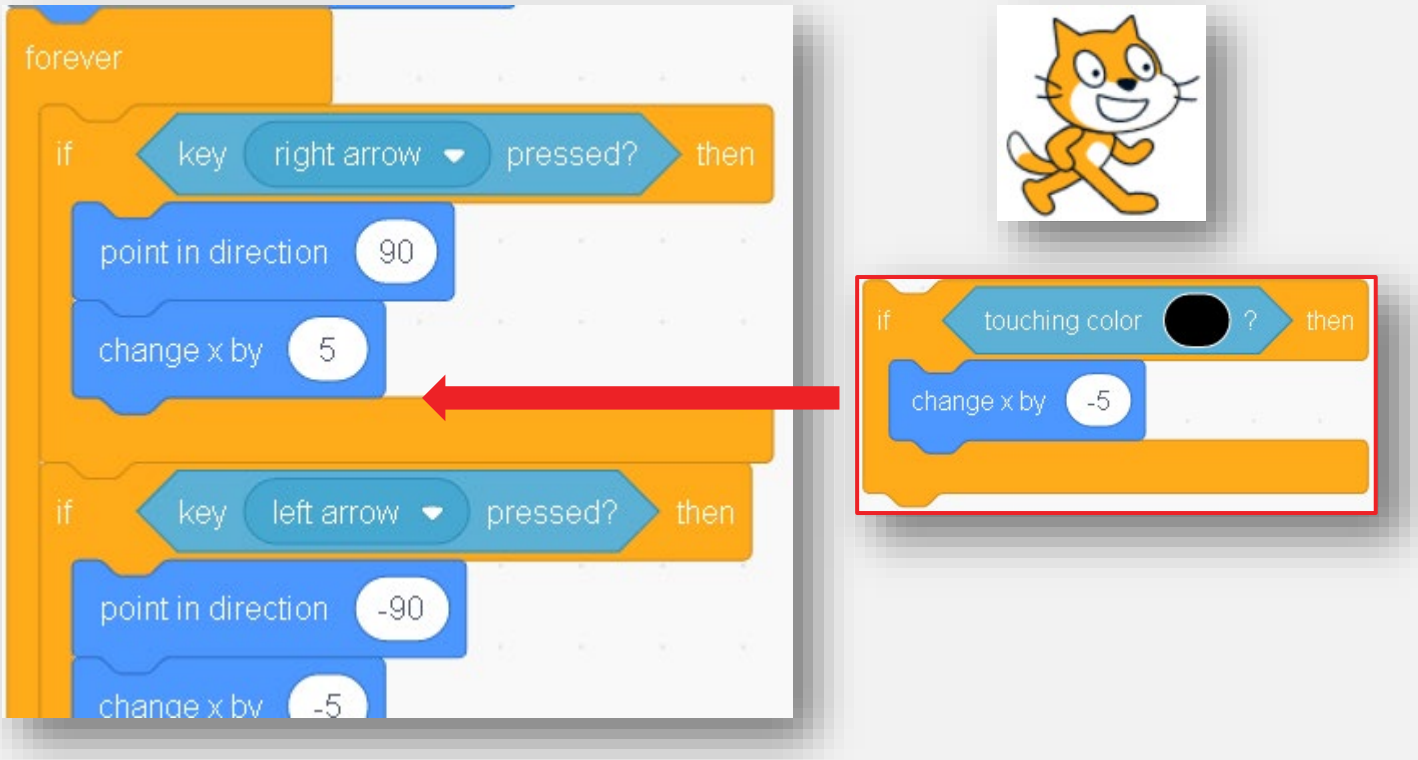
Make the wall solid



Now when you try to run your game, you will find that your cat can go through the wall.

We have to find a way to make the wall solid so that our cat can't go through it.

Program your Cat – Avoid Going through Wall



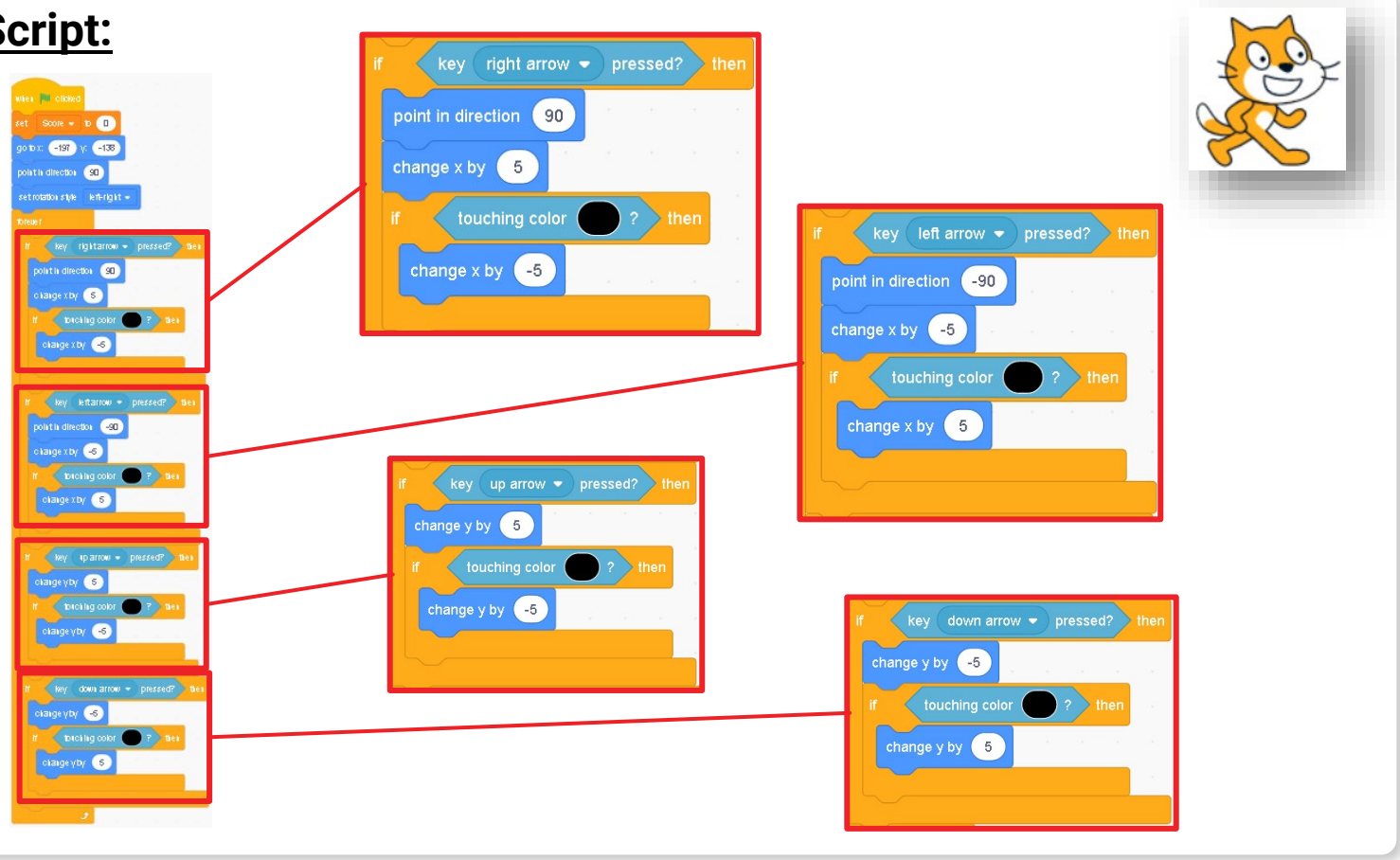
We want to add another if statement inside for each of the control.

This is to offset back the distance travelling when it hits the wall. It's something like bounce back.

Means that if you press <right> 1 time, it will travel 5 steps to the right, but if there is a wall 3 steps in front, so it will move back 5 steps so that it won't go through or get stuck in the wall.

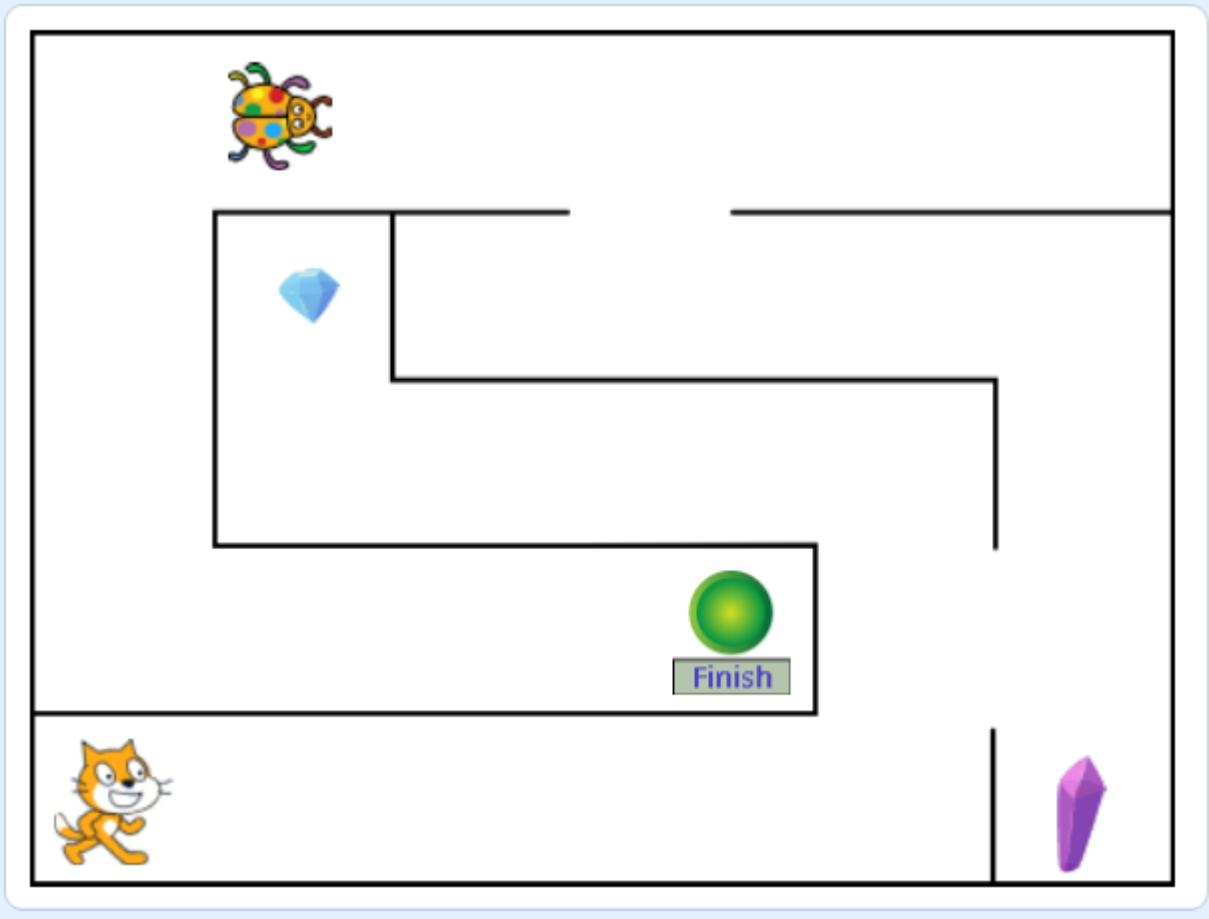
Program your Cat – Avoid Going through Wall

Script:



Each of the controls need have an offset distance travelled if touches colour of the wall.

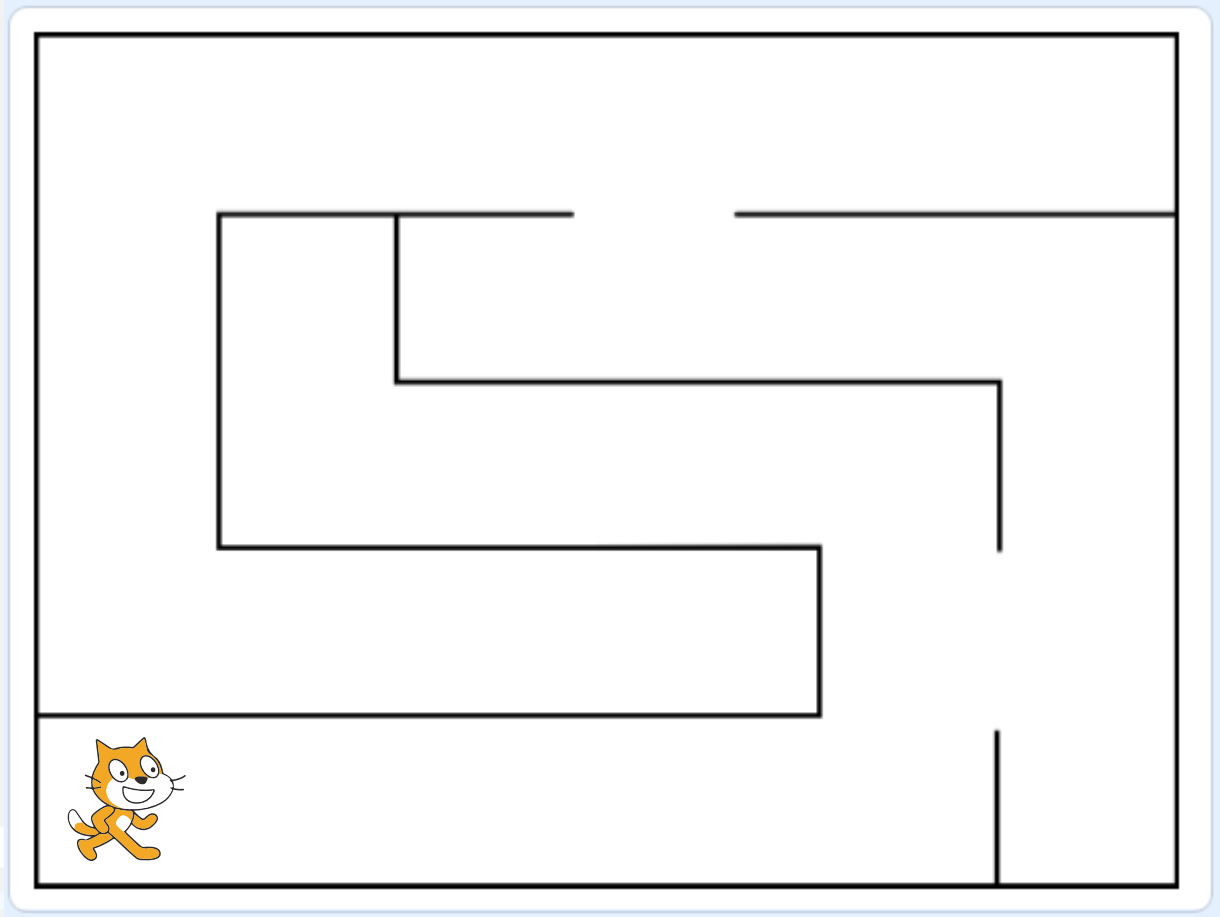
Run Your Maze Game



Run it and play your maze game.

ASSIGNMENT *for*

Lesson 9



L9 – Mission

Create a Maze Game with 2 levels.

Draw your own Maze (use rectangle & line tools to draw) and make your own maze game.

Put some crystals and some bots (to avoid) to increase level difficulty in the maze. You will get scores if collect crystals.

You can direct message your teacher and ask your question through Slack Robotene Community or arrange a One-to-One Consultation with your teacher.

Any Questions?

Thank you :)