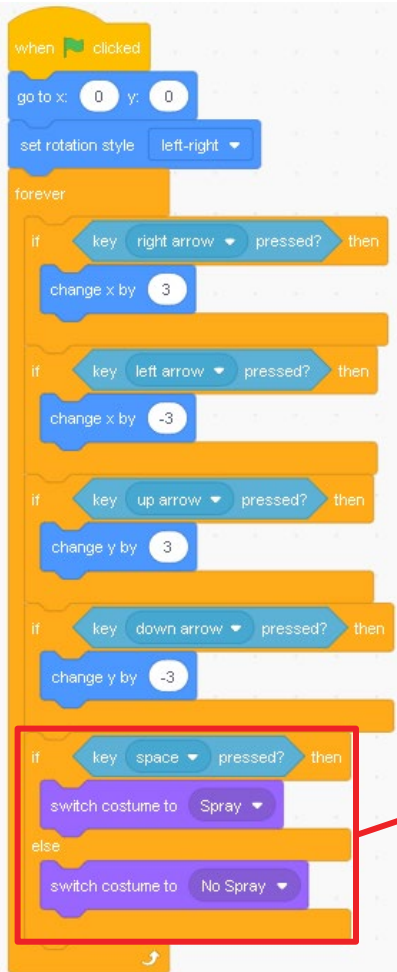# Scratch Programming
==Lesson 8==
Create Clones

Presented by Advaspire Team
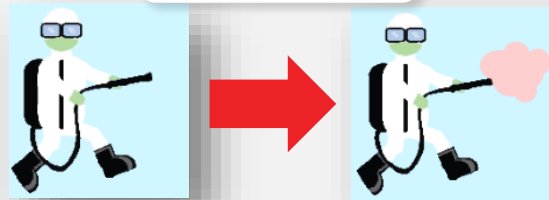
Script:

Review – Program Logical Flow

<Spacebar> pressed

Game Rules #3:

When pressing <space bar> your disinfectant cleaner will spray the gas but it will remain back to the costume without spraying if <space bar> is not pressed.
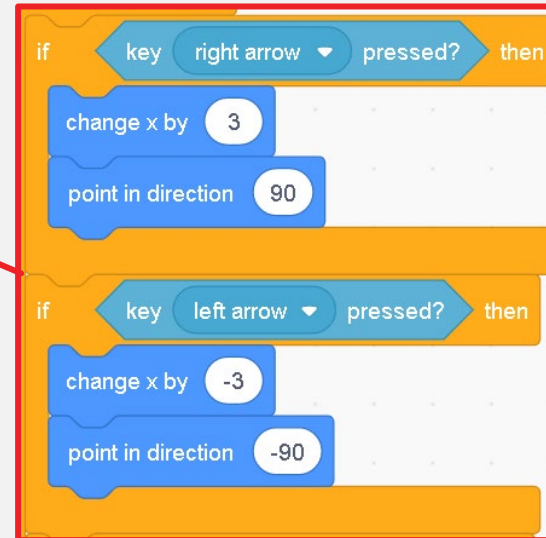

I put a if-else statement in the loop function.
If <space> pressed, then it will switch to "Spray" costume. Else, it will switch back to "No Spray" costume if <space> is not pressed.

Review – Program Logical Flow

Script:

Game Rules #5:

When your cleaner move to the right, it will face right, otherwise it will face to the left

We will at a "point in direction 90°" in the <right arrow> if-statement.

Then add "point in direction -90°" in the <left arrow> if-statement

Review – Program logical flow (Game Rules)

Game Rules:

1. **You are able to control your cleaner with up-down-left-right arrow keys (rotation style = left-right)**
2. **Your cleaner starts at the centre**
3. **When pressing <space bar> your disinfectant cleaner will spray the gas but it will remain back to the costume without spraying if <space bar> is not pressed**
4. **If the cleaner hits the edge, bounce back**
5. **When your cleaner move to the right, it will face right, otherwise it will face to the left**

   Program Disinfectant Cleaner

6. There will be 4 viruses on the stage on the start and all of them spawn randomly
7. If disinfectant hit the virus with spraying costume, the virus will shout "No~~" then disappear.
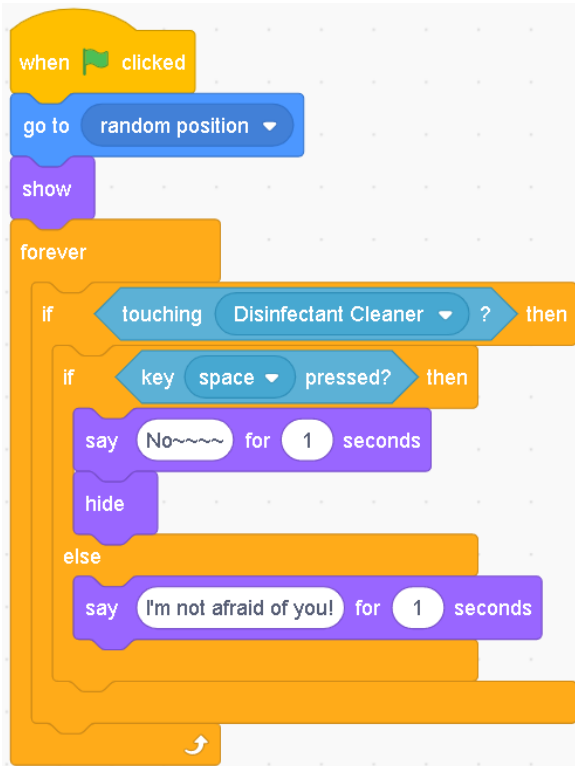8. The virus will say "I'm not afraid of you!" and remain there.

   Program your Virus

Review – Virus Moves Randomly

Script:

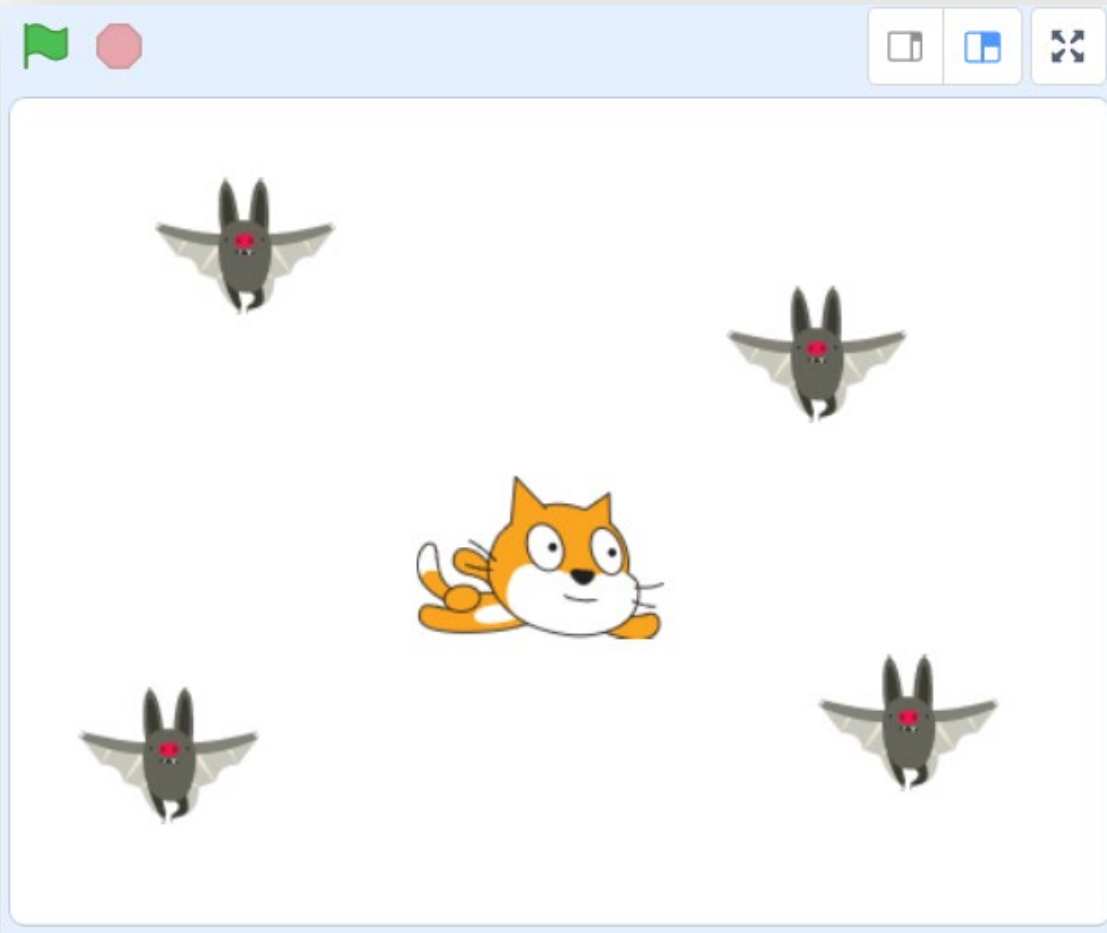**Check if virus touches disinfectant cleaner**

Random movement

My solution is to add a parallel program that make it glide 3 secs to a random position, and make it loop forever.

So as long as the virus is still on the stage, it will keep gliding to random position with 3 seconds.

Remember to add this program to all other viruses.

Mission 8 – Cat Vs Bat

Create a game with title "Cat vs Bat".

In this game your cat can be controlled by you with arrow buttons (up-down-left-right) and <space> key to change to second costume.

The Bat will move randomly and the cat need to punch and knock out all bats.

Mission 8 – Cat Vs Bat

Game Rules:
1. You are able to control your cat with up-down-left-right arrow keys
2. Your cat will start at the centre
3. <space> pressed -> Cat Flying (1st costume)
4. <space> not pressed -> Cat Punching (2nd costume)
5. When cat flying to right side -> face right
6. If cat is flying to left -> face left.
7. 6 bats (size = 40%) in the game, spawn randomly and will move randomly
8. When bat gets hit by "Cat Flying", nothing happen
9. If bat gets hit by "Cat Punching", disappear from the screen

1. Add your Sprites first
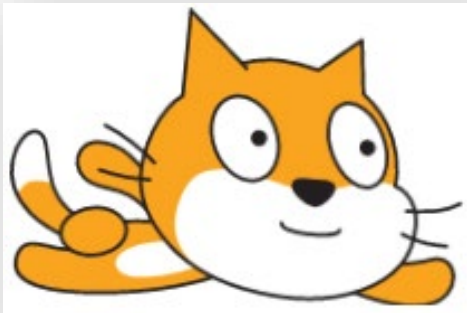
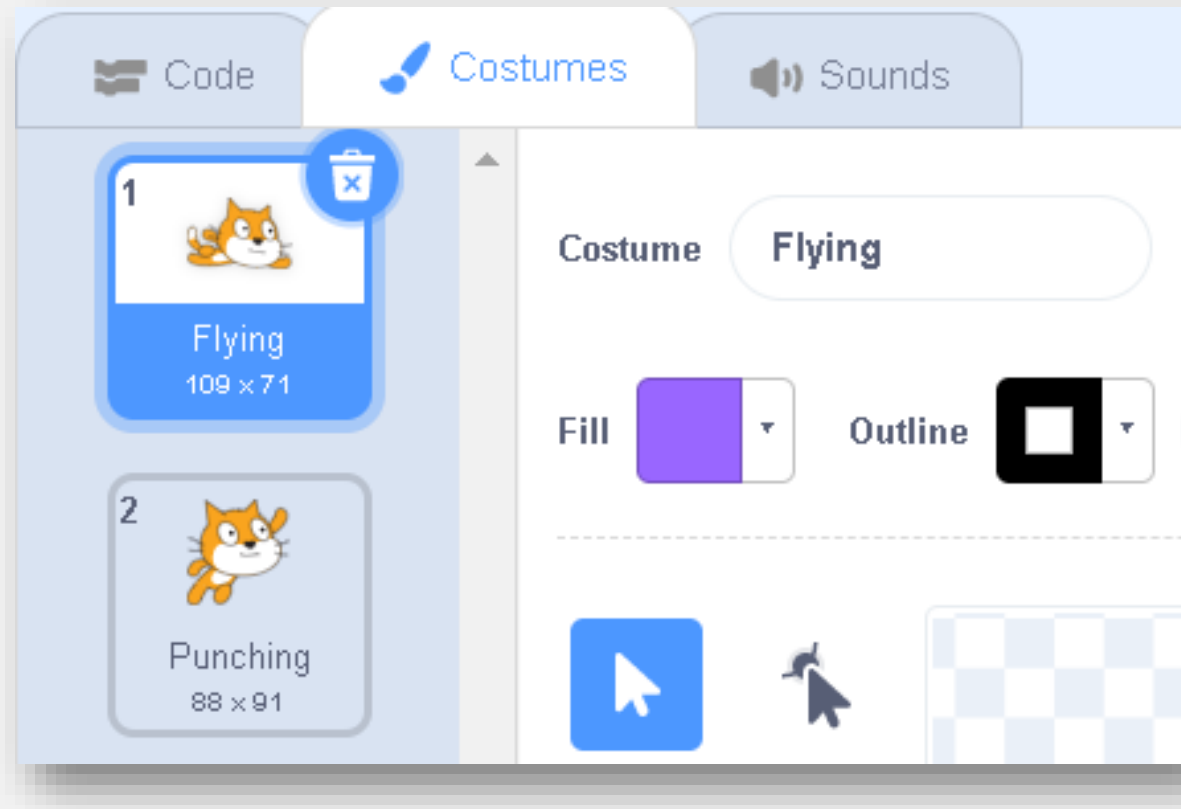**Cat flying**

Bat

Backdrop - Woods

1. Add your Sprites first
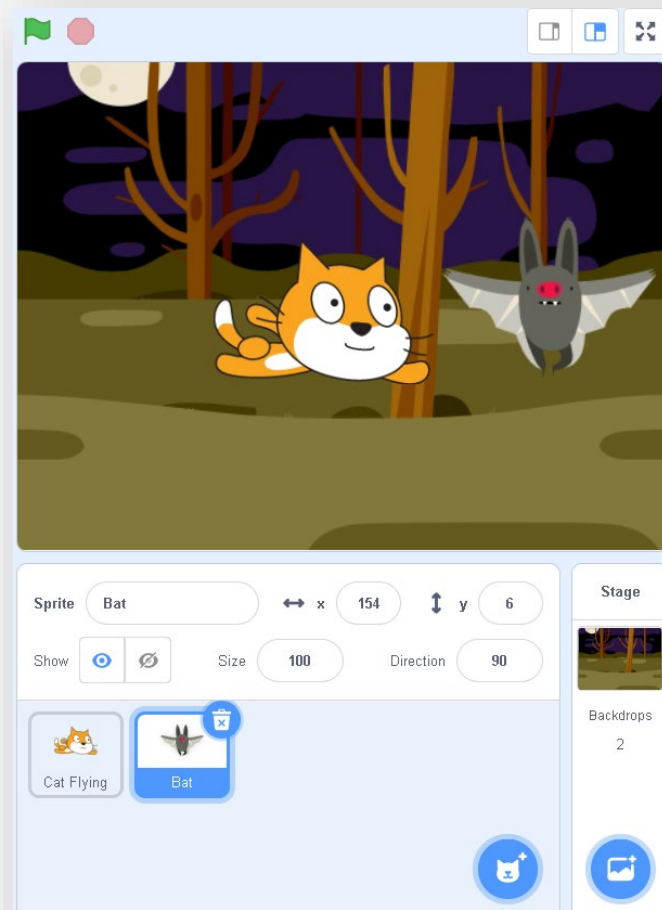
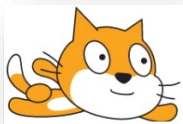Add all sprites and backdrop to your Stage.

2. Rename Cat Costumes

Rename "cat flying-a" to "Flying" and "cat flying-b" to "Punching".

3. Program your Cat

Script:

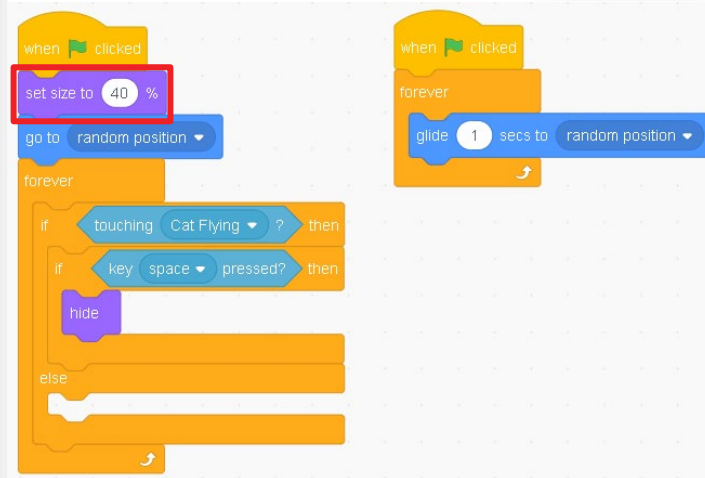Follow the previous lesson programming method, you will settle 6 game rules:

1. You are able to control your cat with up-down-left-right arrow keys
2. Your cat will start at the centre
3. <space> pressed -> Cat Flying (1st costume)
4. <space> not pressed -> Cat Punching (2nd costume)
5. When cat flying to right side -> face right
6. If cat is flying to left -> face left.

3. Program your Bat
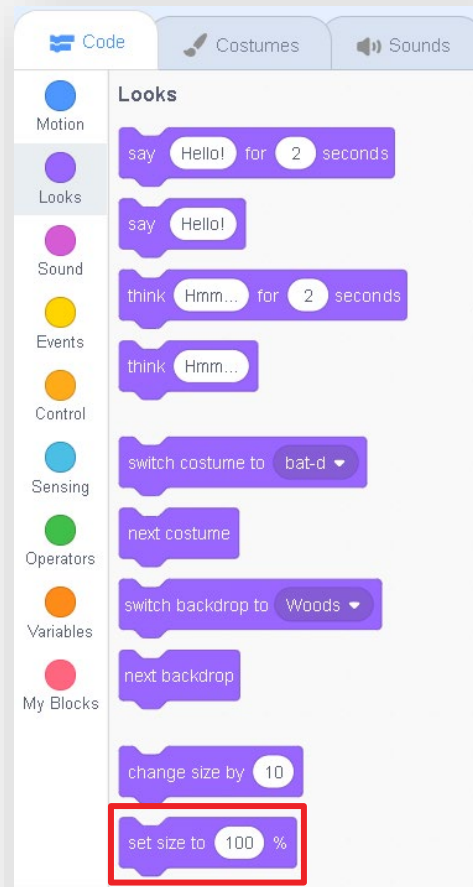
Script:

We add a block to "**Set Bat size = 40%**"

Then the following blocks will be similar to how you code the covid-19 game.

Move Randomly (Unpredictable movement)

Game Rules:
1. You are able to control your cat with up-down-left-right arrow keys
2. Your cat will start at the centre
3. <space> pressed -> Cat Flying (1st costume)
4. <space> not pressed -> Cat Punching (2nd costume)
5. When cat flying to right side -> face right
6. If cat is flying to left -> face left.
7. 6 bats (size = 40%) in the game, spawn randomly and will move randomly
8. When bat gets hit by "Cat Flying", nothing happen
9. If bat gets hit by "Cat Punching", disappear from the screen

Instead of using "**glide 1 secs to random position**", we will make a more frequent movement for the bat.

3. Program your Bat (Set Rotation Style)

Script:
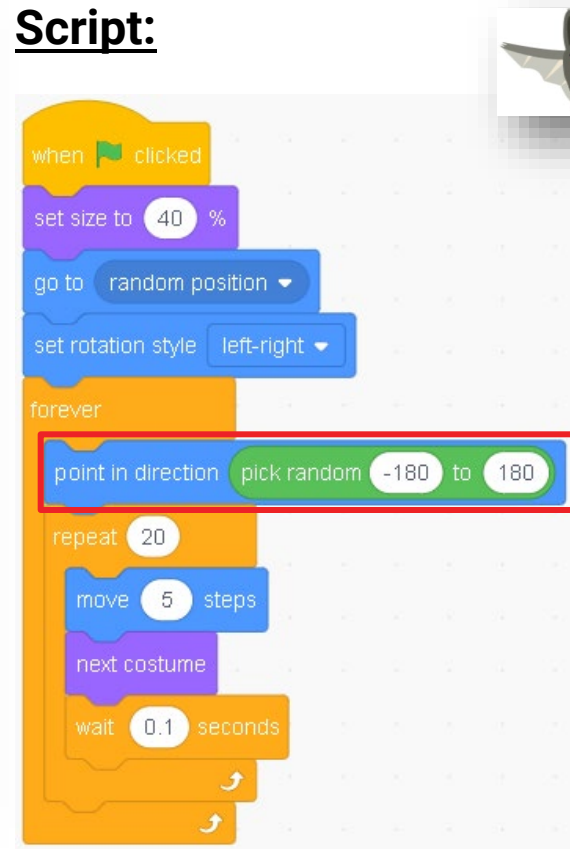

In order to make bat do more frequent unpredictable movement, we will first "**set rotation style [left-right]**" for bat.

This is to make sure bat won't rotate around with different pointing direction

3. Program your Bat (Point randomly)
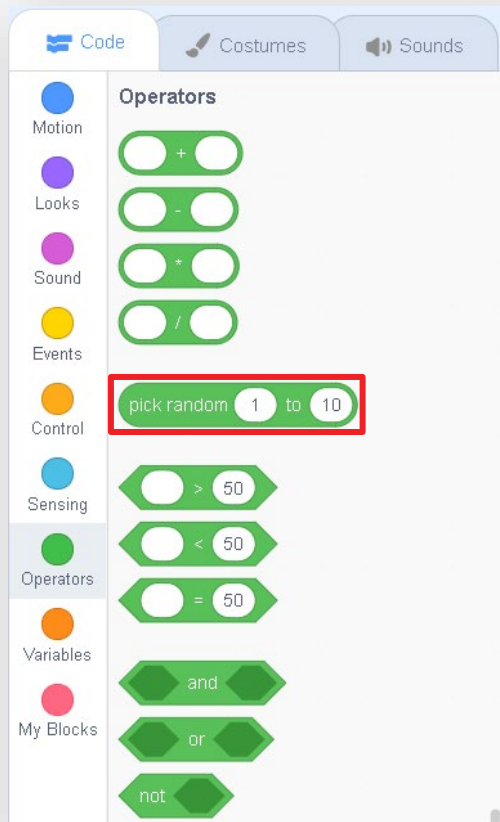
Script:

Then we will keep switching Bat's direction when moving around.

So you need to drag a "**point in direction**" block first.

Then we introduce a new block from the operators.

There is one block call "**pick random 1 to 10**". And you will notice the shape of this block is different than other blocks, it is in ellipse shape.

Pick Random ( ) to ( ) - explained

pick random 1 to 10

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

Pick Random ( ) to ( ) - explained

pick random -10 to 10

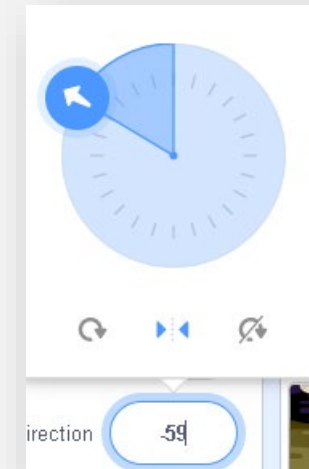If you put from "-10" to "10", then the range expands, and there will be a possibility to pick a number of from "-10" to "0" in this case.

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0

1 2 3 4 5 6 7 8 9 10

3. Program your Bat (Pick Random)
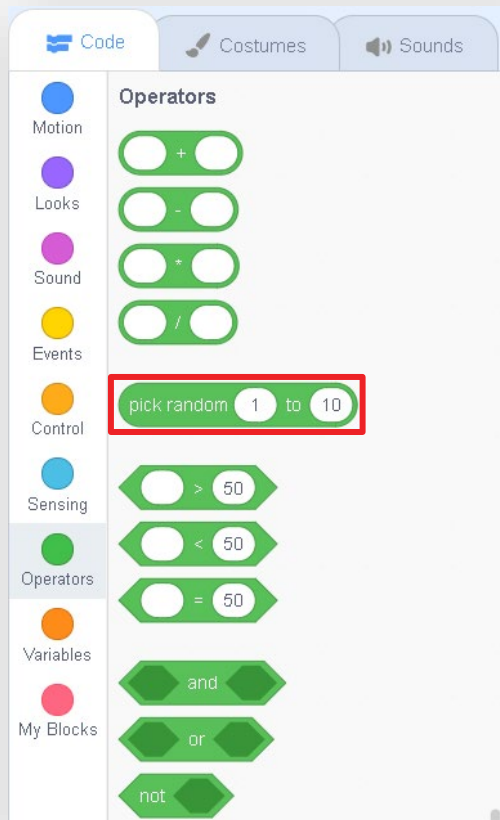
Script:
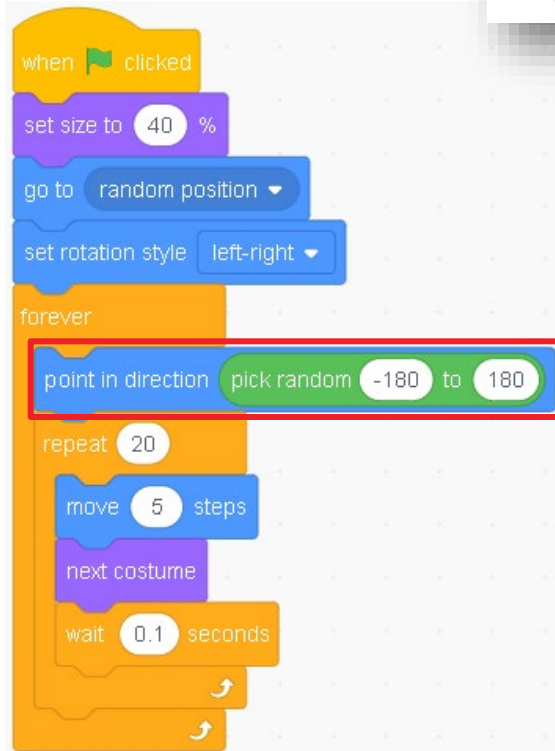
In this case,
I put pick random "-180 to 180" because I want it to turn randomly from every direction.
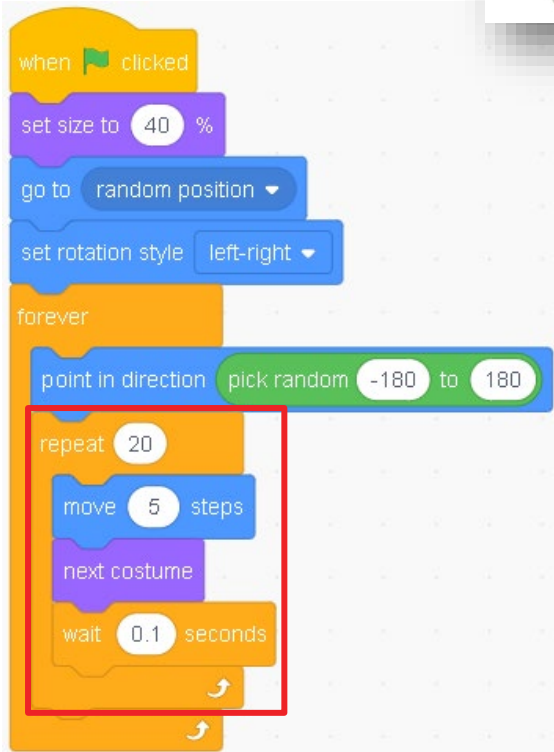
Variable – Number / Text
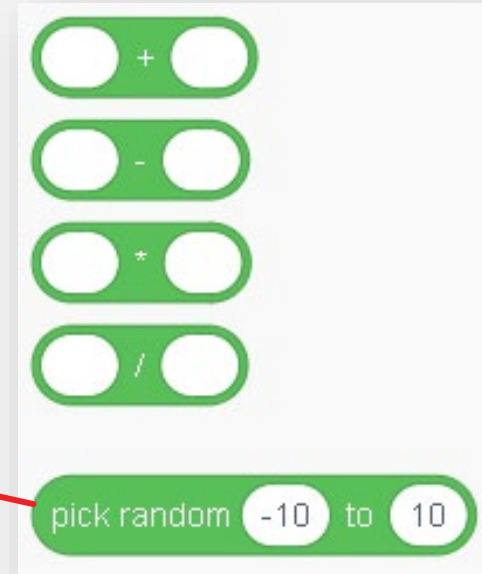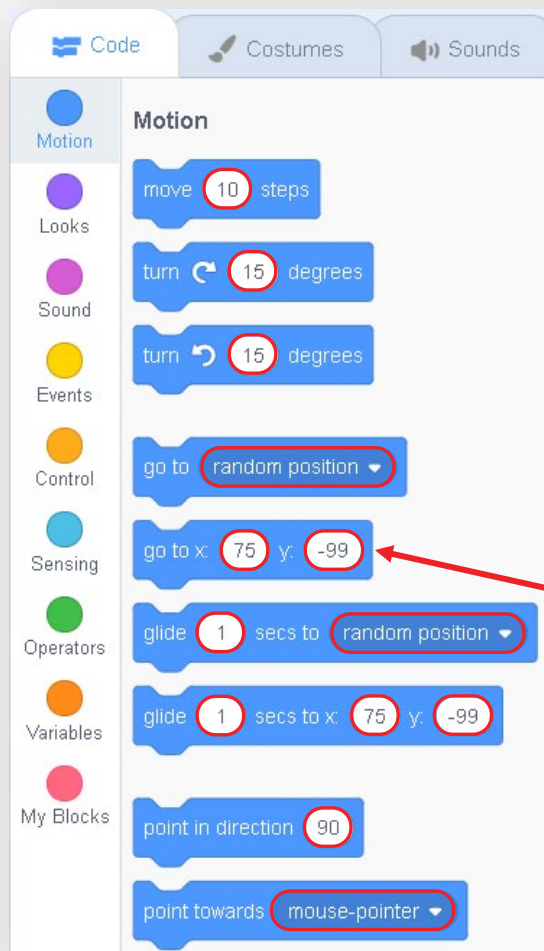
The ellipse block is served as the block that stored the value (number or text) and can be changed over time.

So for those motion block, the ellipse space like move "__" steps, we can put in a constant number like "10" or even put variable or random number to the move "__" steps to make it unpredictable.

3. Program your Bat (Random Movement)

Script:

After pick 1 direction to point to, then the bat will move forward (follow the pointing direction) for 20 times with 5 steps each, while changing to next costume also.

The main difference between move randomly and glide 1 sec to random position is the speed of move randomly is constant, while the speed of glide to position will vary.
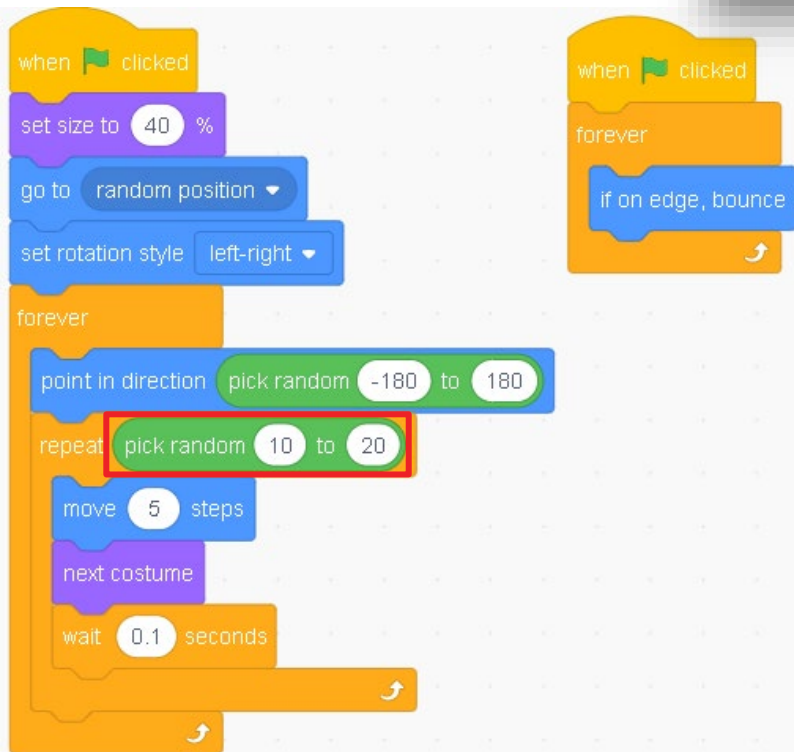
3. Program your Bat (Bounce on edge)
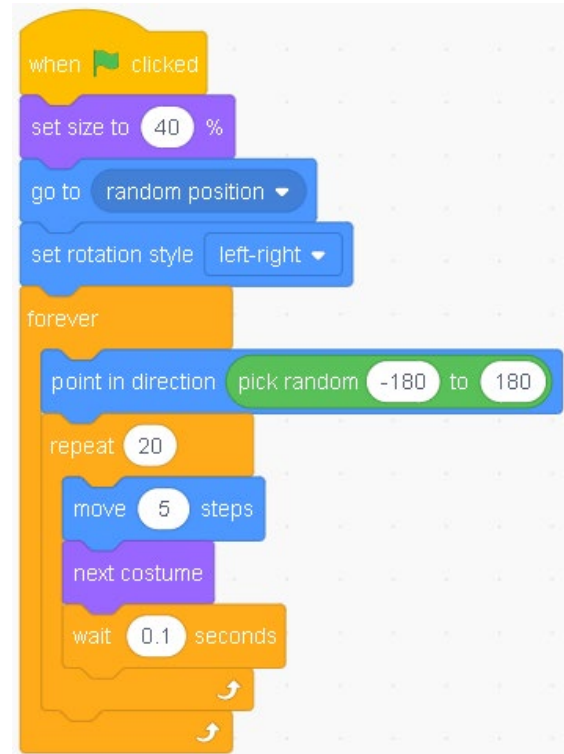
Script:

I add parallel program which is to make the bat to bounce when hit the edge.

3. Program your Bat (Bounce on edge)

Script:

If you want a more unpredictable movement, you can also add pick random from 10 to 20 in the repeat block.

3. Program your Bat (Bounce on edge)

The bat will move randomly with constant speed now.
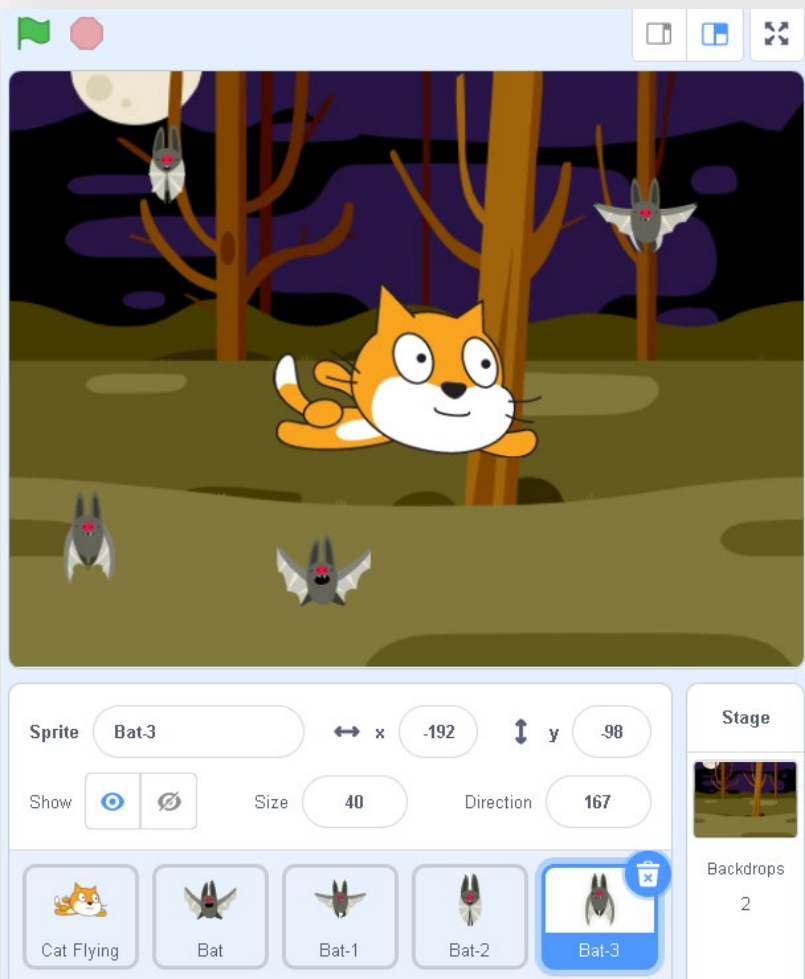
3. Program your Bat (Get hit by Cat)
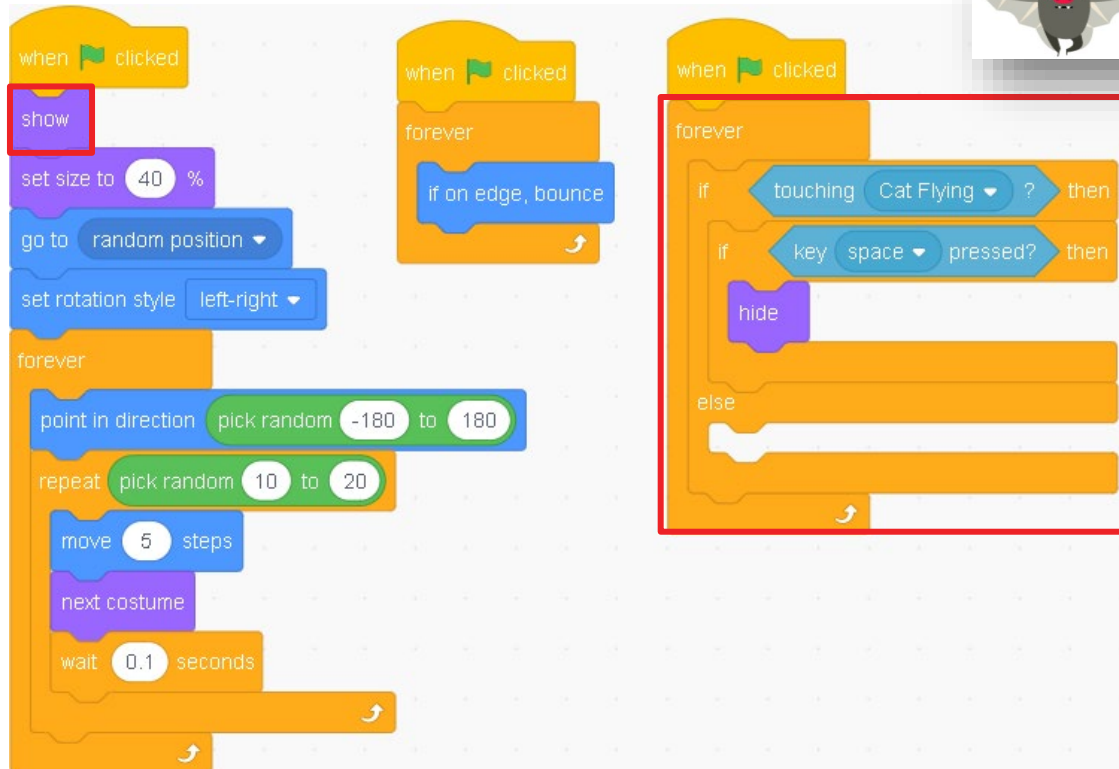
And you need a script to make the bat to disappear from the stage when get hit by "**Cat Punching**".

4. Make multiple bats on the stage

If we want to create few bats on the screen (game rule is to have 6 bats on the stage), normally we will just duplicate the bat to 6 after programming.
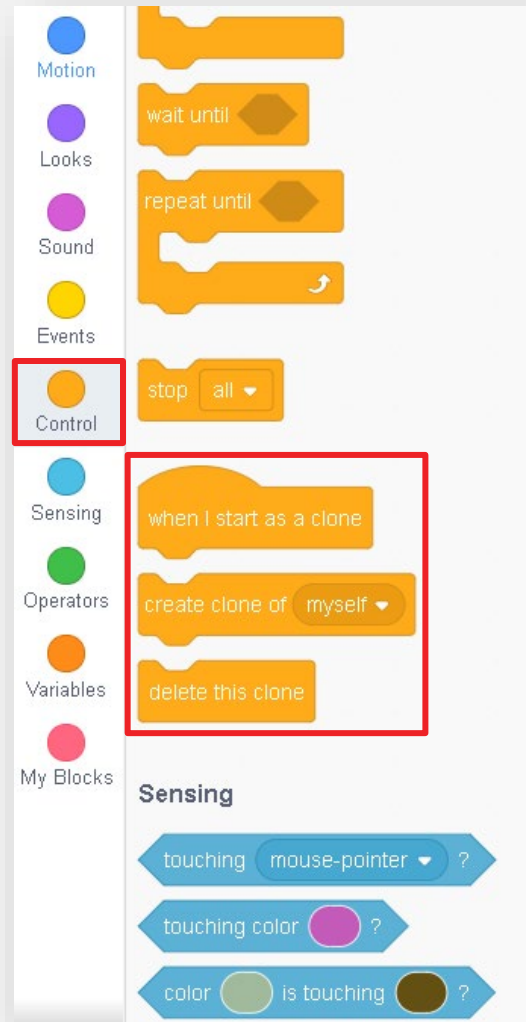
4. Make multiple bats on the stage
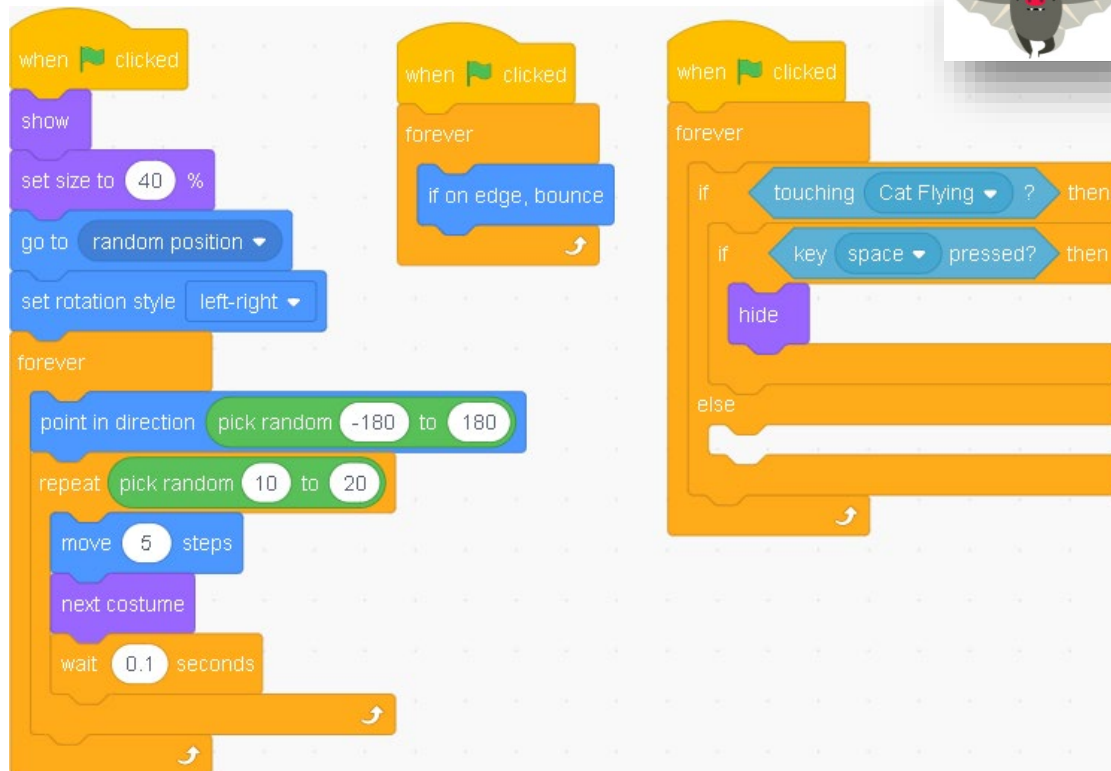
Script:

All of our bats are programmed with the same scripts, so that instead of duplicating the bats, we can use create clone to duplicate our bat.

If we use create clone function, then we can easily choose the number of bats we want at different level.

4. Make multiple bats on the stage

Go to the control category, and you will see these 3 blocks which is to create clone, control clone and delete clone.

4. Make multiple bats on the stage

Script:

We change the "**when Flag clicked**" from the scripts of the bat to "**when I start as a clone**".

This means that the real bat won't have any function, only the clones will do all the functions.

4. Make multiple bats on the stage

Script:

Then we add a start script for the bat, just drag the "**when flag clicked**", and put a "**hide**" followed by "**create clone of myself**" blocks.

4. Make multiple bats on the stage

Script:

And when the cat punched the bat, the bat will delete it's clone instead of just hiding the clone.

4. Make multiple bats on the stage

Script:

By using creating clones method to duplicate the bats, the number of sprites can be reduced if you are doing 12 bats on the stage.

4. Make multiple bats on the stage

Script:
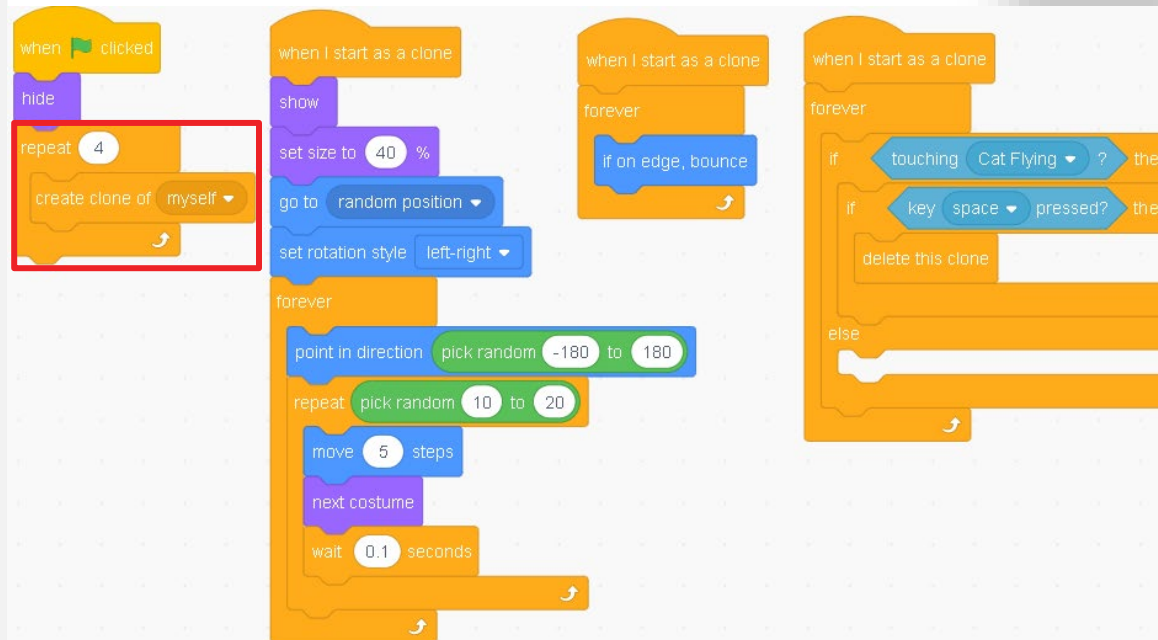
To make it simple and easy to change the number of clones to be created, we can put a repeat blocks and just put in how many clones we want on the repeat block.

4. Create Clone explained

Clone

Clone
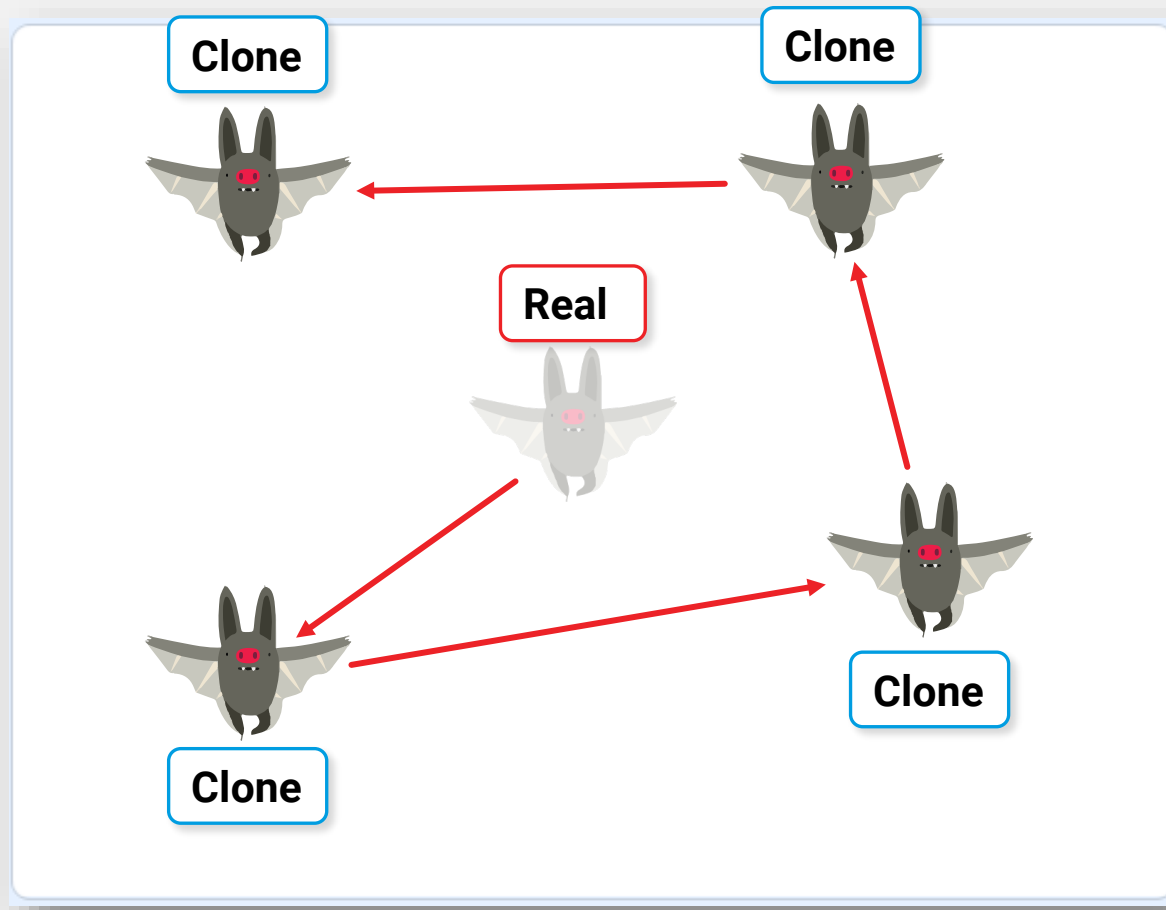
Real

Clone

Clone

The real bat will only create the clones, it won't have other functions.

So the real bat will keep creating clones for repeated time (set by you in the repeat block).

And the real bat won't show itself after all, only the clones will show itself after going to random positions.

4. Make multiple bats on the stage

Script:
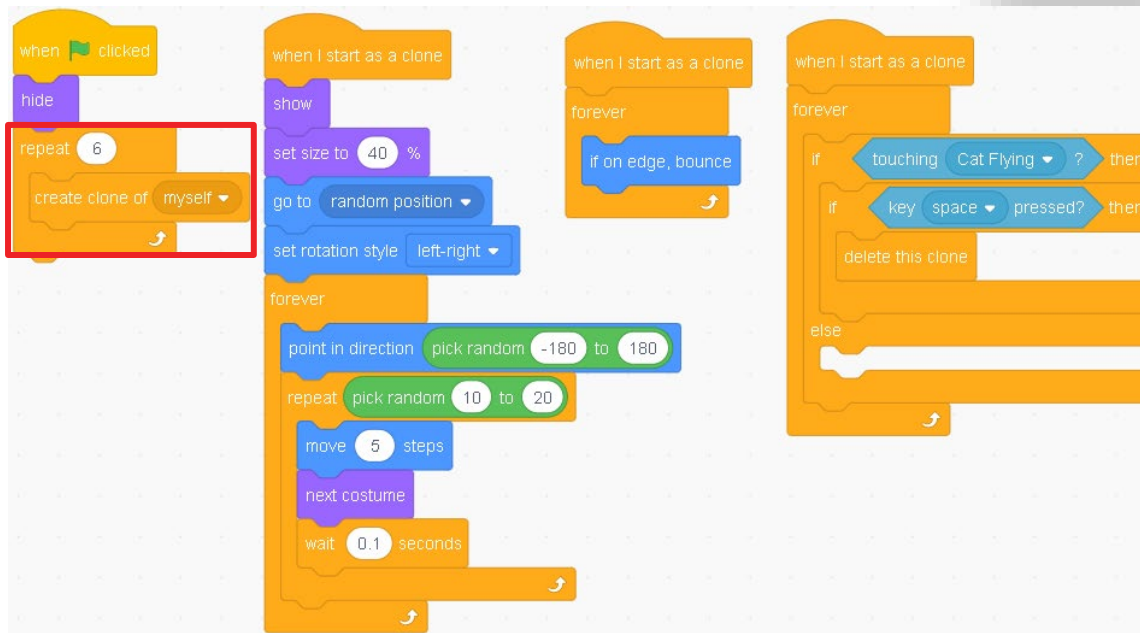
Game Rules #7:
6 bats (size = 40%) in the game, spawn randomly and will move randomly.

Now we will amend the repeat block to 6, because we need 6 bats on the stage.

Run the game

After clicking start / flag, you will see 6 bats flying around on the stage.

ASSIGNMENT *for*

Lesson 8

L8 – Mission

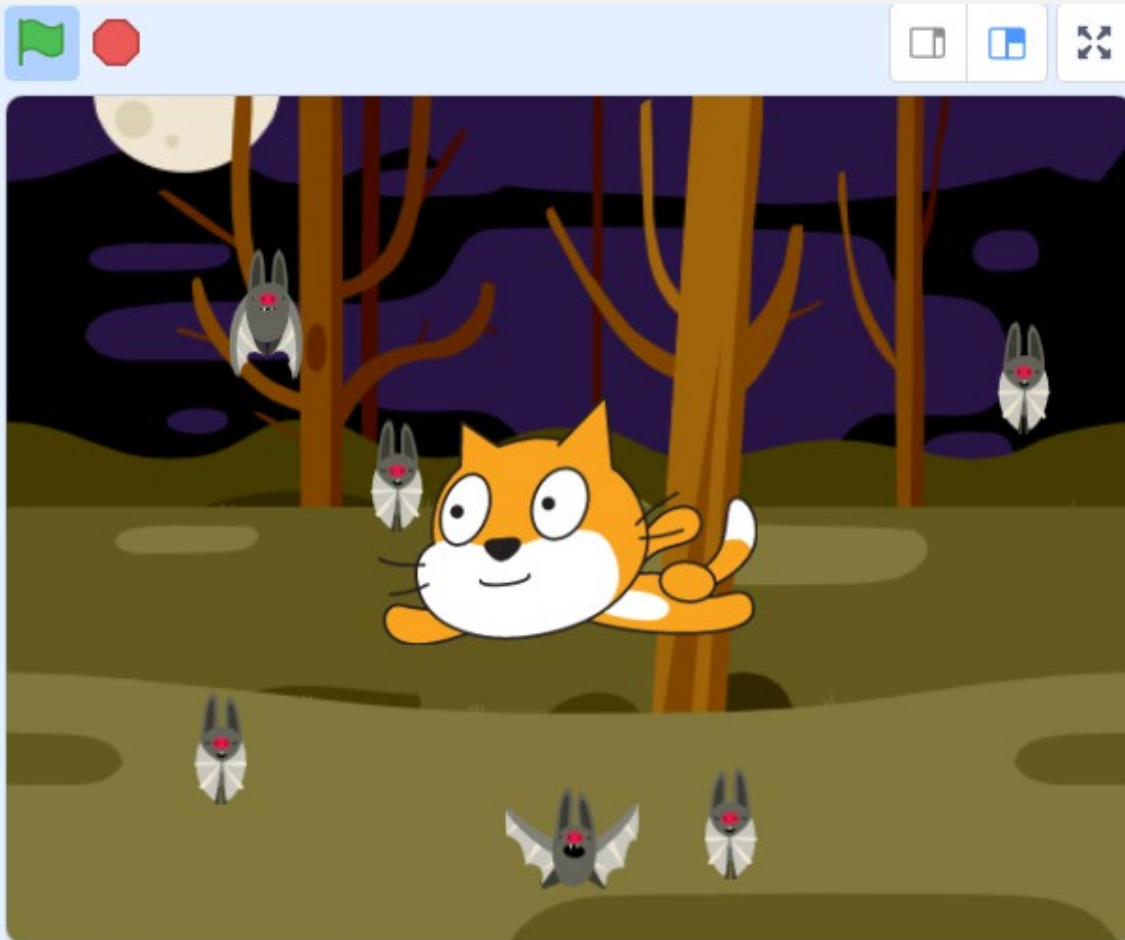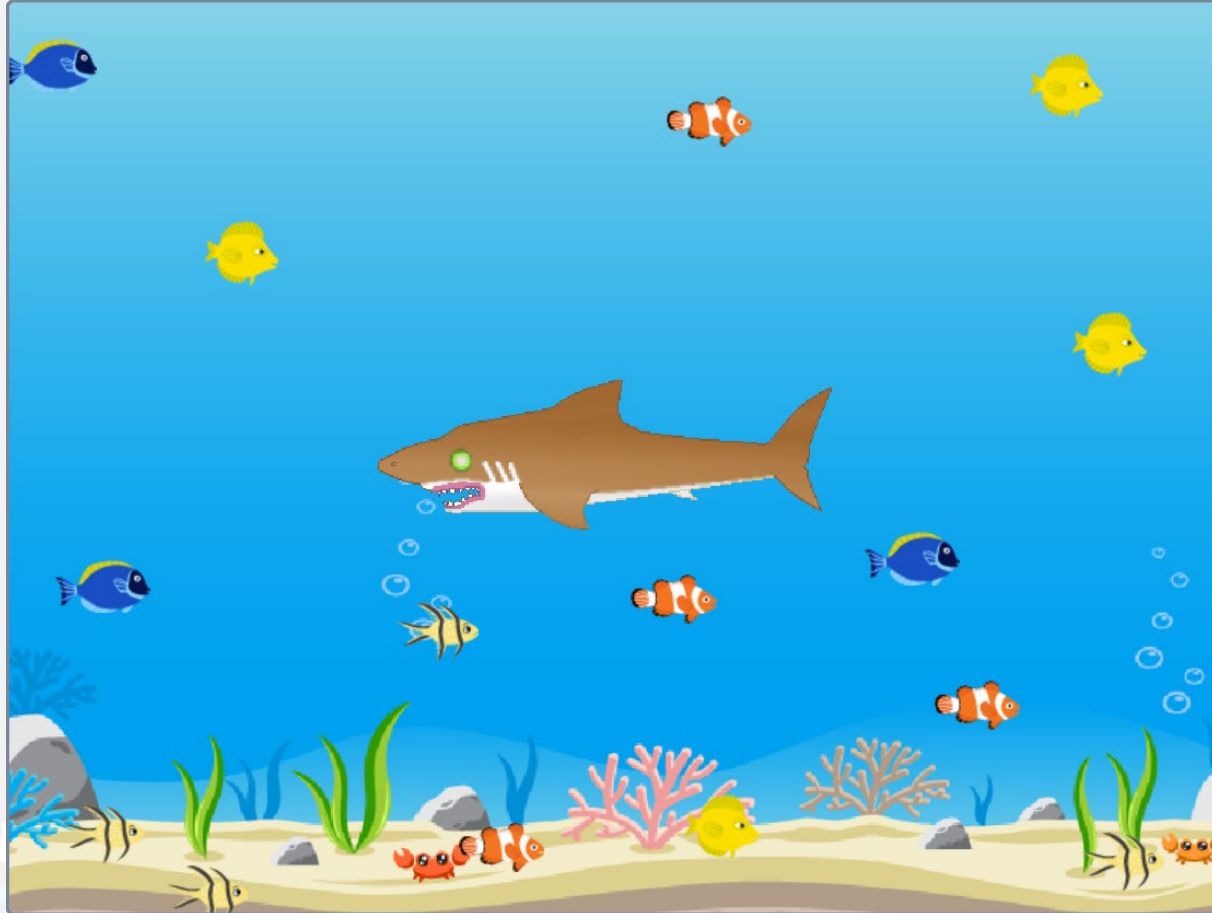**Create a Shark Game.**

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 discord.
2. The backdrop "under the sea" can be downloaded from discord.
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.

Q&A Any Questions?

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

Thank you :)