



# Scratch Programming

## Topic 1.11

# Shark Game

Presented by Advaspire Team



# Review Last Topic – Pointing Randomly

**Script:**

The script is divided into three sections, each starting with a 'when clicked' event:

- Section 1:** 'show', 'set size to 40 %', 'go to random position', 'set rotation style left-right', followed by a 'forever' loop containing 'point in direction pick random -180 to 180', 'repeat pick random 10 to 20', 'move 5 steps', 'next costume', and 'wait 0.1 seconds'.
- Section 2:** A 'forever' loop containing an 'if on edge, bounce' block.
- Section 3:** A 'forever' loop containing an 'if touching Cat Flying ?' block. If true, it runs an 'if key space pressed?' block. If the space key is pressed, it runs a 'hide' block. Otherwise, it runs an empty block.

A small image of a cat flying is shown in the top right corner of the script area.

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



# Review Last Topic – Create Clones

The block palette is shown with the following categories and blocks:

- Motion:** wait until, repeat until, stop all.
- Looks:** when I start as a clone, create clone of myself, delete this clone.
- Control:** when I start as a clone, create clone of myself.
- Sensing:** touching mouse-pointer, touching color, color is touching.

## Script:

The script area contains the following code for a bat character:

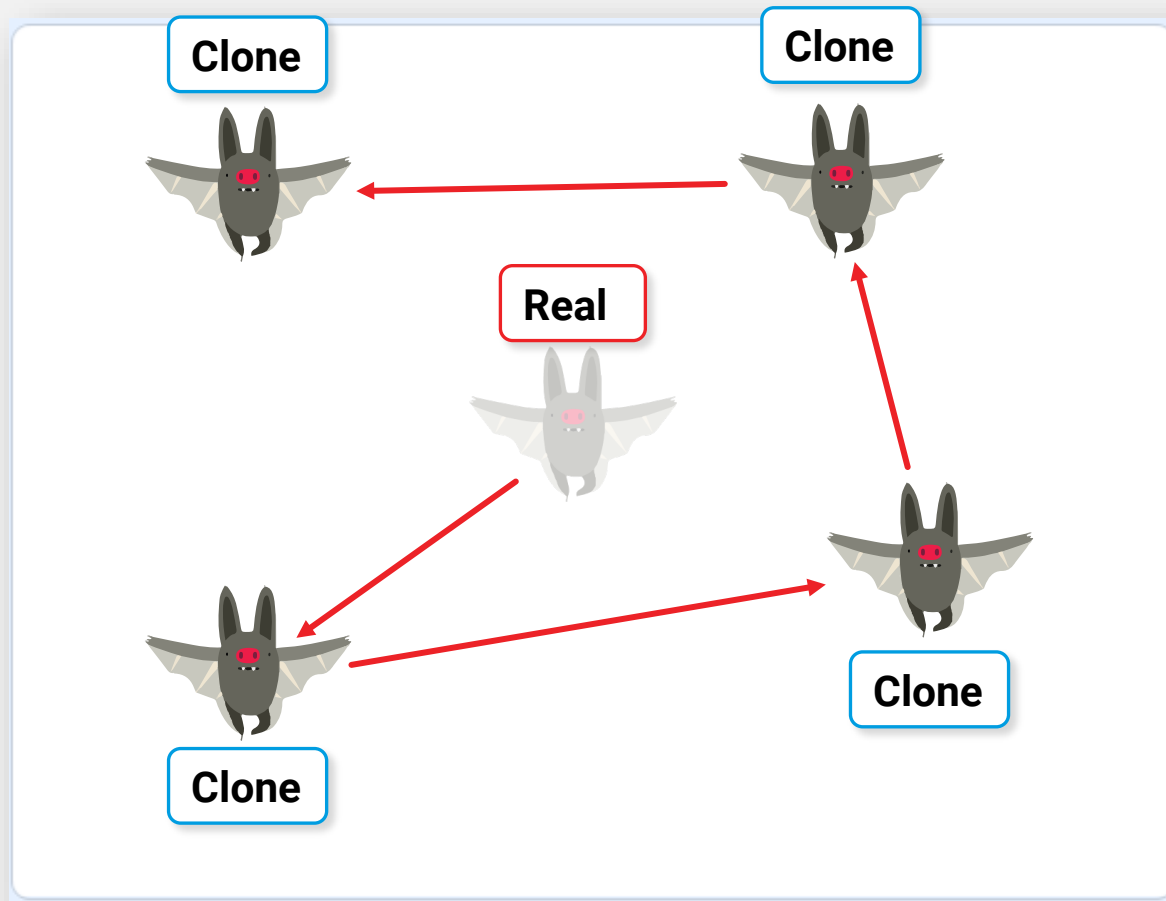
- when flag clicked:** hide, create clone of myself.
- when I start as a clone:** show, set size to 40%, go to random position, set rotation style left-right, forever loop: point in direction pick random -180 to 180, repeat pick random 10 to 20, move 5 steps, next costume, wait 0.1 seconds.
- when I start as a clone:** forever loop: if on edge, bounce.
- when I start as a clone:** forever loop: if touching Cat Flying? then: if key space pressed? then: hide, else: (empty).



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.



# Review Last Topic – How does Create clone work



**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.**



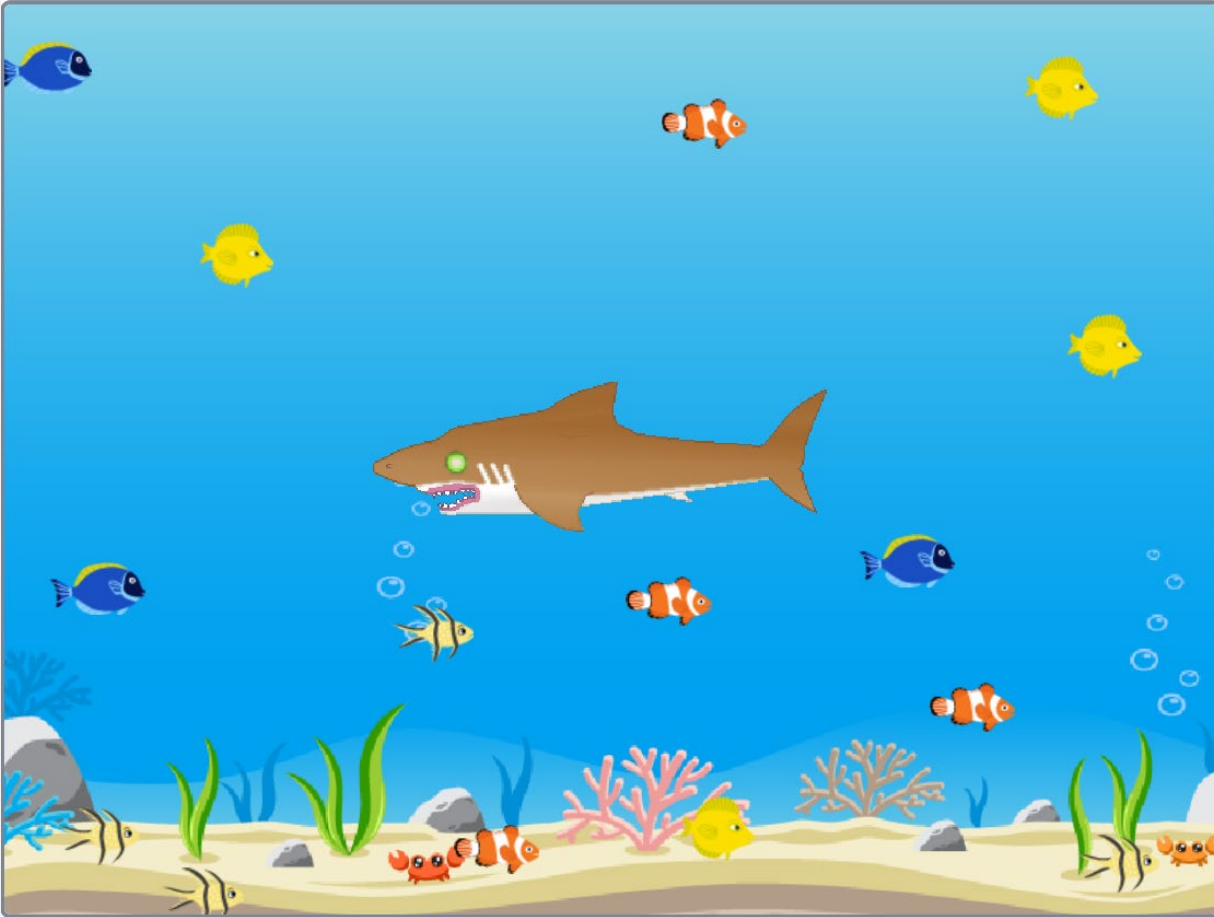
# Today's Topic

1. Create a shark game
2. Spawn random number of fishes
3. Sensing Shark Bite
4. Add Score Variable



# Learning Outcome

1. Able to code a shark game
2. Able to use clone to spawn different number of fishes
3. Able to set up scoring system



## T1.10 – Mission

**Create a Shark Game.**

**The shark can move with arrow keys like the cat in topic 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>>](#)



# T1.10 – 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.





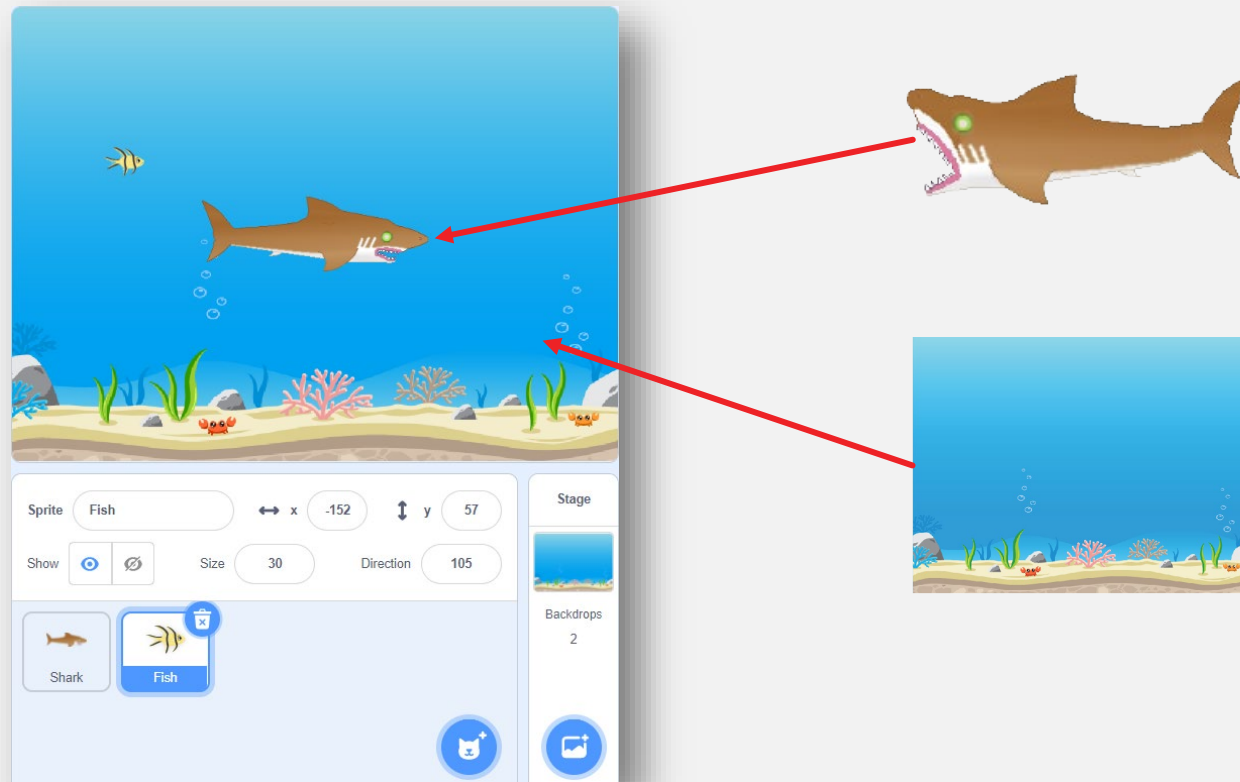
# T1.10 – Mission – Game Rules 2

## **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.



# Upload the sprites and backdrop



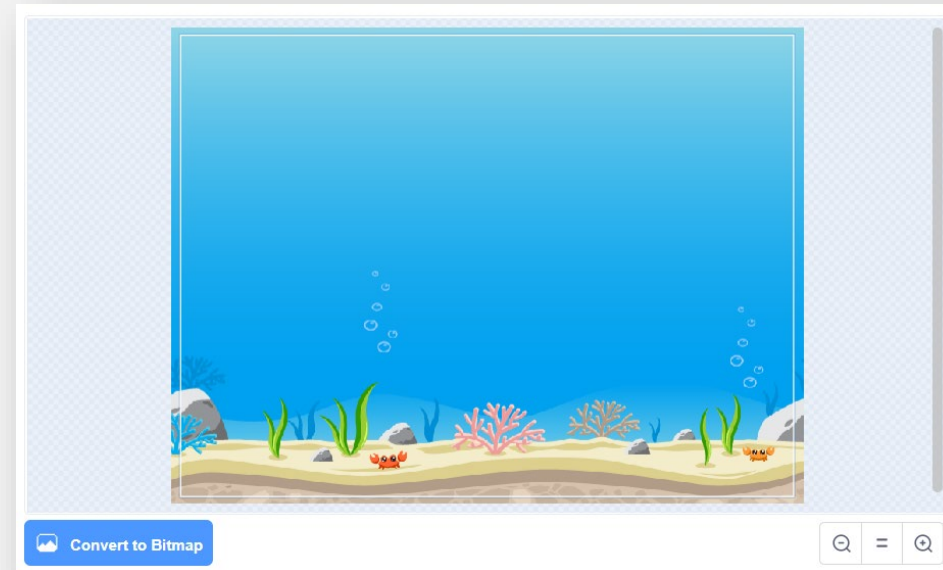
Upload the shark sprites (with 2 shark costumes – Shark bite and shark swim) and the backdrop of “under the sea”, then scale up the backdrop to full screen.

<https://scratch.mit.edu/projects/578153758/>

You can also remix the project provided above.



## Game Rule #4 – Set Size



### Game Rule #4:

Shark size = 60%; Fish = 30%; Backdrop = fullscreen



# Game Rule #5 & #6 – Smooth Control & Starting Position

## Script:



## Game Rule #5:

You are able to control your shark with up-down-left-right arrow keys

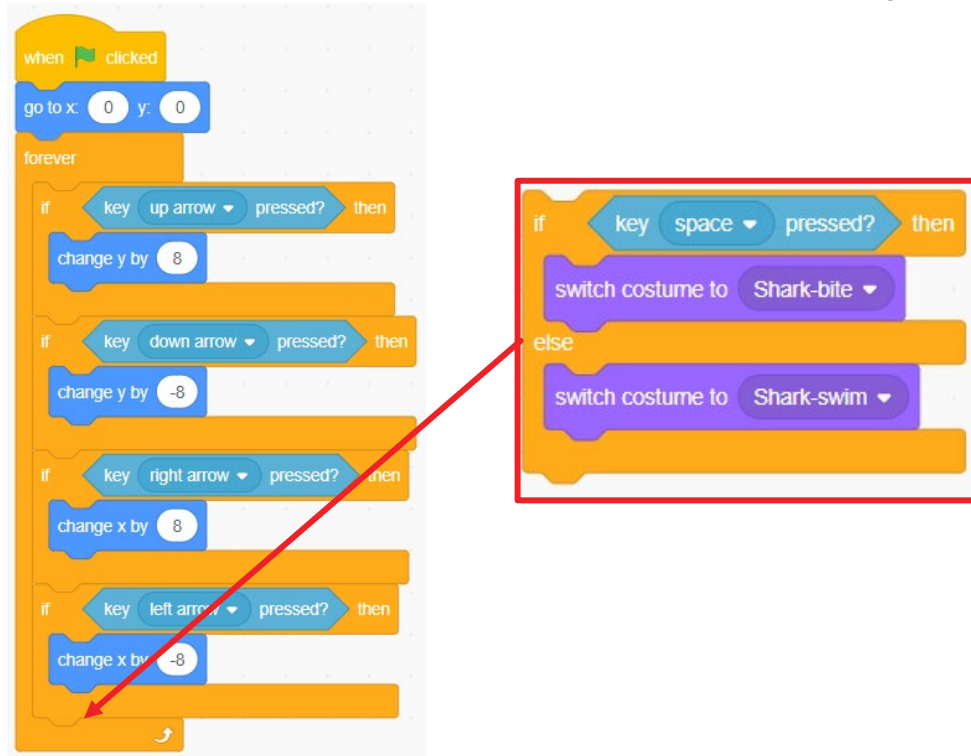
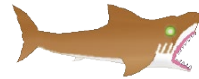
## Game Rule #6:

Your shark will start at the centre



# Game Rule #7 & #8 – Shark Attack

## Script:



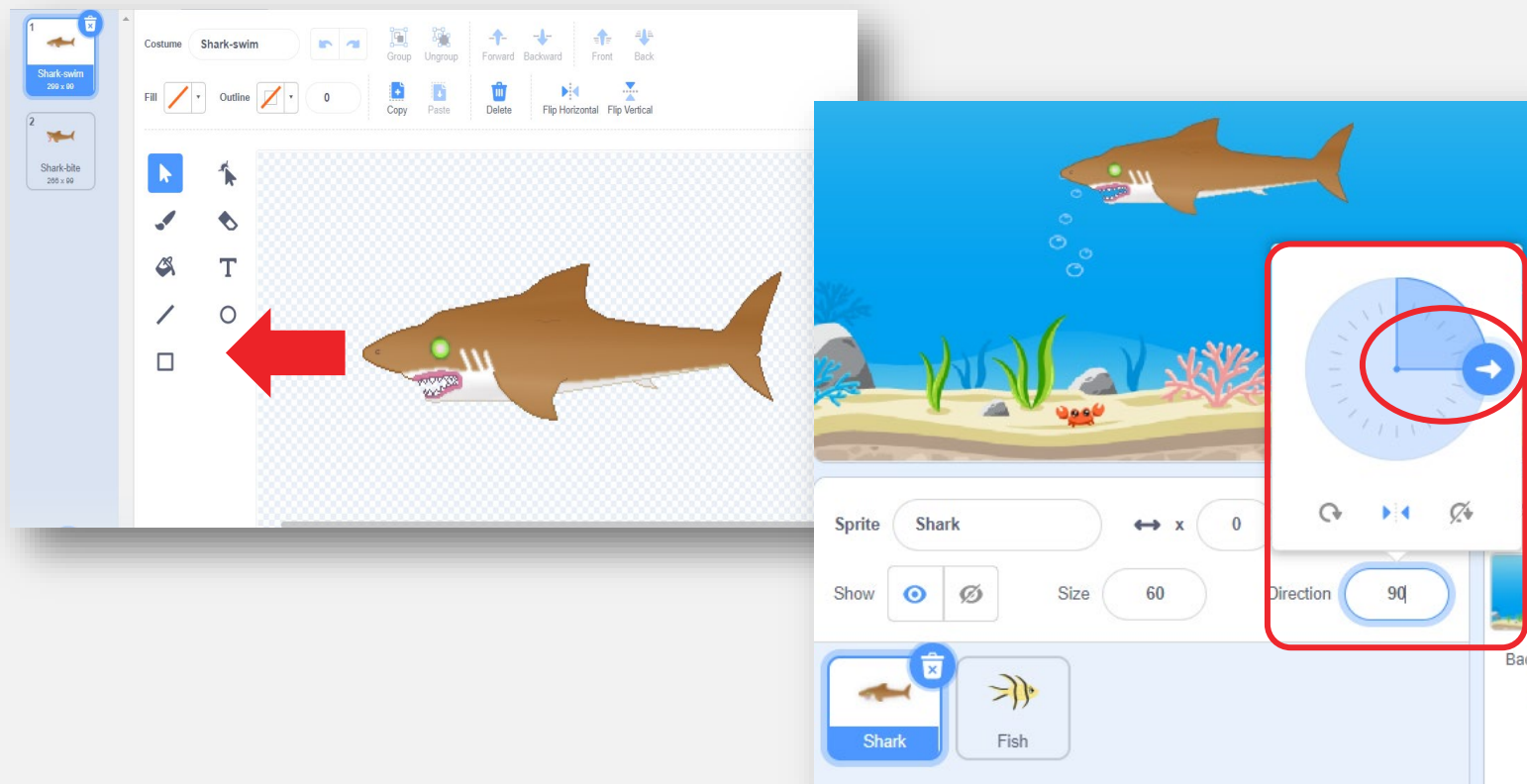
## Game Rule #6 & #7:

<space> pressed -> shark-bite  
<space> not pressed -> shark-swim

Since we are going to make the shark to switch costume based on the <space> is pressed or not, and in this situation, we need to set the <space> control with 2 situation, “pressed” and “not pressed”. Therefore, we can’t use if-block only, we should use if-else block instead.



# Game Rule #9 – Shark's facing direction



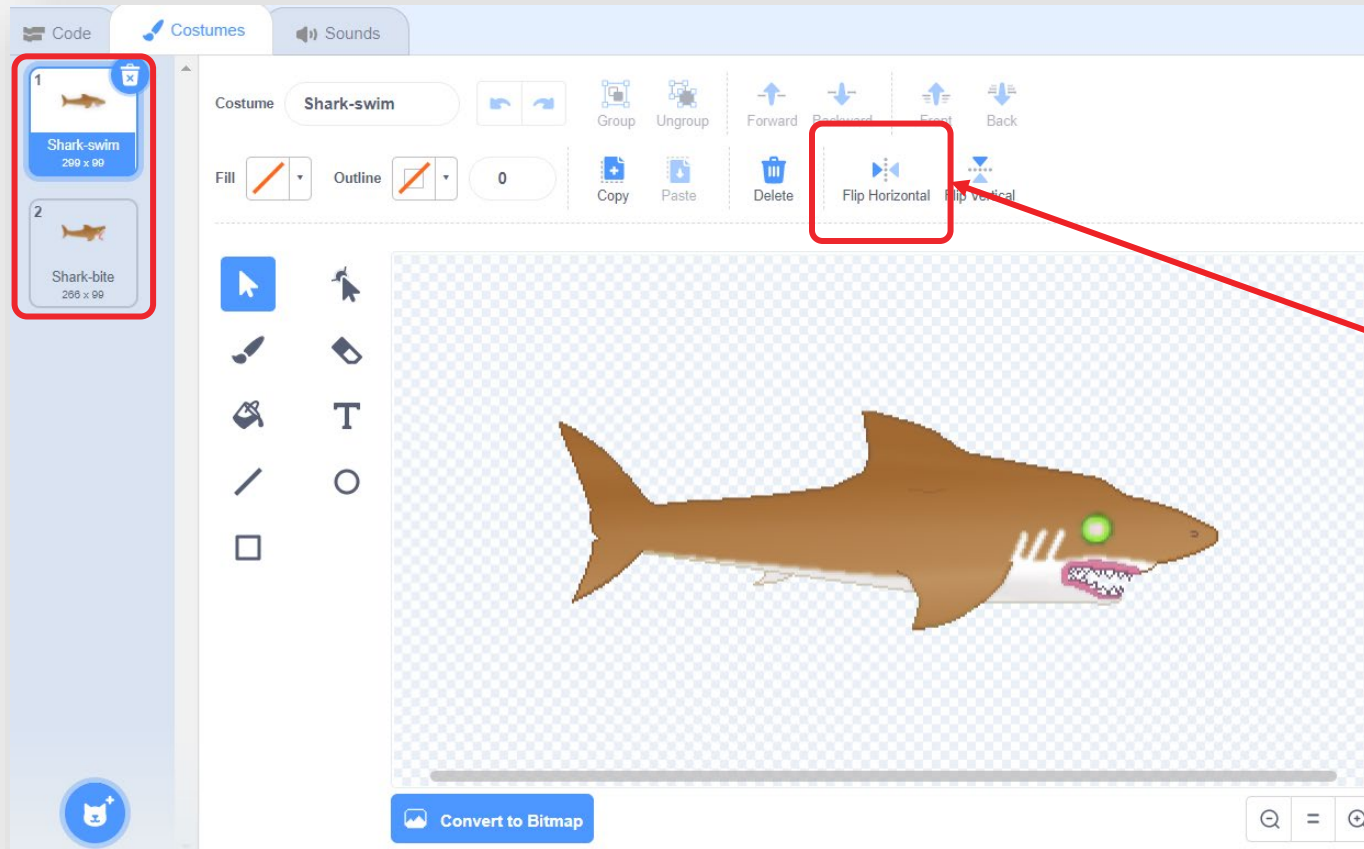
When we upload our shark sprite, the costumes are facing to the left side.

When you look into the properties of shark – the pointing direction of shark, it is opposing the pointing direction of the costume.





# Game Rule #9 – Shark's facing direction

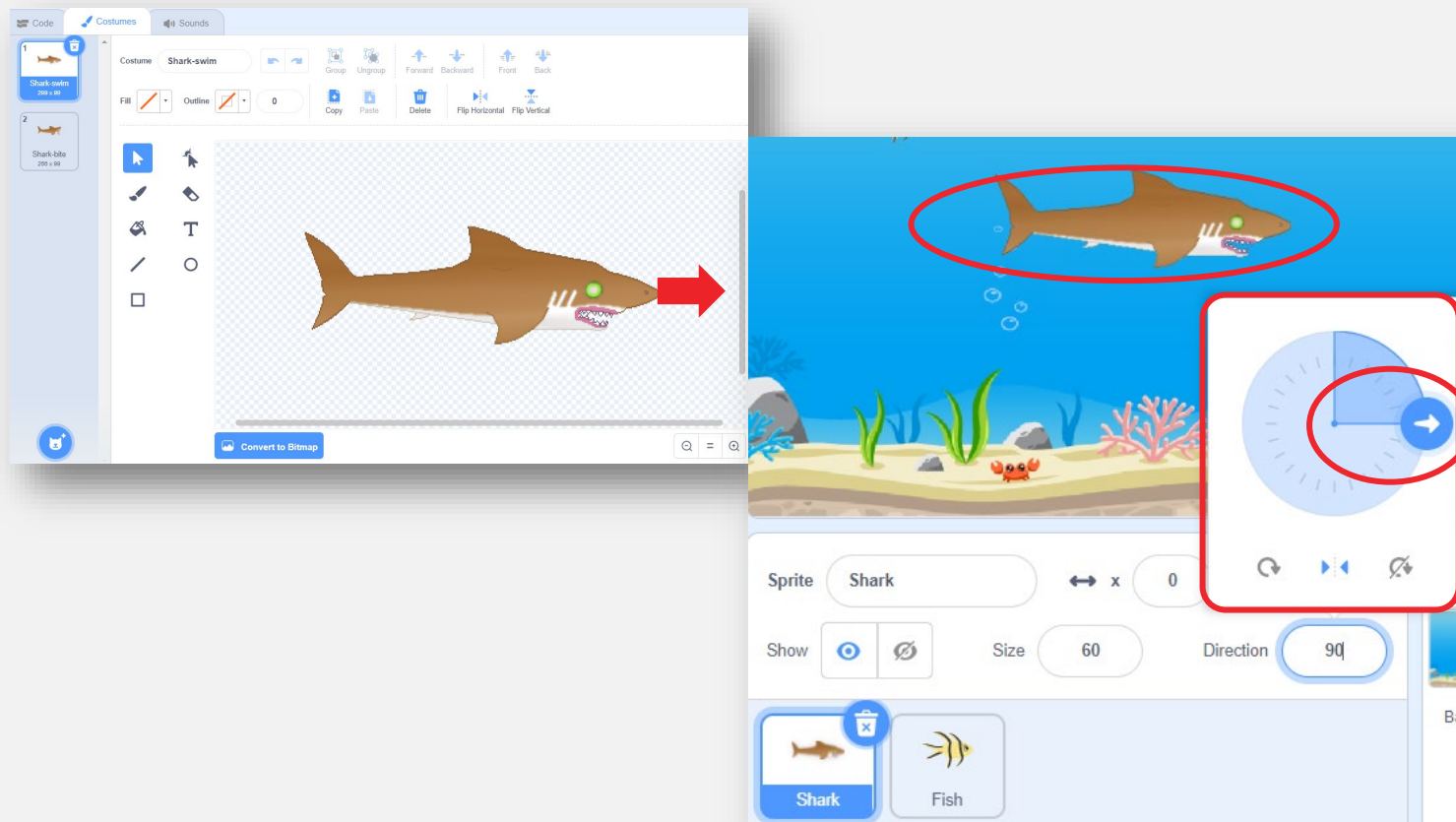


We should make the direction of the costume compatible to the pointing direction in shark's properties.

Then it won't give us confusion when we are changing the pointing direction in the script.



# Game Rule #9 – Shark's facing direction



Now your pointing direction in the properties should be same with your costume.





# Game Rule #9 – Shark's facing direction

## Script:



## Game Rule #9:

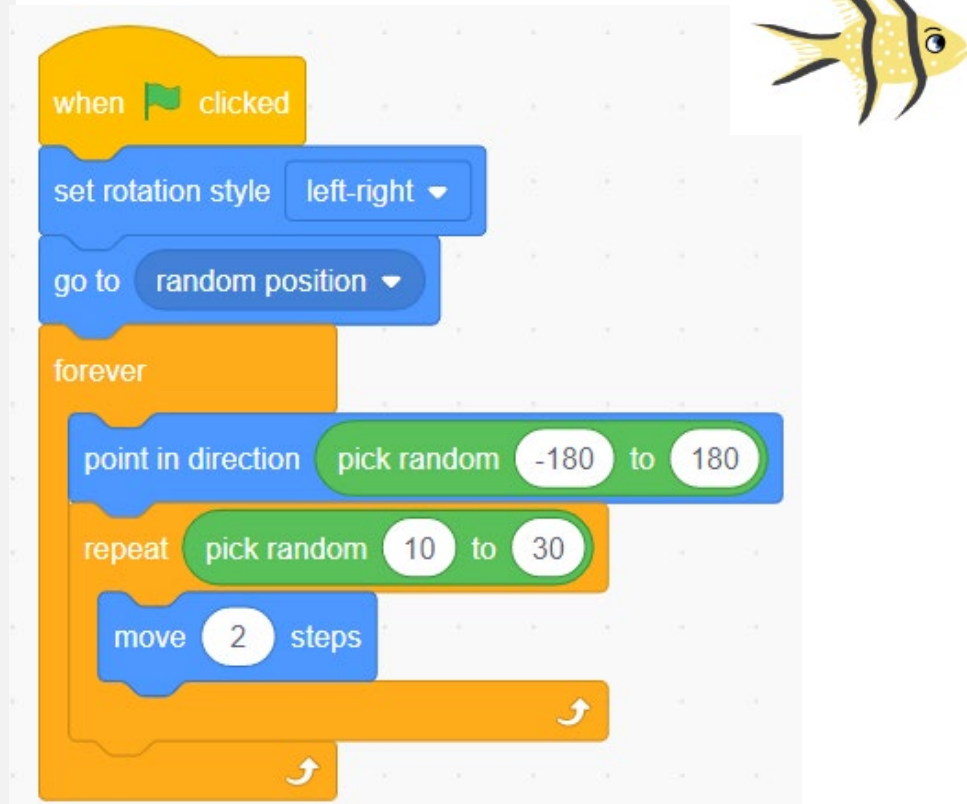
Shark facing direction: {left pressed = face left; right pressed = face right}

We will set rotation style to left-right only for shark.

Then add in the point in direction to the <Left> <Right> control.

# Game Rule #10 – Fishes Spawning & Movement

## Script:



## Game Rule #10:

Fishes are spawned randomly and with random movement (constant speed).

This script is like the bat (npc) from the cat and bat game.

To make it move randomly with constant speed, we use move steps instead of glide to position.



# Game Rule #11 – Create Clones

## Script:



The script is divided into two parts. The first part, triggered by 'when green flag clicked', contains three blocks: 'hide', 'set rotation style to left-right', and 'create clone of myself'. The second part, enclosed in a red box and triggered by 'when I start as a clone', contains a 'show' block followed by a 'forever' loop. Inside the loop, the fish 'point in direction' to a 'pick random' value between -180 and 180, then 'repeat' a 'move 2 steps' block a 'pick random' number of times between 10 and 30.

## Game Rule #11:

Number of fishes are random, range from 12 to 20.

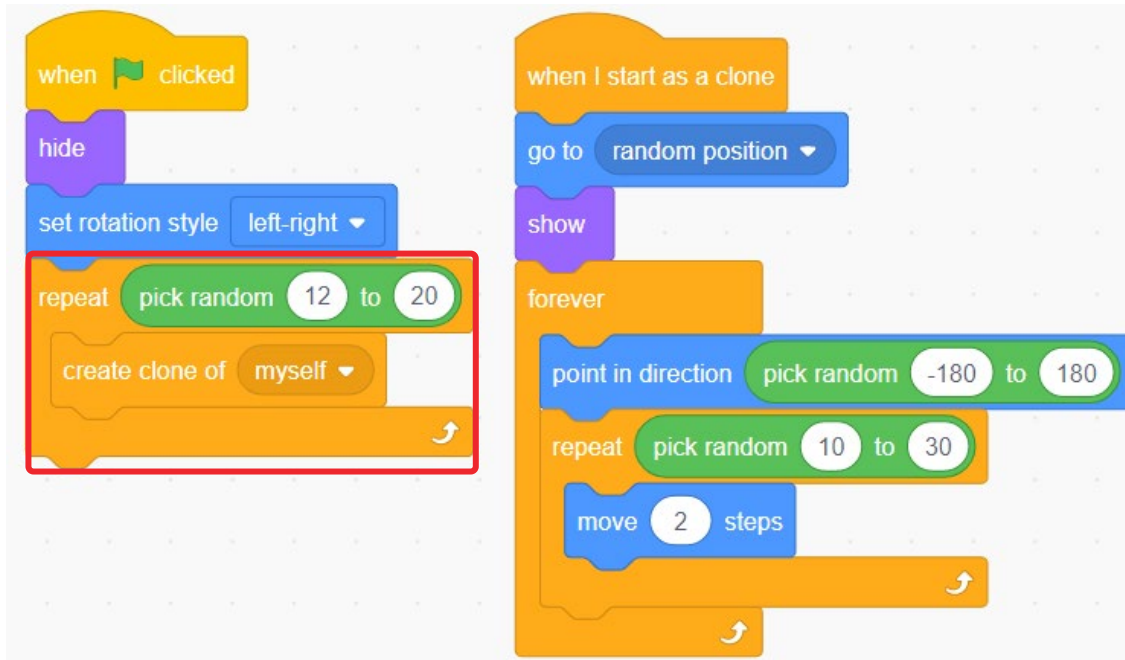
Since we want our fishes randomly spawn, and the number of fishes is ranged from 12 to 20.

To make a random number of fishes created from start, we need to make it with clones.



# Game Rule #11 – Create Clones

## Script:



## Game Rule #11:

Number of fishes are random, range from 12 to 20.

To create random number of clones, we can use pick random block to specify the range of number in the repeat block to for clone creation.



# Game Rule #12 – Fish being eaten by Shark

## Script:



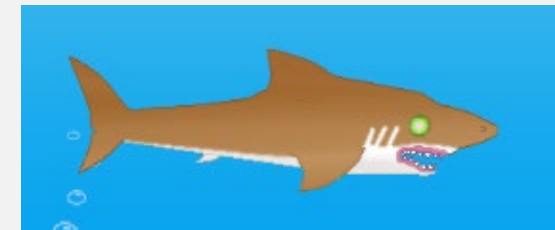
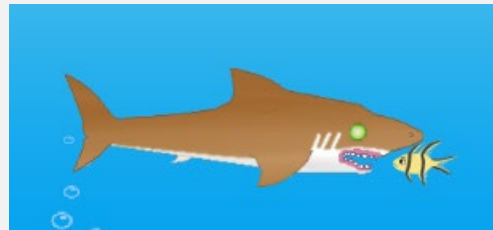
## Game Rule #12:

Fish only disappears when touches the open mouth of shark

When we are coding for the sensing blocks, we will use the forever-if loop to keep checking if the conditions happened (touching shark when shark open its mouth in this case)

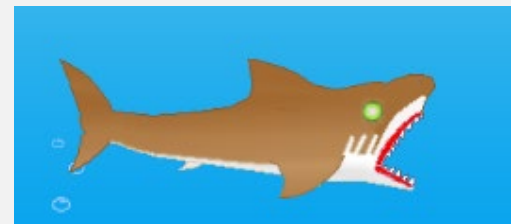
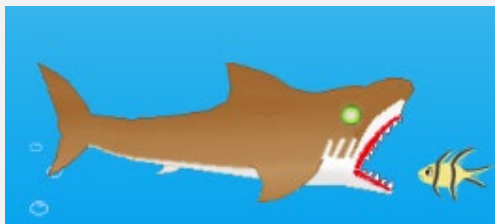


## Game Rule #12 – Fish being eaten by Shark



If we use touching Shark as our condition to kill the fish, it will have this problem:  
Fish will be eaten even if the shark is not opening its mouth.

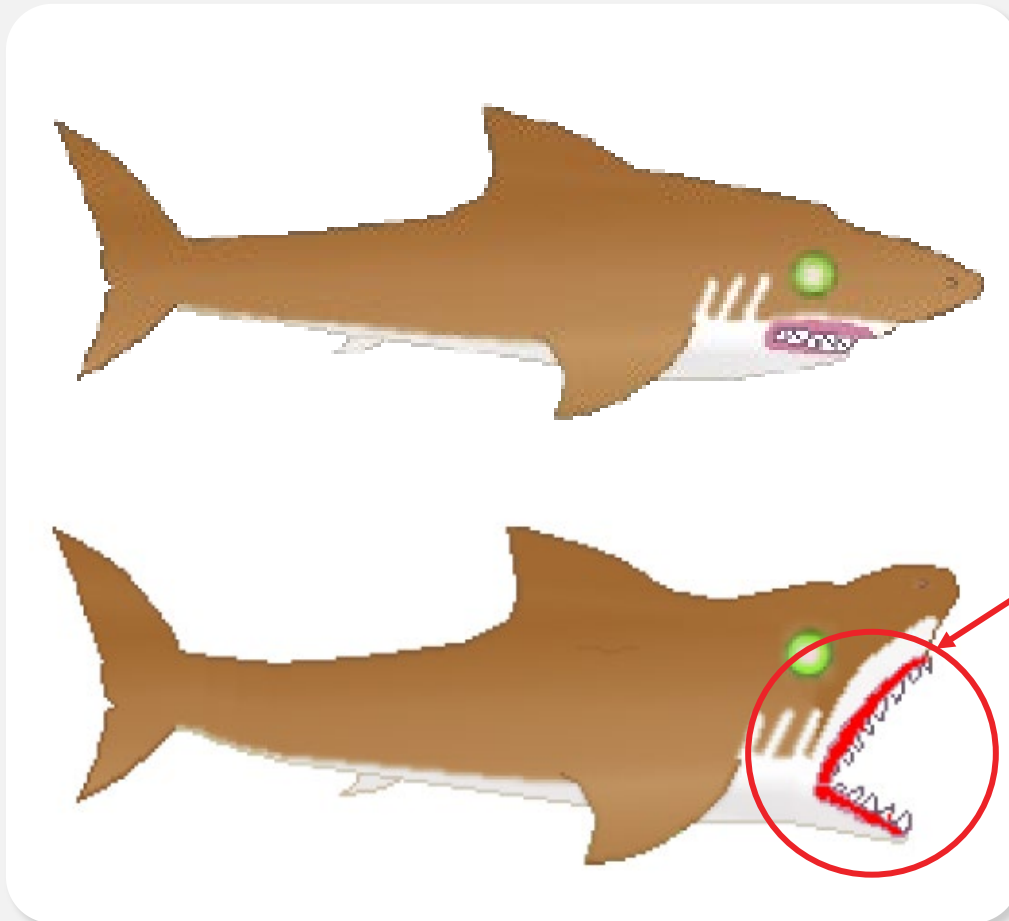
# Game Rule #12 – Fish being eaten by Shark



What we want is only when the shark open its mouth, it can eat the fish, otherwise the fish will not disappear if touching shark with closed mouth.



## Game Rule #12 – Touching Colour



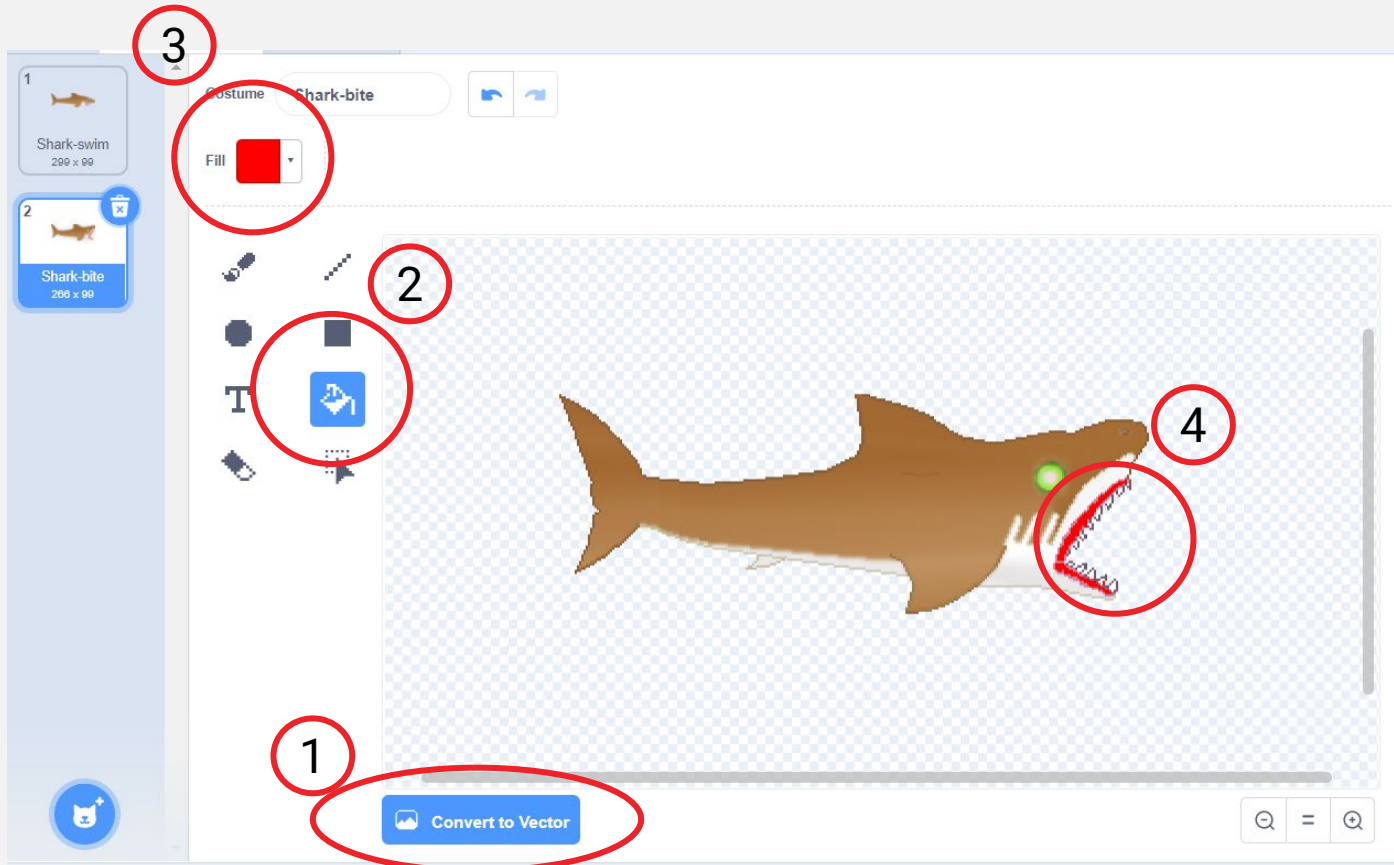
We can go to costume, then change the gum of the shark to red color for the shark bite costume only, the shark swim will remain same color.

Then we can code our fish to make touching this red color as the condition to make fish disappear.





# Game Rule #12 – Touching Colour

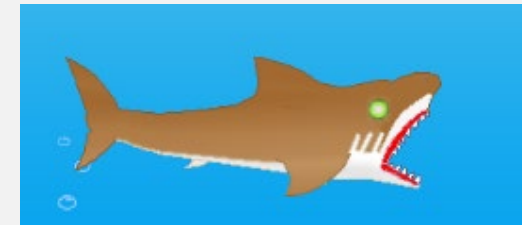
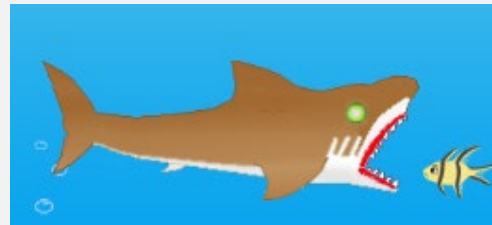
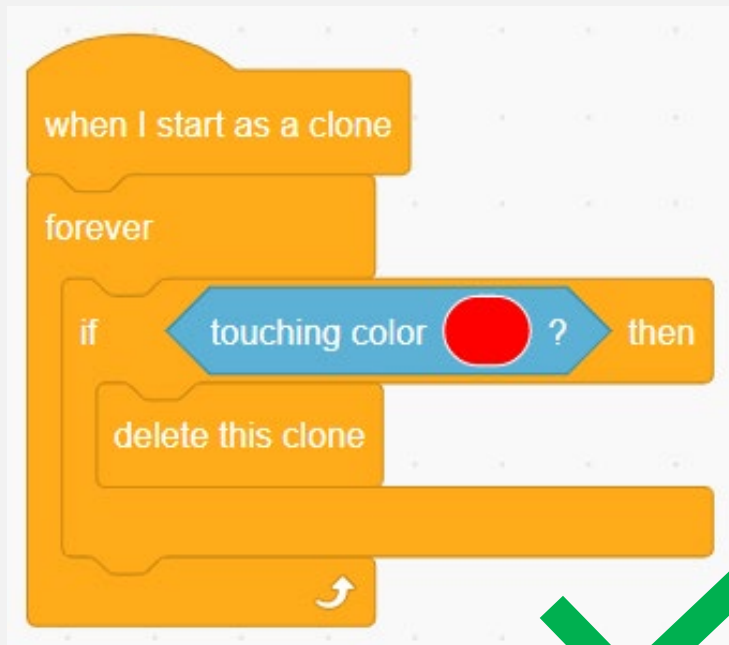


Make sure that your shark is in bitmap format (when the “1” is in “Convert to Vector”).

Use fill tool and select red color, then click on the gum of the shark to turn it to red color.

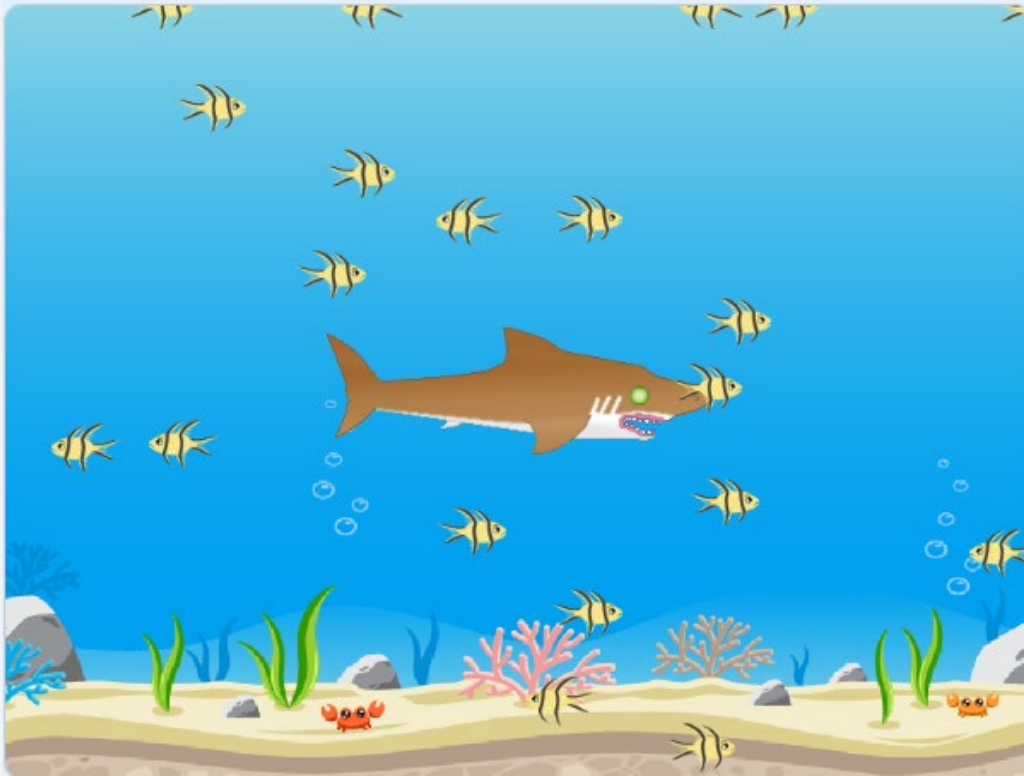


## Game Rule #12 – Fish being eaten by Shark



We will use touching color to make the fish disappear.  
\*Use the color dropper to drop the color of shark gum (red).

# Game Rule #13 & #14 – Random Fish Criteria



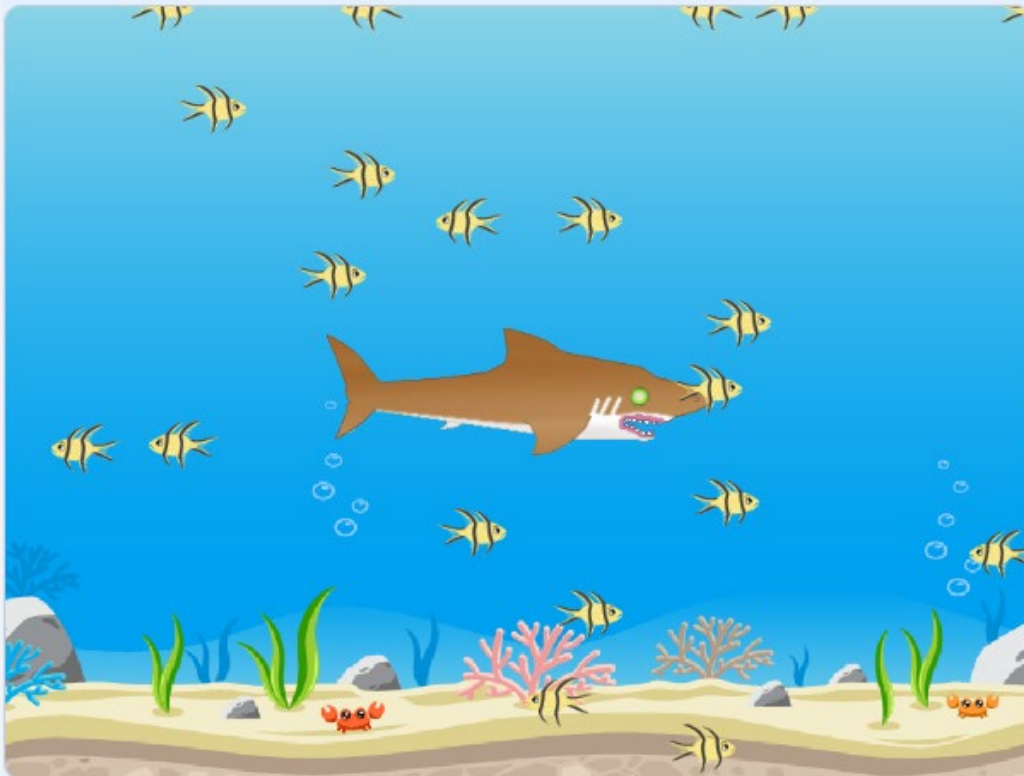
## **Game Rule #13:**

Your sea must have at least 4 types of fishes

## **Game Rule #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)

## Game Rule #13 & #14 – Random Fish Criteria



When we click start to run our shark game, your fish now should spawn in random number.

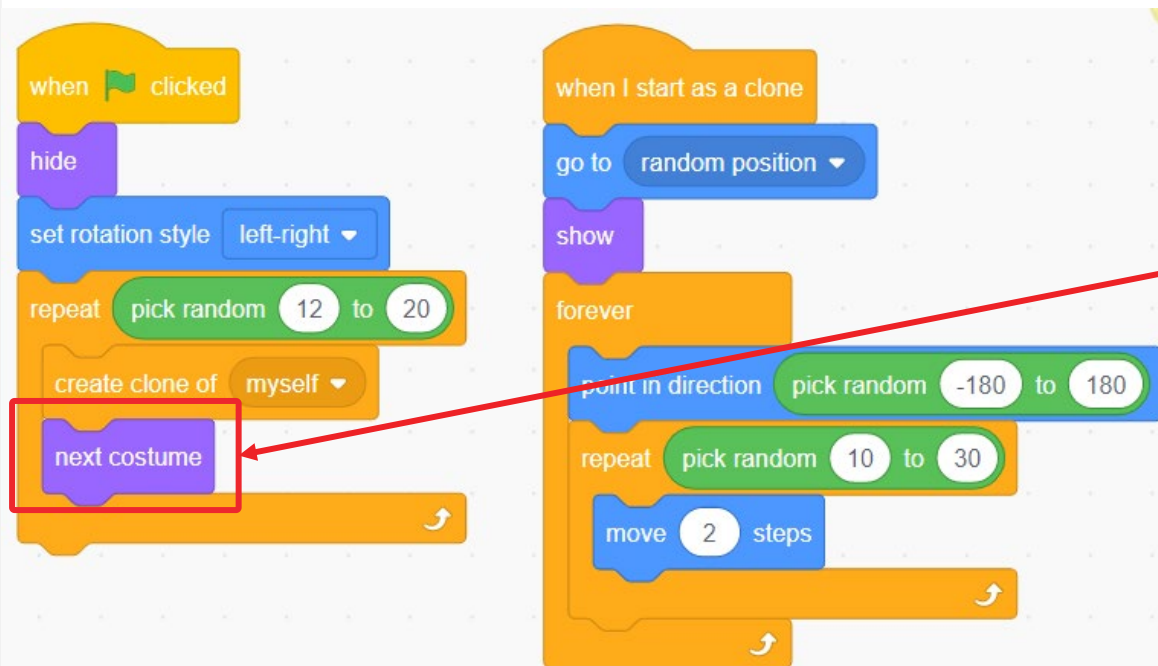
But our fish only has one type in our game.

In Game rule #13, we must have at least 4 types of fishes, where our fish types must be evenly spread, we don't want to see that there are 5 fish-a and 1 fish-c, it is not even in type.



## Game Rule #13 & #14 – Random Fish Criteria

### Script:

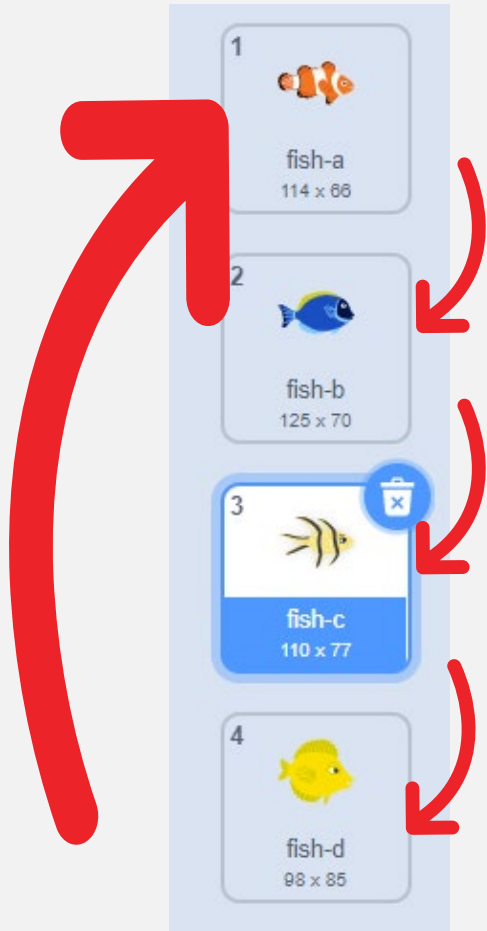


We can just add a little trick over here, the “Next costume” block.

Since clones will inherit the properties from the real body, I will keep switching next costume every time I created a clone, this will make the clone of the fish more even.



## Game Rule #13 & #14 – Random Fish Criteria



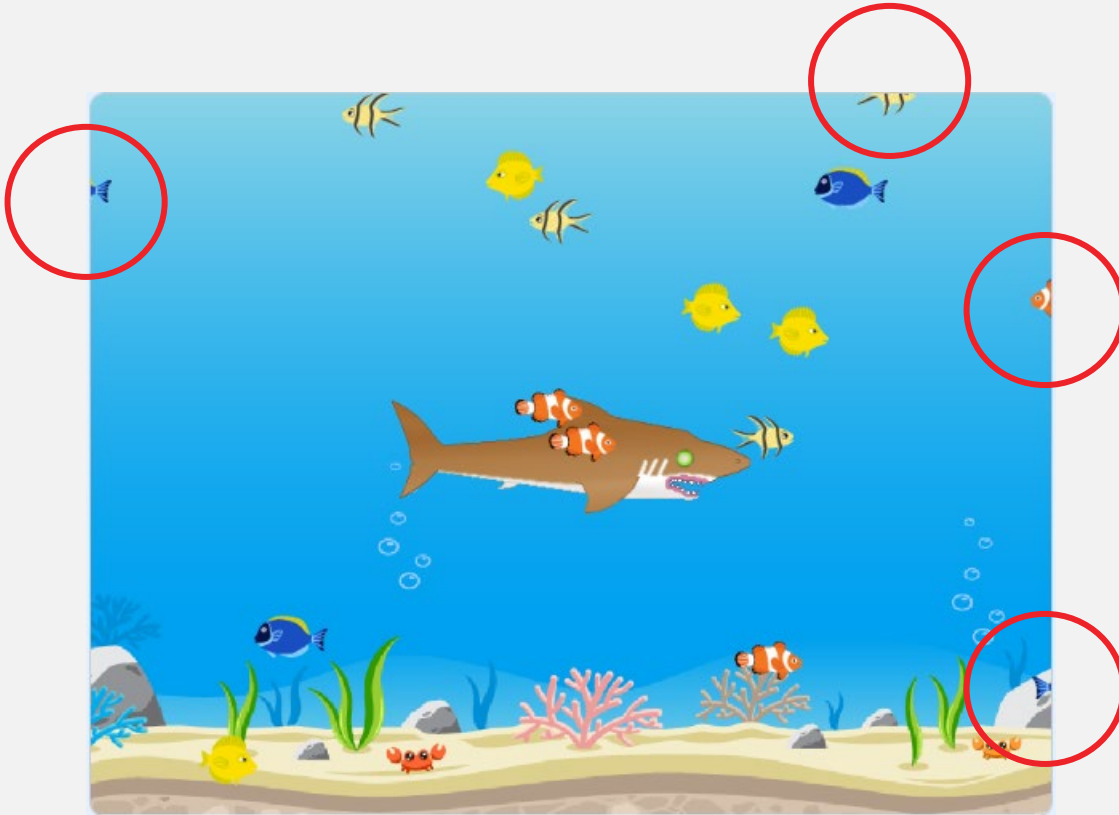
The switching type (next costume) in clone creation works like this.

Starting up, it will create clone for fish-a, then fish-b, then fish-c, then fish-d.

If the number is more than 4, it will jump back to fish-a, then fish-b on and on...



# Game Rule #15 – Bounce back from edge



## Game Rule #15:

The fish will bounce back if hitting the edge.

Without setting the bounce back function for the fish, you will find that some of your fishes will stuck at the edge and couldn't come back to the screen.

# Game Rule #15 – Bounce back from edge

## Script:



## Game Rule #15:

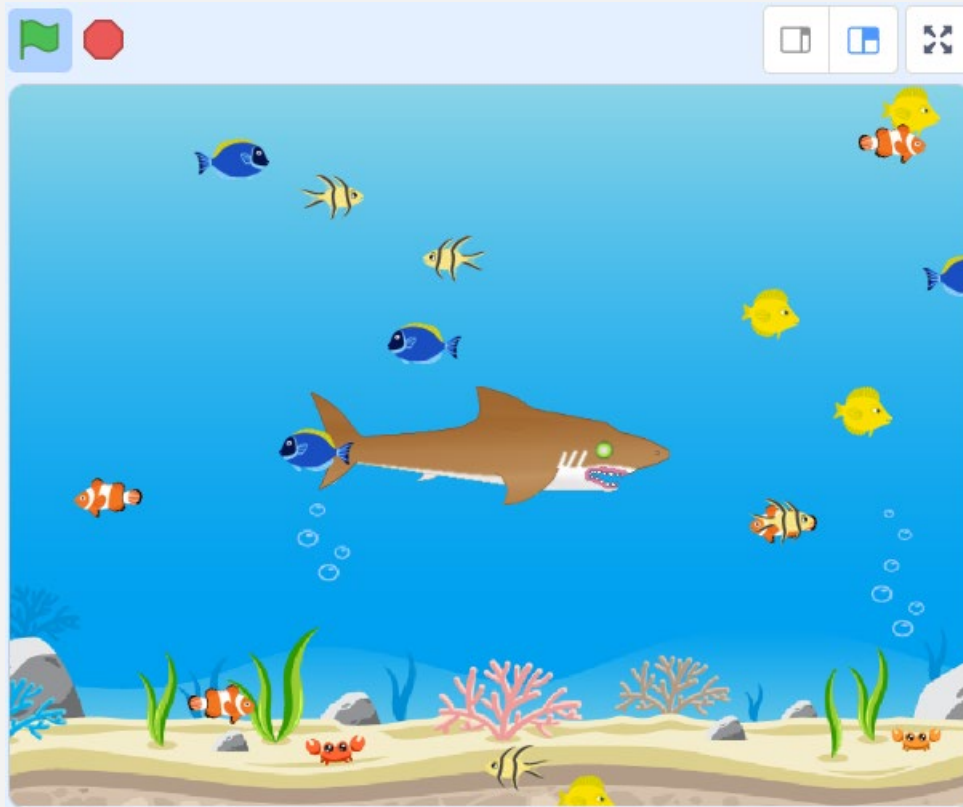
The fish will bounce back if hitting the edge.

To make the bounce effect move parallelly, we will add a new script with “when I start as a clone”, followed by a forever loop with “if on edge, bounce”.





# Try your Shark Game now!



Now you can try to play your completed shark game.



# ASSIGNMENT *for*

## *Topic 1.11*



## T1.11 – Mission 1

**Create a game that function similarly to the shark game.**

**Make at least 4 types of collectibles that will keep moving randomly in the game.**

**You have a character to control and collect the items.**



## T1.11 – Mission 2

**Continued from Mission 1:**

**Make animation to your character while it's moving, and it won't animate when it's not moving.**

**Try to add another player into the game with <w><s><a><d> control.**





# T1.11 – Mission 3

Continued from Mission 2:

Explore the variable block.

Can you add a score variable and add points to the player when it collect each item.





## Summary

1. Create clone is one of the method to make random number of sprites spawned in game.
2. Combining pick random with repeat block when creating clones can make random number of sprites being cloned.
3. When the costume of the sprite is not pointing to the right, it won't be compatible to the pointing direction properties of our sprite.
4. Flipping your costume to make your sprite's pointing direction same as your costume make your coding easier when you are changing direction of the sprite in the script.



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 :)