

INTRODUCTION TO PROGRAMMING USING SCRATCH

CS.001

```

526     If a collision occurs with the ball and the paddle, when the ball has a
527     negative velocity, the ball's y component of the velocity is negated. If
528     there is a collision with the ball and paddle, but the ball is going up,
529     nothing happens. If there is a collision between the ball and a brick,
530     the brick is removed, and the ball's y component of the velocity is
531     negated. Also plays a specific sound depending on what object the ball
532     hits.""""
533
534     collision = self._getCollidingObject() # Checks for Collisions
535
536     if collision == self._paddle and self._ball.vy > 0:
537         pass # nothing happens when the ball is going up and hits the paddle
538     elif collision == self._paddle and self._ball.vy < 0:
539         if self._soundToggle:
540             paddleSound = Sound('bounce.wav')
541             paddleSound.play()
542         self._ball.vy = - self._ball.vy # change direction
543     elif collision in self._bricks:
544         if self._soundToggle:
545             brickNoise = Sound(BRICKS_AUDIO[self._audioCounter])
546             brickNoise.play()
547             self._audioCounter = self._audioCounter + 1
548         if self._audioCounter == len(BRICKS_AUDIO):
549             self._audioCounter = 0
550         self._ball.vy = - self._ball.vy # change direction
551         self._view.remove(collision) # remove from view
552         self._bricks.remove(collision) # remove from field
553         self._score = self._score + 10
554         self._scoreKeeper.text = 'Current Score : '+'self._score'
555
556     def _keepInBounds(self):
557         """This method keeps the paddle within the boundaries of the window.
558
559         Although short, this helper method is mainly for styling purposes.

```

WHAT IS CODE?

AND HOW IS IT PREVALENT TO TODAY'S WORLD?

CODE

```
01010100100101110010100101010101  
0101010011101010110011100011010  
01110010101011001101100000110100  
10010101000100110011001001001100
```

BINARY



```
mov    abx3e321, e32  
mov    324aev,231fba1  
eax   f2va33,ffa3a34  
edx   249gjfa,23f2fa
```

ASSEMBLY



```
when green flag clicked  
forever  
  if key right arrow pressed? then  
    change x by 10
```

SCRATCH



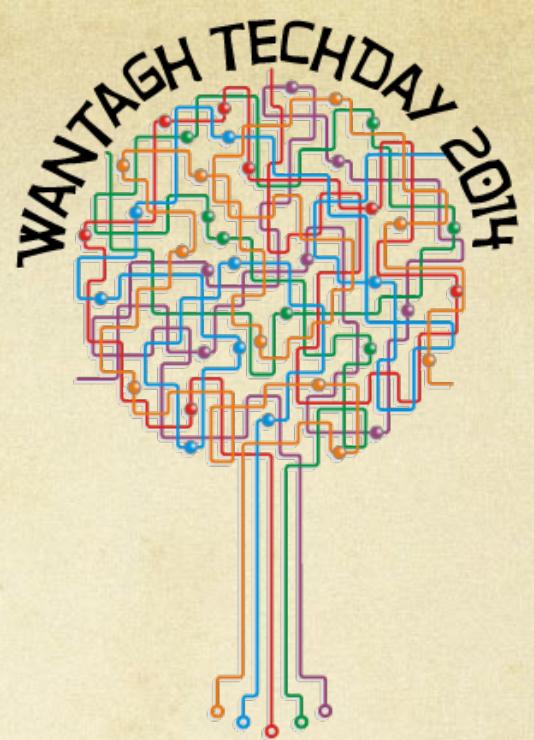
STARTING / USING SCRATCH

- TO START SCRATCH
 - CLICK THE GOOGLE CHROME ICON ON YOUR DESKTOP
 - GO TO SCRATCH.MIT.EDU

- TO BEGIN LOG INTO SCRATCH
 - CLICK "SIGN IN" IN THE TOP RIGHT CORNER
 - USERNAME: SCHOOL ID
 - PASSWORD: (CAPITAL P) PASSWORD!

- NOW LET'S WRITE OUR FIRST PROGRAM!





SUPER SWIMMER

INTRODUCTION TO SCRATCH AND COMPUTER
PRINCIPLES THROUGH CREATING A GAME

SUPER SWIMMER

SUPER SWIMMER IS A GAME ORIGINALLY CREATED BY PETER MOUNTANOS
USING SCRATCH

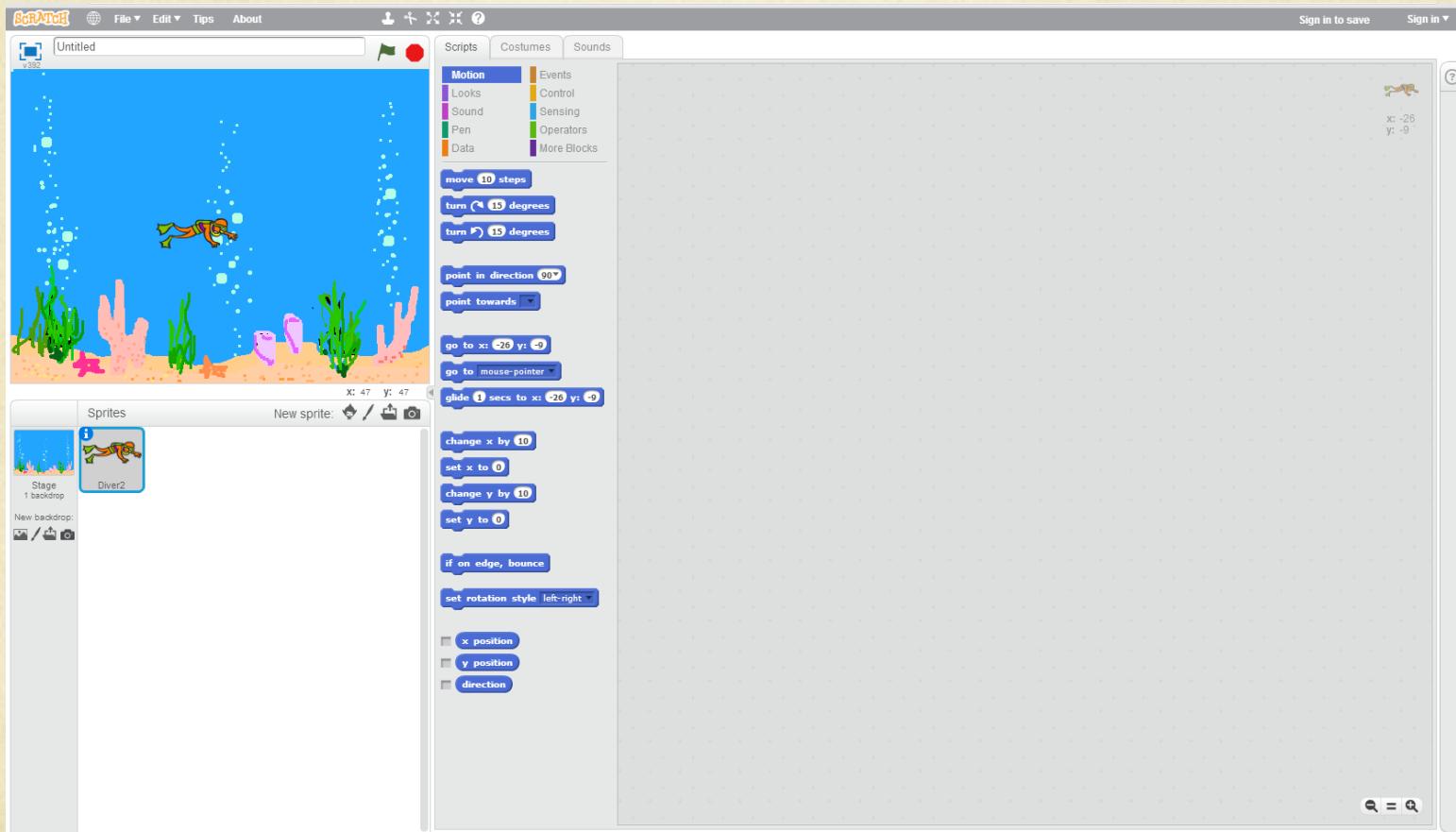
THE OBJECTIVE OF THE GAME IS TO COLLECT AS MANY FISH AS YOU CAN
WHILE AVOIDING THE SHARKS

TODAY YOU WILL LEARN ABOUT SOME OF THE BASICS OF PROGRAMMING
THROUGH MAKING A SUPER SWIMMER GAME OF YOUR OWN!

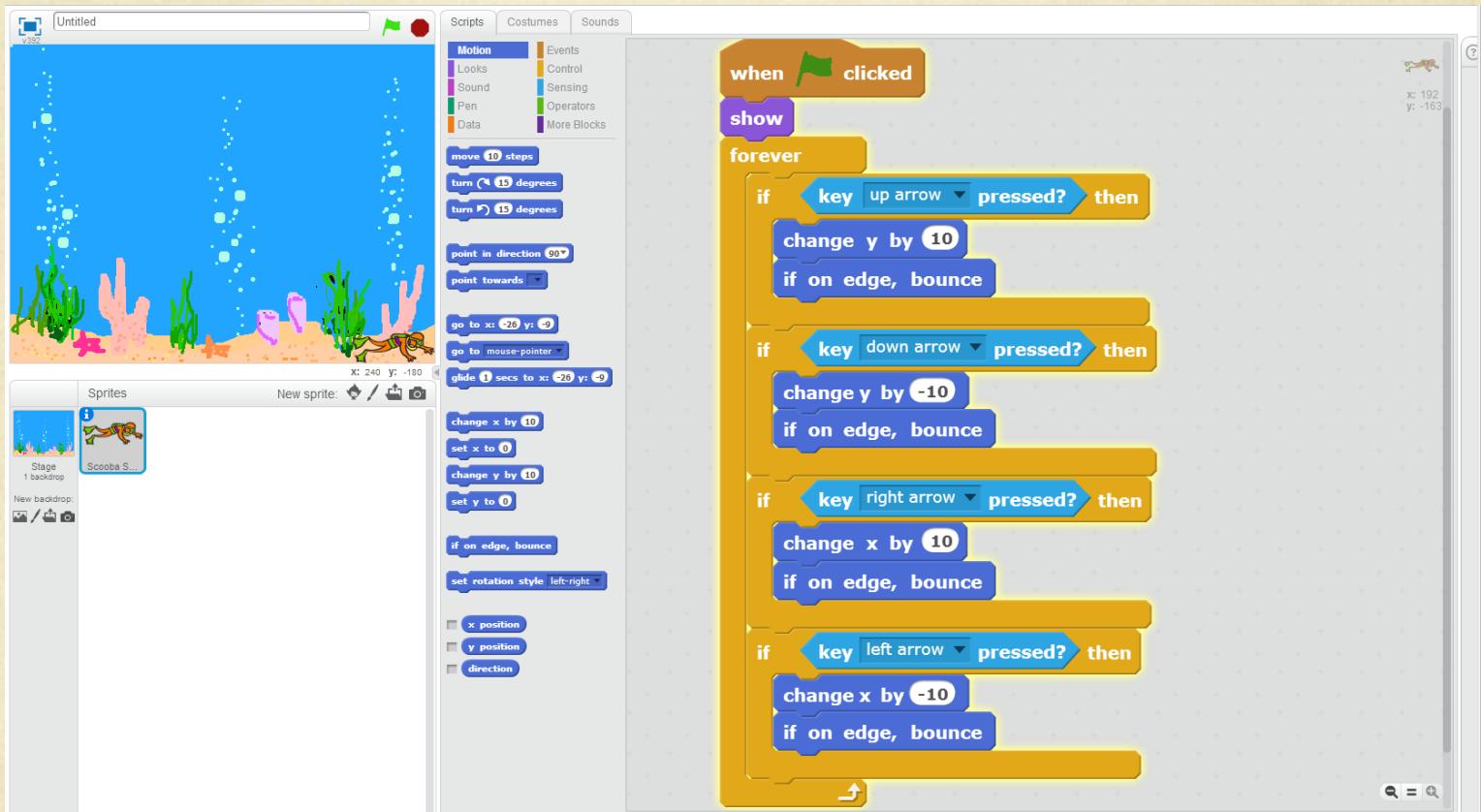
TRY OUT PETER'S VERSION OF SUPER SWIMMER HERE!

<http://scratch.mit.edu/projects/3310840/>

SETTING UP SUPER SWIMMER



MOVING OUR DIVER



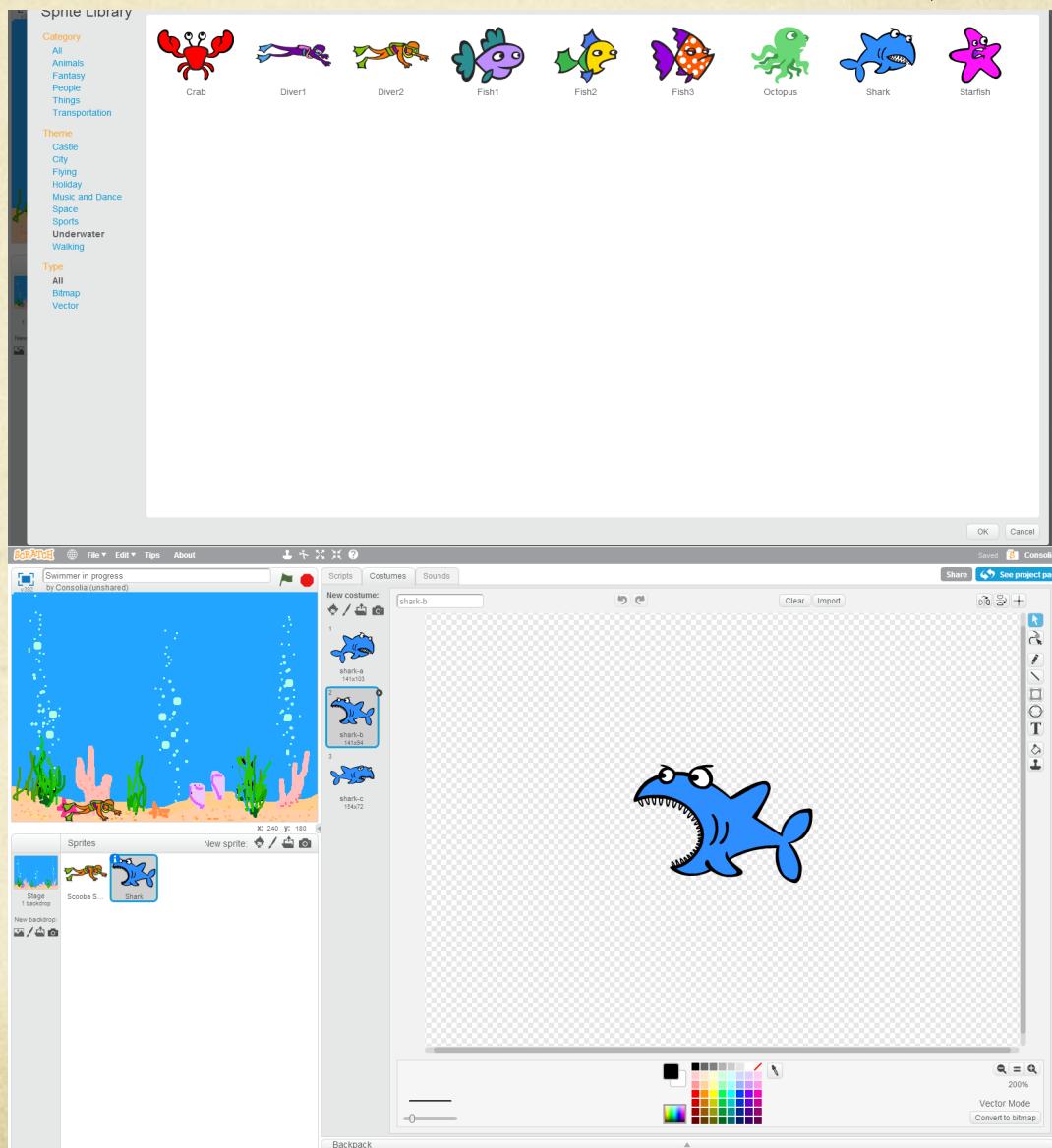
MOVING OUR DIVER REVISED

The image shows a Scratch project titled "Swimmer in progress" by Consolia (unshared). The stage features an underwater scene with green coral reefs, pink sea anemones, and bubbles. A diver sprite is positioned in the center. The Scripts tab displays the following script:

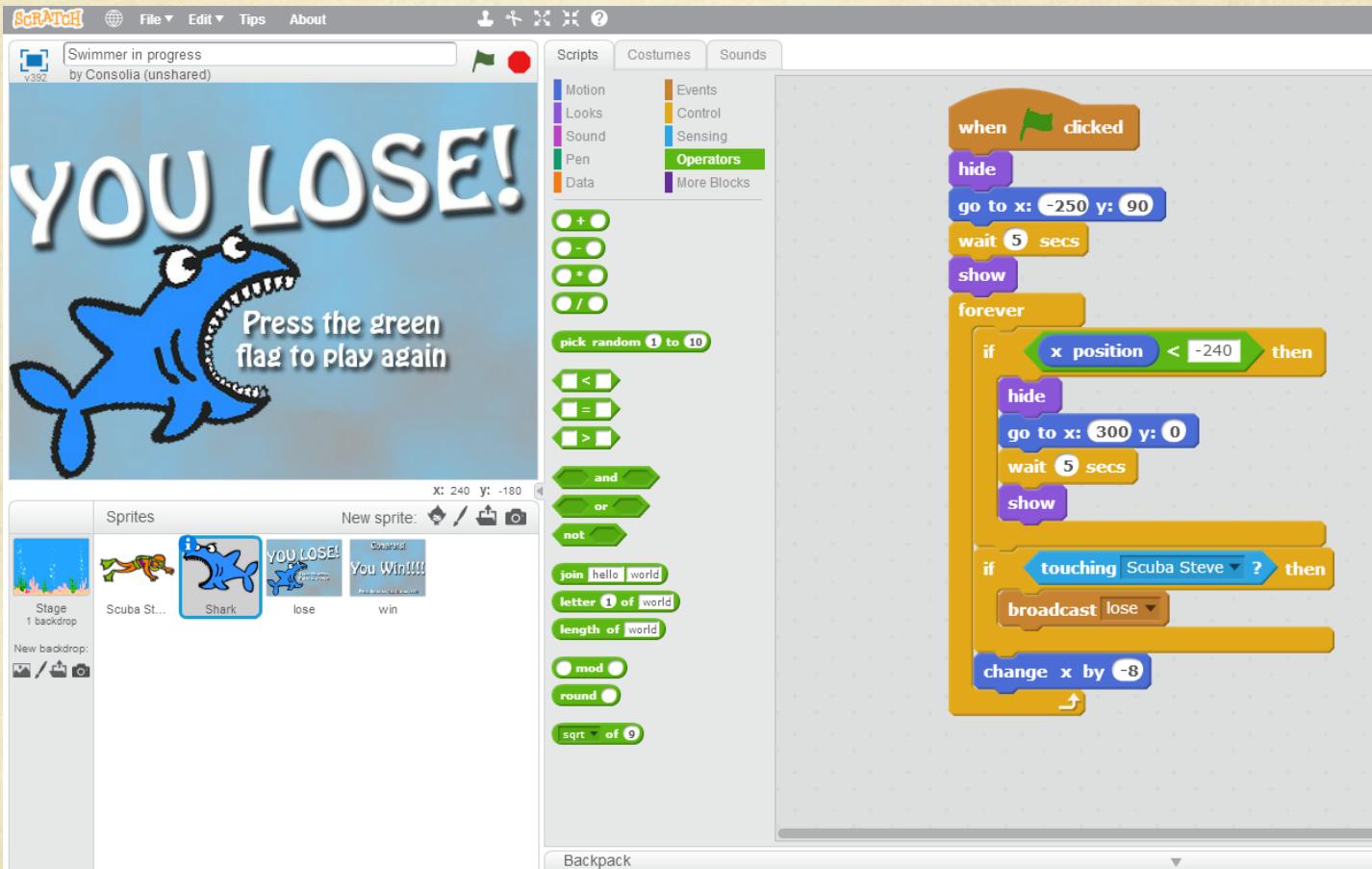
```
when green flag clicked
show [Diver v]
forever
  if key [up arrow] pressed? then
    change y by 10
    if y position > 162 then
      set y to 162
    end
  end
  if key [down arrow] pressed? then
    change y by -10
    if y position < -163 then
      set y to -163
    end
  end
  if key [right arrow] pressed? then
    change x by 10
    if x position > 194 then
      set x to 194
    end
  end
  if key [left arrow] pressed? then
    change x by -10
    if x position < -194 then
      set x to -194
    end
  end
```

The Sprites tab shows two sprites: "Scooba S..." and "Shark". The stage has one backdrop.

ADDING THE SHARK



GETTING THE SHARK TO MOVE



ADDING LOSE SPRITE

The image shows a Scratch project titled "Swimmer in progress" by Consolia (unshared). The stage features a blue background with a large, cartoonish blue shark swimming towards the left. Overlaid on the shark is a white, stylized "YOU LOSE!" text. Below the shark, the text "Press the green flag to play again" is displayed. In the bottom right corner of the stage, there is a small "lose" button.

Scripts Tab:

- The "Shark" sprite has a script starting with a **when green flag clicked** hat block followed by a **hide** block.
- The "lose" button has a script starting with a **when I receive [lose v]** hat block, which then branches into **show**, **show variable [time v]**, **show variable [score v]**, and **stop all**.

Sprites Tab:

- Scuba St... (Stage 1 backdrop)
- Shark
- lose (the button sprite)
- win (another button sprite)

Costumes Tab:

- Stage 1 backdrop (blue background with water plants)
- Scuba St... (swimmer in a yellow suit)
- Shark (large blue shark)
- lose (button with "YOU LOSE!" text)
- win (button with "You Win!!!!")

Operators Category:

- Motion
- Looks
- Sound
- Pen
- Data
- Events
- Control
- Sensing
- Operators** (selected)
- More Blocks

Operators Submenu:

- + - * /
- pick random 1 to 10
- < = >
- and or not
- join [hello world]
- letter [1] of [world]
- length of [world]
- mod
- round
- sqrt [9] of [9]

Backpack:

- green flag

Script:

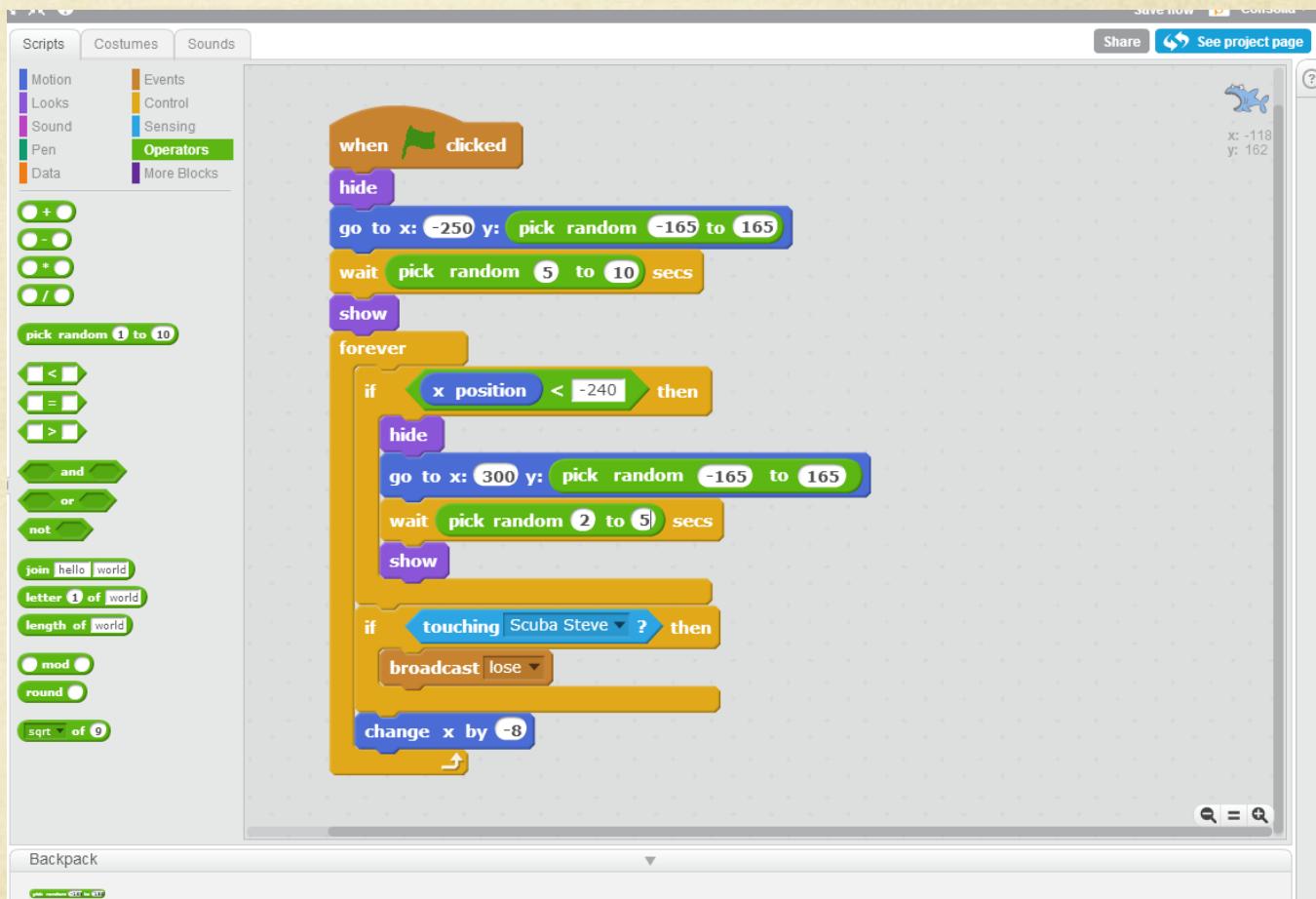
- Script

TEST YOUR GAME

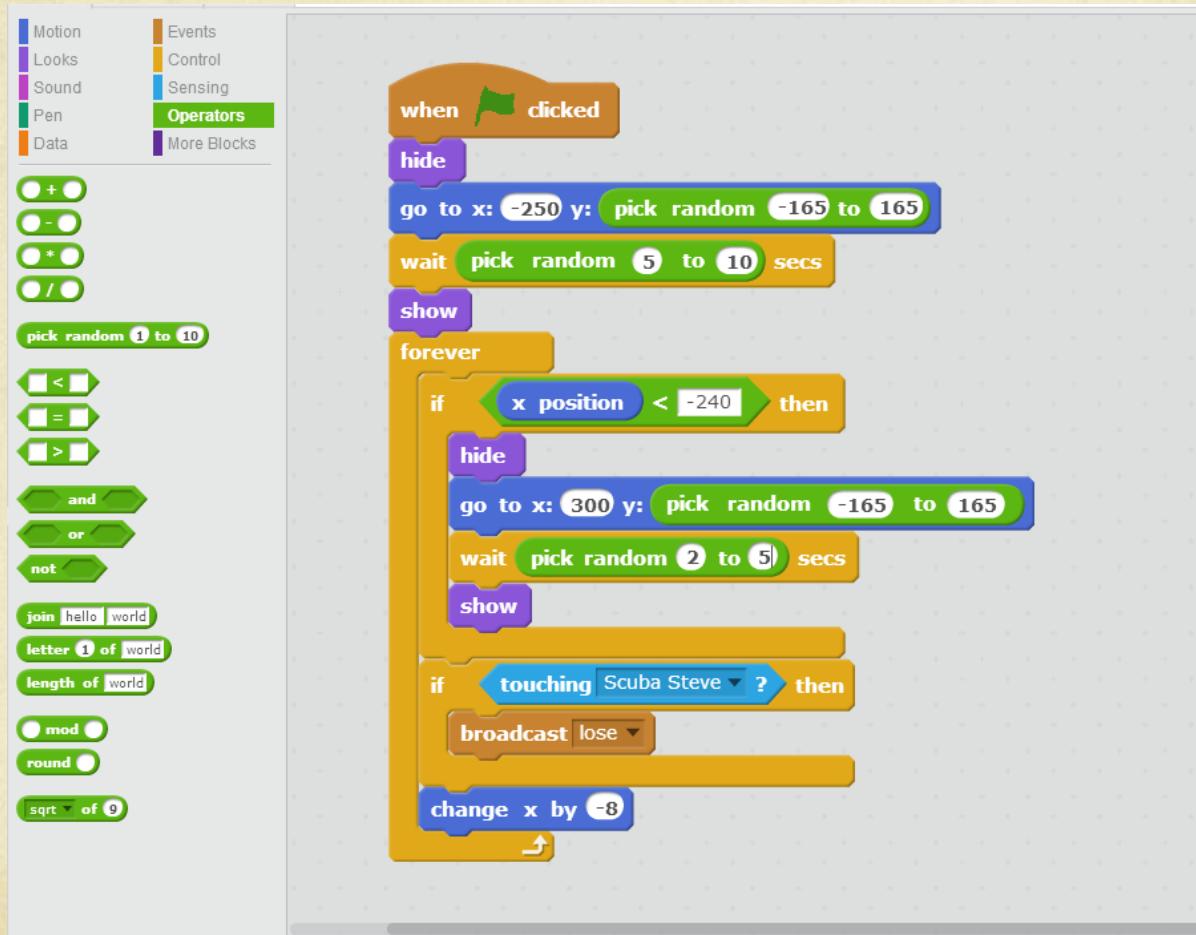
- AVOID THE SHARK ONE TIME
- GET EATEN BY THE SHARK THE SECOND TIME

****TESTING IS AN EXTREMELY IMPORTANT PART OF
PROGRAMMING****

MAKING THE SHARK RANDOM



ADDING OUR FIRST FISH



AFTER YOU HAVE COPIED AND PASTED THE CODE FROM THE SHARK, TEST THE GAME.

TRY TO CATCH THE FISH AND THE RAISE YOUR HAND IF YOU NOTICE THE PROBLEM

MAKING OUR FIRST VARIABLE

The image shows a Scratch project titled "Super Swimmer (CS.001 Edition)" by pjmountanos. The stage features a blue background with large white text "You Win!!!!" and "Congrats!". A green flag button at the bottom left says "Press the green flag to play again". The script editor on the right contains a script for the "superSteve" sprite:

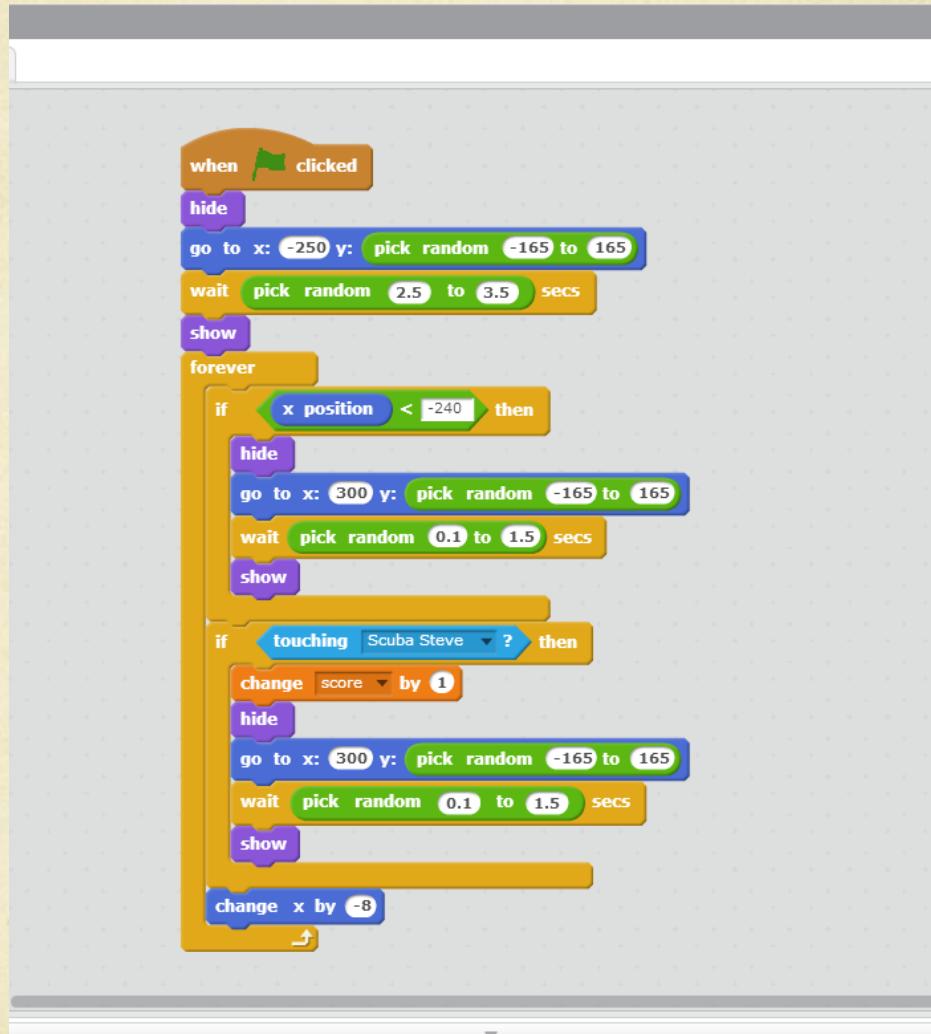
```
when green flag clicked
  hide
  go to x: 300 y: pick random -165 to 165
  wait [pick random 2.0 to 3.5 secs]
  show
  forever
    if [x position < -240] then
      hide
      go to x: 300 y: pick random -165 to 165
      wait [pick random 0.3 to 1.5 secs]
      show
    end
    if [touching superSteve v? then
      change [score v] by 1
      hide
      go to x: 300 y: pick random -165 to 165
      wait [pick random 0.3 to 1.5 secs]
    end
  end
  when I receive [lose v]
  hide
  when I receive [win v]
  hide
```

A "New Variable" dialog box is open in the foreground, prompting for a variable name. The "score" variable has been selected, and the "For all sprites" option is checked.

Sprites:

- Stage 1 backdrop
- superSteve
- Shark
- lose
- purpleFish
- win
- yellowFish
- yellowFish
- greenClam

FIXING OUR PROBLEM



MAKING A TIME VARIABLE & INITIALIZING VARIABLES



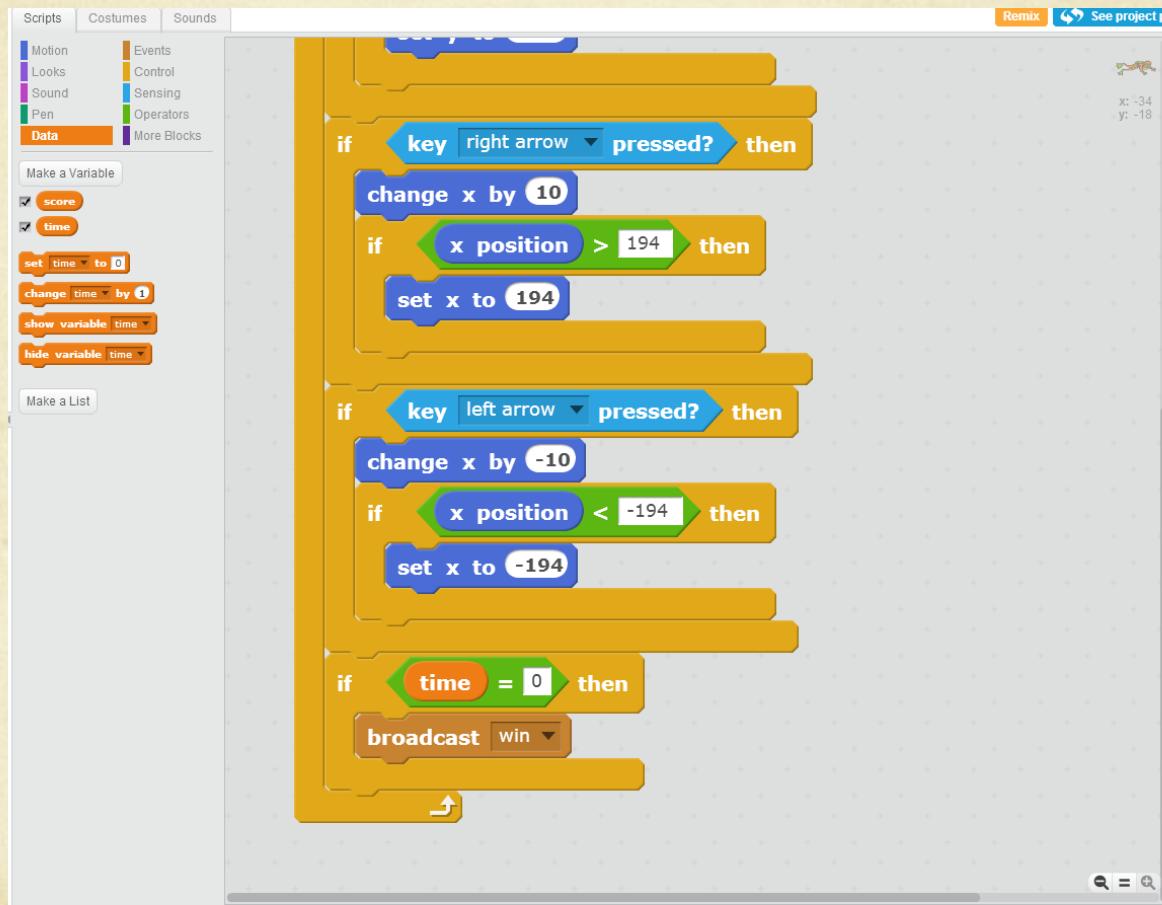
ADDING WIN SPRITE

FIRST WE MUST UPLOAD THE WIN SPRITE JUST LIKE WE DID WITH THE LOSE SPRITE AND CENTER IT ON THE SCREEN

AFTER THAT WE SHOULD EDIT THE SCRIPT FOR THE WIN SPRITE TO LOOK LIKE THIS.



ALTERING SCUBA STEVE/SALLY'S SCRIPT TO ACCOUNT FOR TIME



NOW WE ALL SHOULD HAVE THE BASIC
FUNCTIONALITY OF THE GAME

TEST THE GAME

AFTER YOU HAVE TESTED YOUR GAME IT IS TIME
TO ADD MORE FISH TO MAKE THE GAME MORE
INTERESTING

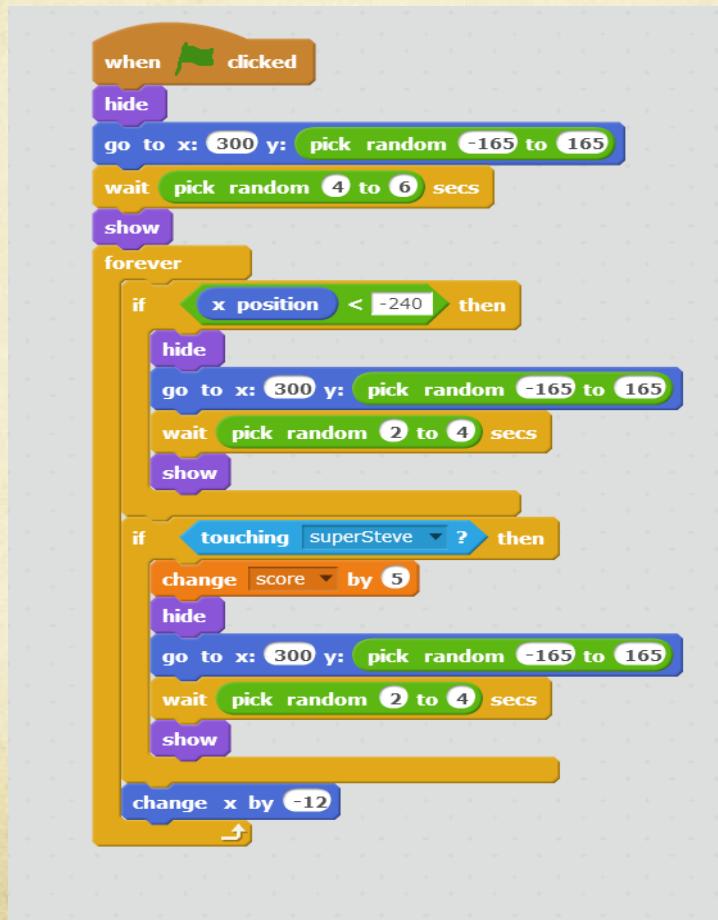
ADDING MORE FISH



WE WILL BE ADDING THE RED FISH AND THE GREEN FISH JUST LIKE THE PURPLE FISH AND THEN DUPLICATING THE CODE FROM THE PURPLE FISH INTO THE OTHERS.

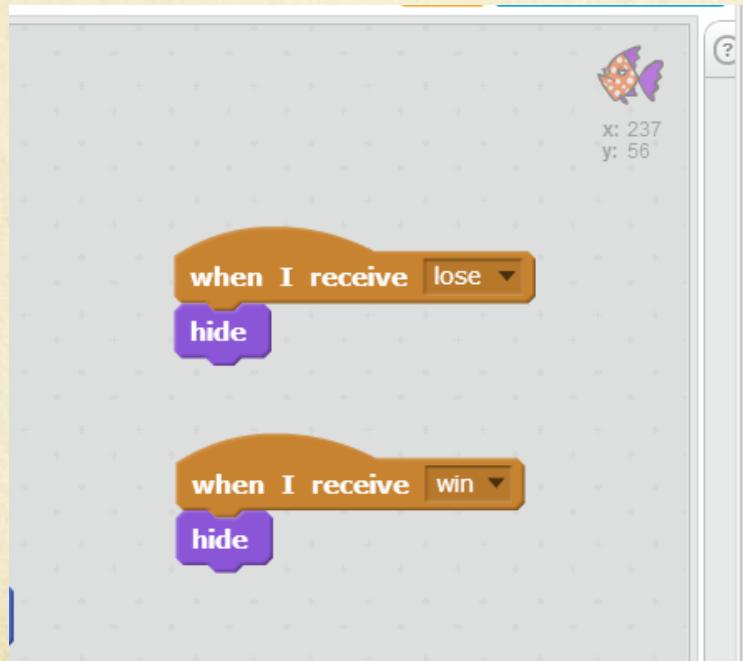
MAKING THE CLAM A RARE CATCH

AFTER UPLOADING THE GREEN CLAM SPRITE YOU WILL CHANGE THE CLAM'S SCRIPT TO MAKE IT HARDER TO CATCH. THIS ALSO MEANS THE CLAM SHOULD BE WORTH MORE POINTS



FINISHING YOUR GAME

BY ADDING THIS CODE TO THE SCRIPTS OF ALL OF THE CHARACTER SPITES IT WILL ENSURE THAT ALL OF THE FISH ARE HIDDEN WHEN YOU WIN OR LOSE.



CHALLENGE

CHECK OUT THE FULL VERSION OF SUPER SWIMMER TO SEE ALL OF THE OTHER COOL THINGS YOU CAN ADD TO YOUR GAME.

TRY TO ADD POWER-UPS AND OTHER FEATURES TO YOUR GAME USING WHAT YOU HAVE LEARNED WHILE CREATING IT.

IF YOU HAVE IDEAS OF YOUR OWN FEEL FREE TO TRY TO PUT THEM INTO YOUR GAME TO MAKE IT EVEN BETTER.

THE POSSIBILITIES ARE ENDLESS