

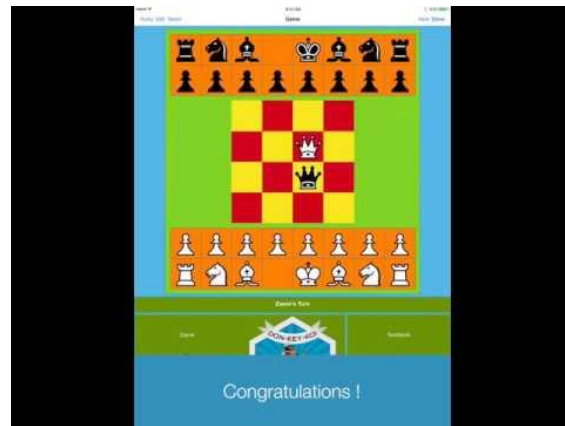
# Game Design with Scratch

- Zachary Abraham



# Presenter Intro

- Zachary Abraham
- Aragon High School Grade 10
- IOS App -
- <https://itunes.apple.com/us/app/tic-tac-block/id1059070767?mt=8>
- DonkeyKo! Are you smarter than a gorilla!



# Download

## Requirements

- Each attendee must have a laptop with Wifi to access the internet (Windows or Mac)
- Prior to the workshop, please download and install scratch from <https://scratch.mit.edu/scratch2download/>

<https://github.com/zacharythomasabraham/gamedesignwithscratch>

<https://www.meetup.com/Devoux4Kids-BayArea/events/239869586/>



# Introduction

- What is computer science ?
- Computer science involves solving problems and creating programs using computers.
- Block-based programming language Scratch to teach basic programming logic. Programming language gives computers instruction.
- Scratch is available for free at [www.scratch.mit.edu](http://www.scratch.mit.edu). Click "create" to start a new project.
- Are u guys excited ?
- Have u guys coded
- What's your favorite video game?



# Scratch

- What is scratch?

The Scratch logo, featuring the word "SCRATCH" in a stylized, orange, blocky font with a blue outline, set against a light blue, cloud-like background.

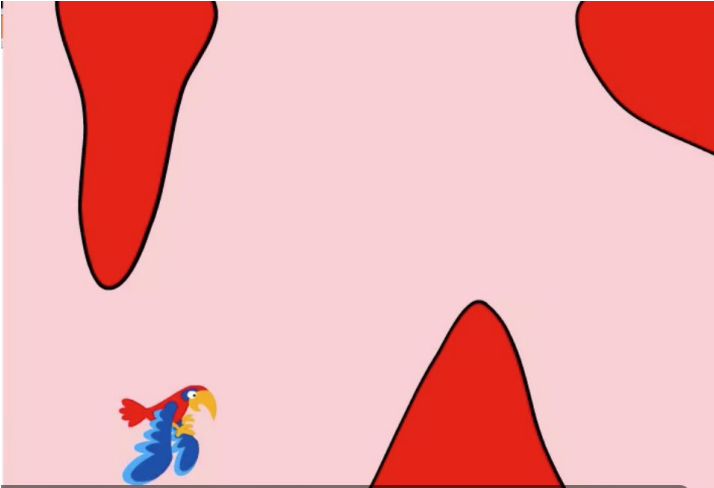
# Activity 1

**Activity 1: Racing Game** Create a two-player racing game in which players control movement with the keyboard.



# Activity 2

**Activity 2: Cave Surfing Game** Create a game with a side scrolling background (similar to the popular game Flappy Bird). In this game, the player sprite moves up and down to avoid obstacles



# Activity - Racing Game

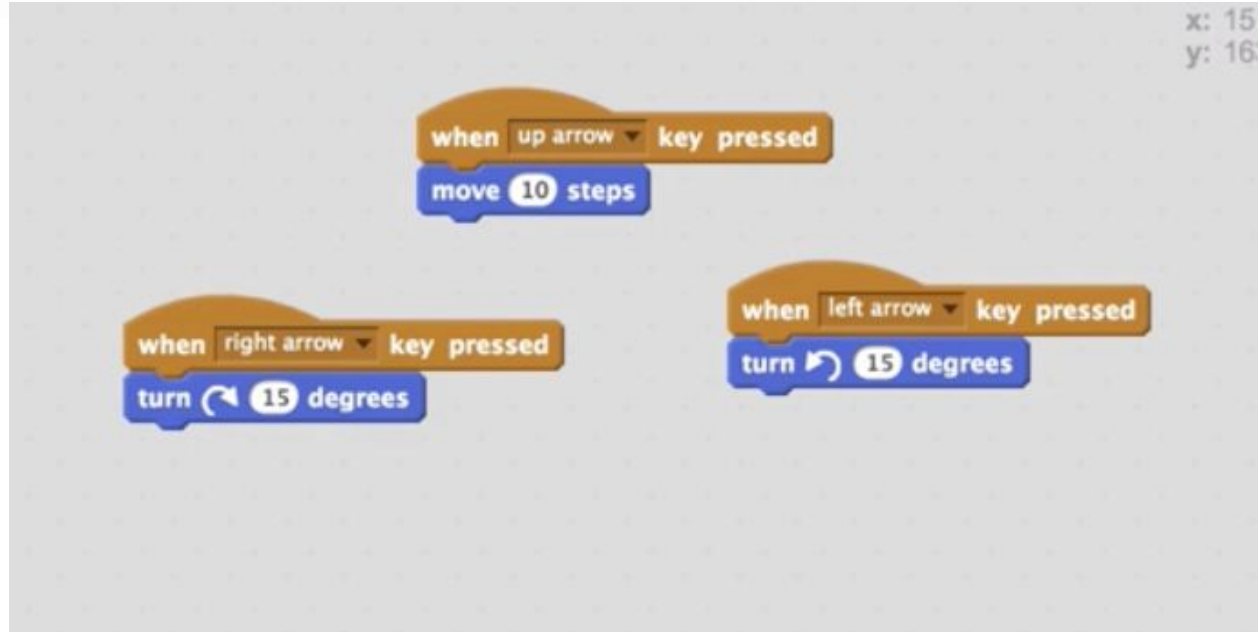
- What are events?
- move forward , left,right





1. Add **move**  **steps** blocks and **turn**  **degrees** blocks

2. Add a **when**  **key pressed** Event block to each movement



# Make sprite run smoothly

## Now it's your turn!

2. Program the Player 2 sprite to move when different keys are pressed



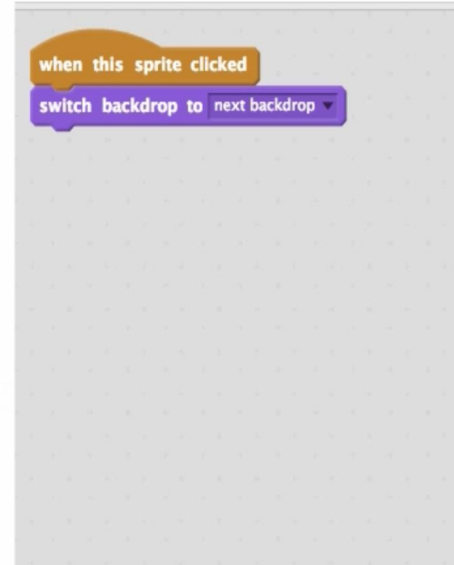
# Advanced option - Change racetrack



Now it's your turn!

1. Add a sprite
2. Change the backdrop using:

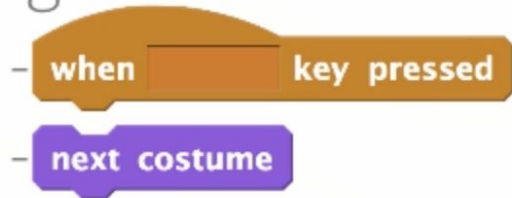
- when this sprite clicked
- switch backdrop to



# Advanced Option - Costume Change

Now it's your turn!

1. Add more costumes to your players
2. Program costumes changes using:



# Advanced Option - Step on the gas



The image displays the Scratch interface for a project titled "Racecar Starter Project remix" by csf001 (unshared). The stage shows a green dinosaur character named "Stan" on a grey track with yellow borders. A "Player 1: Speed" slider is set to 20. The Scripts area on the right contains three event-driven scripts:

- When up arrow key pressed:** A "repeat until" loop with a "not" condition on the "key up arrow" block, containing a "move Speed steps" block.
- When right arrow key pressed:** A "repeat until" loop with a "not" condition on the "key right arrow" block, containing a "turn 8 degrees" block.
- When left arrow key pressed:** A "repeat until" loop with a "not" condition on the "key left arrow" block, containing a "turn 8 degrees" block.

The Data area on the right shows a variable named "Speed" with a checkbox checked. Below the variable, there are four blocks: "set Speed to 0", "change Speed by 1", "show variable Speed", and "hide variable Speed".

# Advanced Option - Step on the gas

Now it's your turn!

1. Create a variable and name it "speed"
2. Put the  block inside of the  block
3. Double click the variable display 2 times to get the slider



# Advanced Option - Crashing sounds

Now it's your turn!

1. Add a  block

2. Add a  block

3. Put an  inside the  block

4. Add a  block

5. Pick a sound using the Sounds Tab

6. Play your sound using 



# Advanced option - Racing fans

Now it's your turn!

1. Code a new sprite to start your race using the



say  for  secs

blocks








The image shows a Scratch stage with two sprites, Dinosaur3 and Butterfly2, each with a script. Dinosaur3's script starts with a 'when green flag clicked' block, followed by a 'say Ready... set... for 2 secs' block, a 'say GO!!!! for 2 secs' block, a 'play sound tom drum' block, a 'wait 1 secs' block, and a 'say YAAAAYYYYY!!!! for 2 secs' block. Butterfly2's script starts with a 'when green flag clicked' block, followed by a 'wait 6 secs' block, and a 'say I want the elephant to win!! for 2 secs' block. A timeline at the bottom shows the current time as 2:04 / 2:16.



# Advanced option - clone/color trail effect

Now it's your turn!

1. Create a clone when the player sprite moves forward using a 
2. Make the clone repeat changing colors, then delete itself using:
  - 
  - 
  - 
3. Tinker with the effect to make it your own by adding more  and modifying the values
4. Add the same effect, or a completely different one, to the second sprite

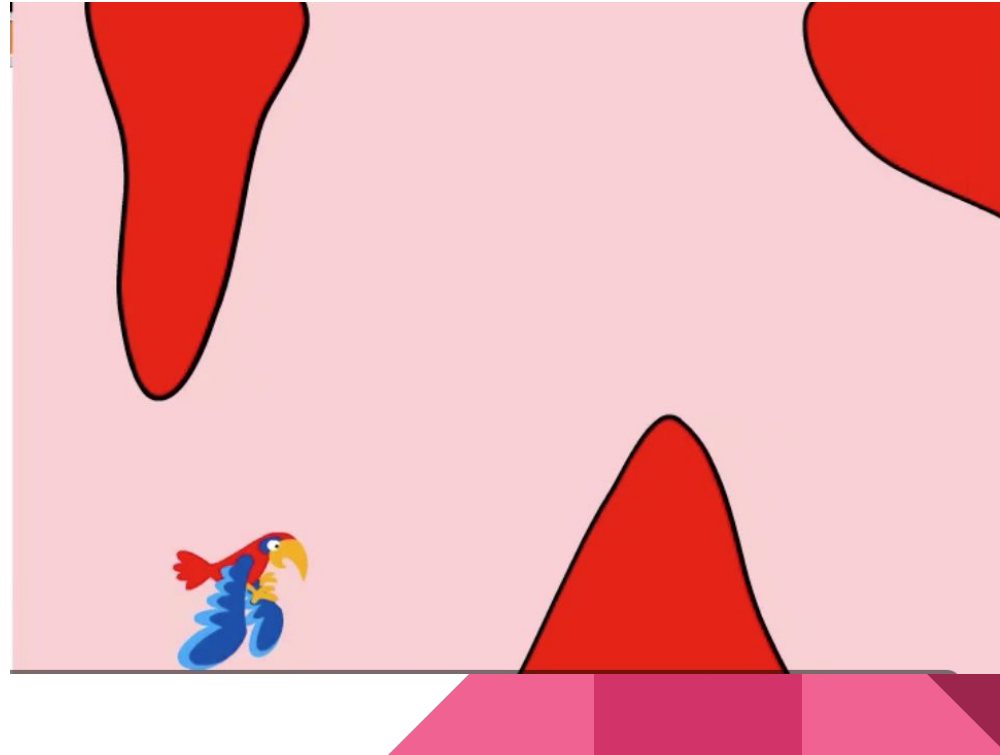


# Activity - Side Scrolling Games and If-Else Statements

- Helicopter and flappy bird
- If ..else...
- <https://scratch.mit.edu/projects/21490386/#editor>

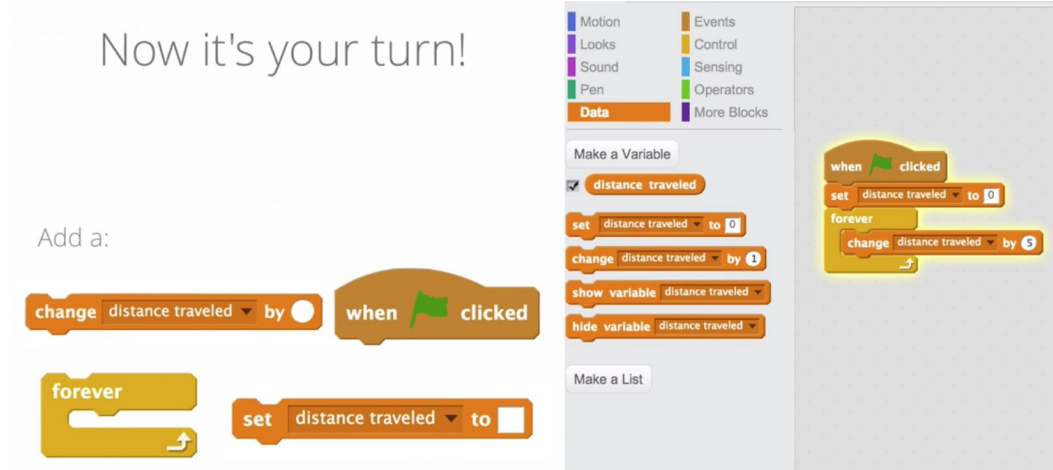
## Instructions

1. Open the starter project.
2. Remix the project.
3. Sign in to Scratch.
4. Add a New Sprite (preferably one that flies).



# Activity - Side Scrolling Games (scrolling background)

- you will learn how to create a scrolling backdrop.
- Distance traveled variable increases throughout game



## Instruction

1. Make the player 1 sprite move across the screen.
2. Make the sprite keep moving across the screen.
3. Reset the sprite's position at the start of each game.

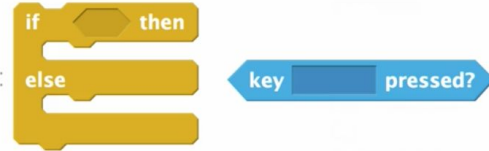
# Activity - Side Scrolling Games (make parrot rise & fall)

you will learn how to make the Parrot Sprite rise and fall.

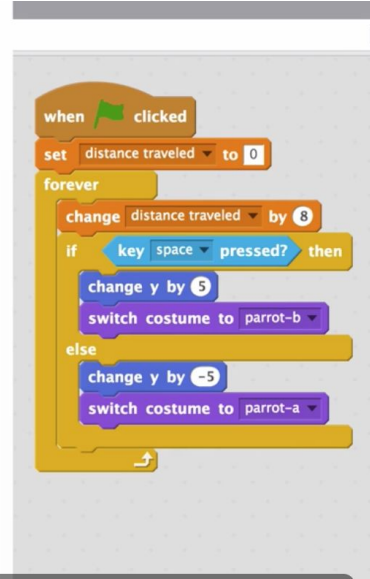
## Instructions

1. Add an if-else statement and a "space key pressed?" block to your program that makes the sprite move up and down when the user presses and releases the spacebar.
2. Program the if condition to move y by 5, and the else condition to move y by -5.
3. Add costume changes to make the sprite look more realistic as it flies up and down.

Now it's your turn!



1. Add an:
2. Program the if condition to move y by 5.
3. Program the else condition to move y by -5.
4. Add costume changes for a more realistic sprite movement.



# Activity - Side Scrolling Games (scrolling background)

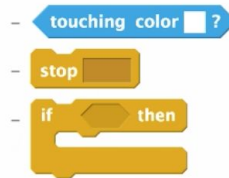
you will receive some guidance on how to program winning and losing conditions for your game.

## Instructions

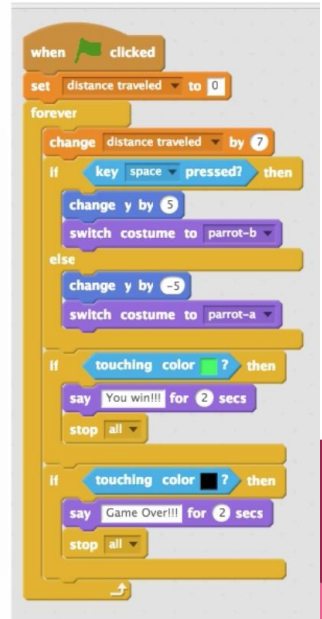
1. Program a winning condition for the player sprite. (hint: use if statements and color sensing blocks)
2. Program a losing condition for the player sprite. (hint: the cave walls all have a black border)
3. Program the game to reset when someone wins or loses. (hint: use a stop-all block)

Now it's your turn!

1. Program winning and losing conditions by adding:



2. Add features to your winning and losing conditions to make gameplay more exciting!



# Advanced Activity - Side Scrolling Games (make music)

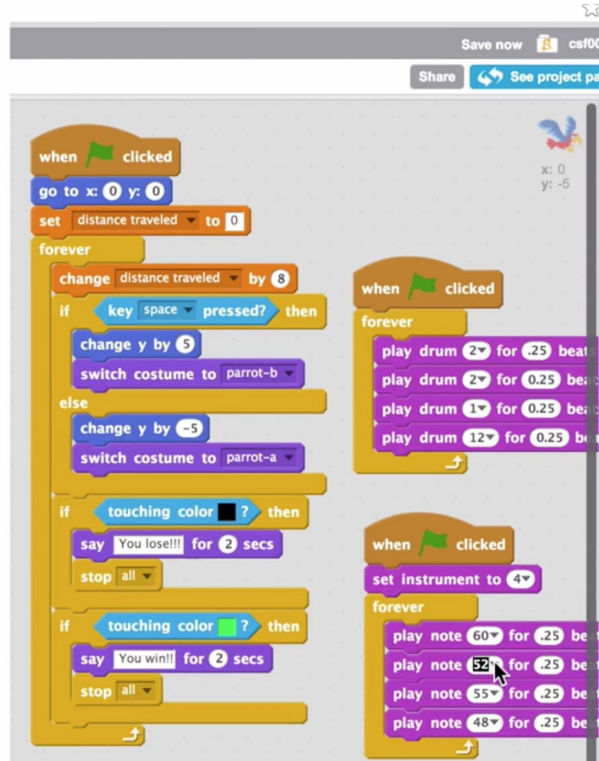
Add a drum beat and background music to your game.

Now it's your turn!

Add 2 block stacks to your program:

-a drum beat stack

-an instrument stack

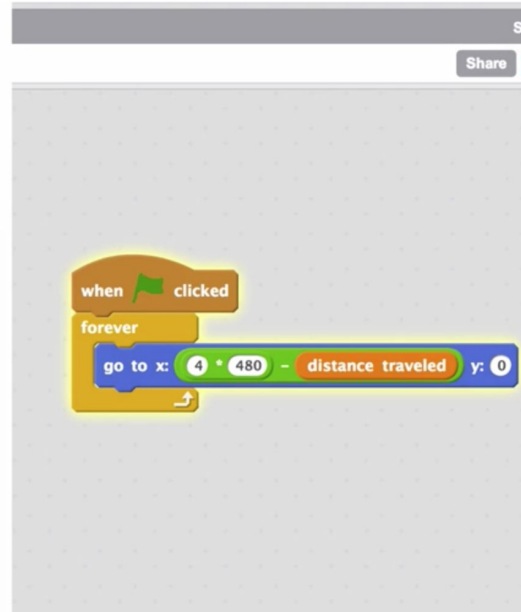


## Advanced Activity - Side Scrolling Games (add cave section)

Design a new cave sprite with black edges and add it to your game.

Now it's your turn!

1. Design a new cave sprite with black edges.
2. Copy the code from another cave sprite.
3. Adjust the numbers to match the cave sprite order.



## Advanced Activity - Side Scrolling Games (make game harder)

Make the player press the spacebar over and over to keep the sprite in flight.  
Now it's your turn!

1. Add a block that tells the computer to wait until the spacebar is no longer being pressed before moving up.
2. Change the "y" value for modify your difficulty level.





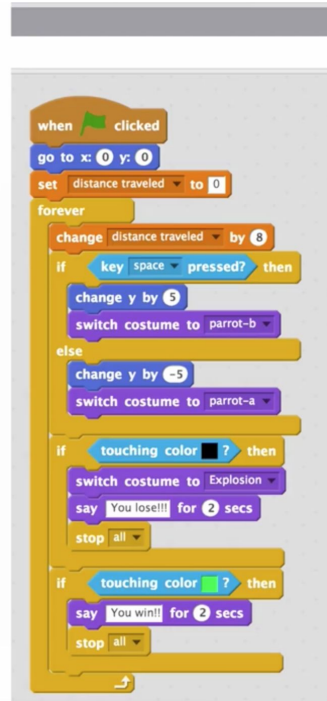
# Activity - Side Scrolling Games (dangerous cave walls)

Make the player sprite explode when it touches the walls of the cave.

Now it's your turn!

Use the **switch costume to**

to make an explosion when the sprite hits the wall.

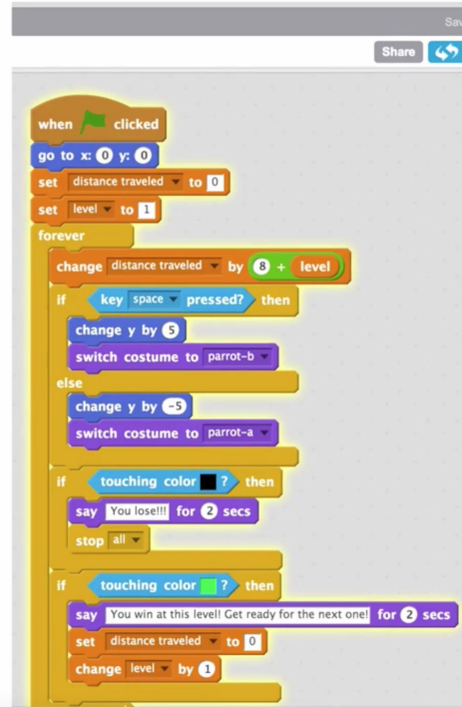


# Activity - Side Scrolling Games (another level)

Create additional game levels that get faster and harder as the player progresses.

Now it's your turn!

Change the code so that the user has a chance to go through a faster maze!



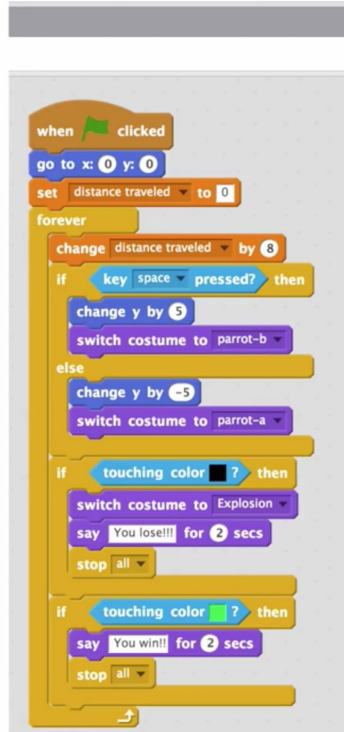
# Activity - Side Scrolling Games (dangerous cave walls)

Make the player sprite explode when it touches the walls of the cave.

Now it's your turn!

Use the **switch costume to**

to make an explosion when the sprite hits the wall.

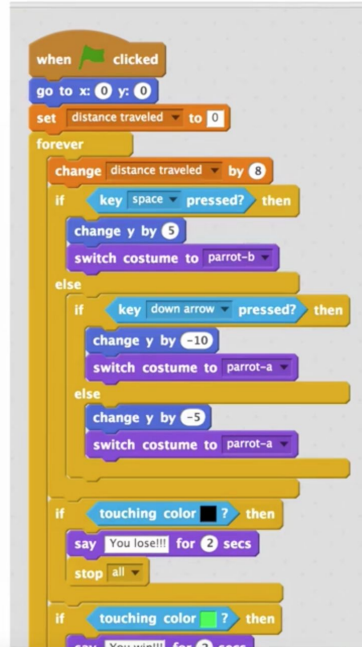


# Activity - Side Scrolling Games (dive!!)

Make the sprite dive, or move down faster than it falls.

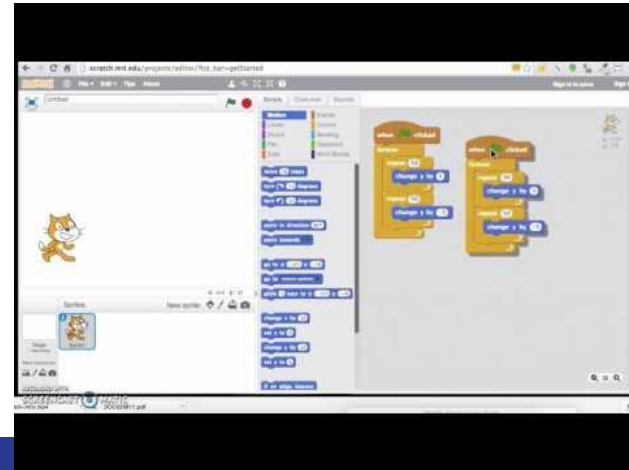
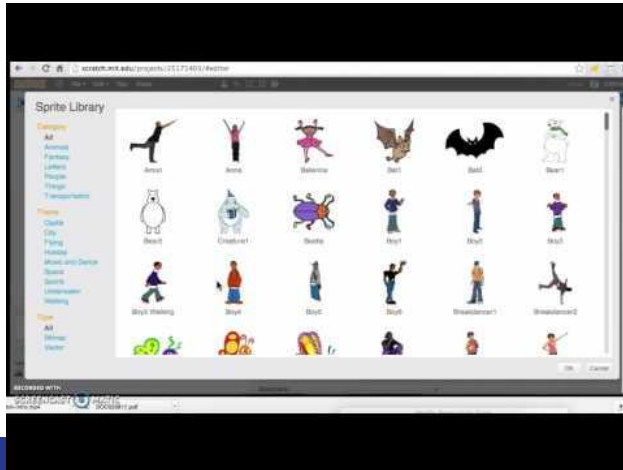
Now it's your turn!

1. Add another if-else statement to check if the user has pressed the down arrow.
2. Make the bird move down faster when the down arrow is pressed.



# Scratch Summary

- Computer science involves solving problems and creating programs using computers.
- block-based programming language Scratch to teach basic programming logic.
- Scratch is available for free at [www.scratch.mit.edu](http://www.scratch.mit.edu). Click "create" to start a new project.
- There are seven block types in Scratch: statements, loops, events, booleans, conditions, variables and procedures.
- Loops can be used inside of each other (embedded loops).
- Scratch allows parallel programming (more than one block stack).



# Congratulations !

- You've completed Game Design with Scratch



# Keep learning

- [Sample projects](#)

