Game Making

Girls Learning Code

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What is a Game?

- A game is **playing**
- but it's a special kind of playing
- what makes **games** different than **play?**

Games vs. Play

- Games have **players**
- Games have **goals**
- Games have **rules**

Players

- A player is like a character
- But they have specific roles and rules
- Players usually compete
  - against the game
  - against a computer
  - against each other

Goals

- What the player is trying to do
- How do they win?
- ex: reach the finish line first, save the princess, kill all the monsters

Rules

- Tell us what our player can do
- And what happens when they do things
- Usually have an **if** and a **then**
- Rules are what make a game fun or exciting or easy or hard

Examples of Rules

- **If** the player gets to the end of the level, **then** they win
- **If** the player picks up a coin, **then** they get a point
- **If** the player runs into a monster, **then** their health decreases
- **If** the player's health reaches 0, **then** they lose

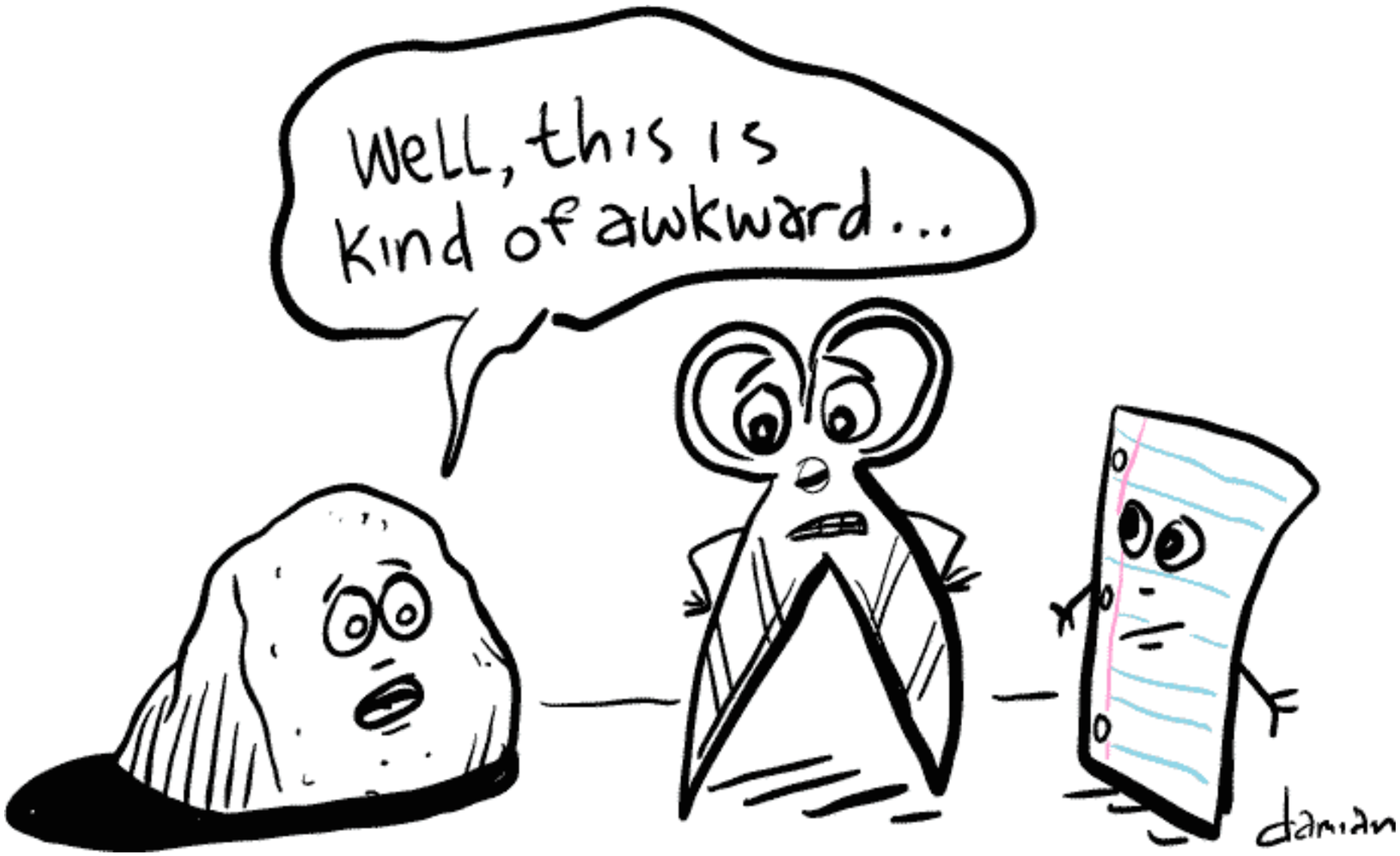
Rules about Actions

- Use the arrow keys to move the player
- Play one card per turn
- Only touch the ball with your feet
- Press space bar to shoot

Examples

- What are the **Players**, **Goals,** and **Rules**

Ex 1: Rock, Paper, Scissors



Who are the Players?

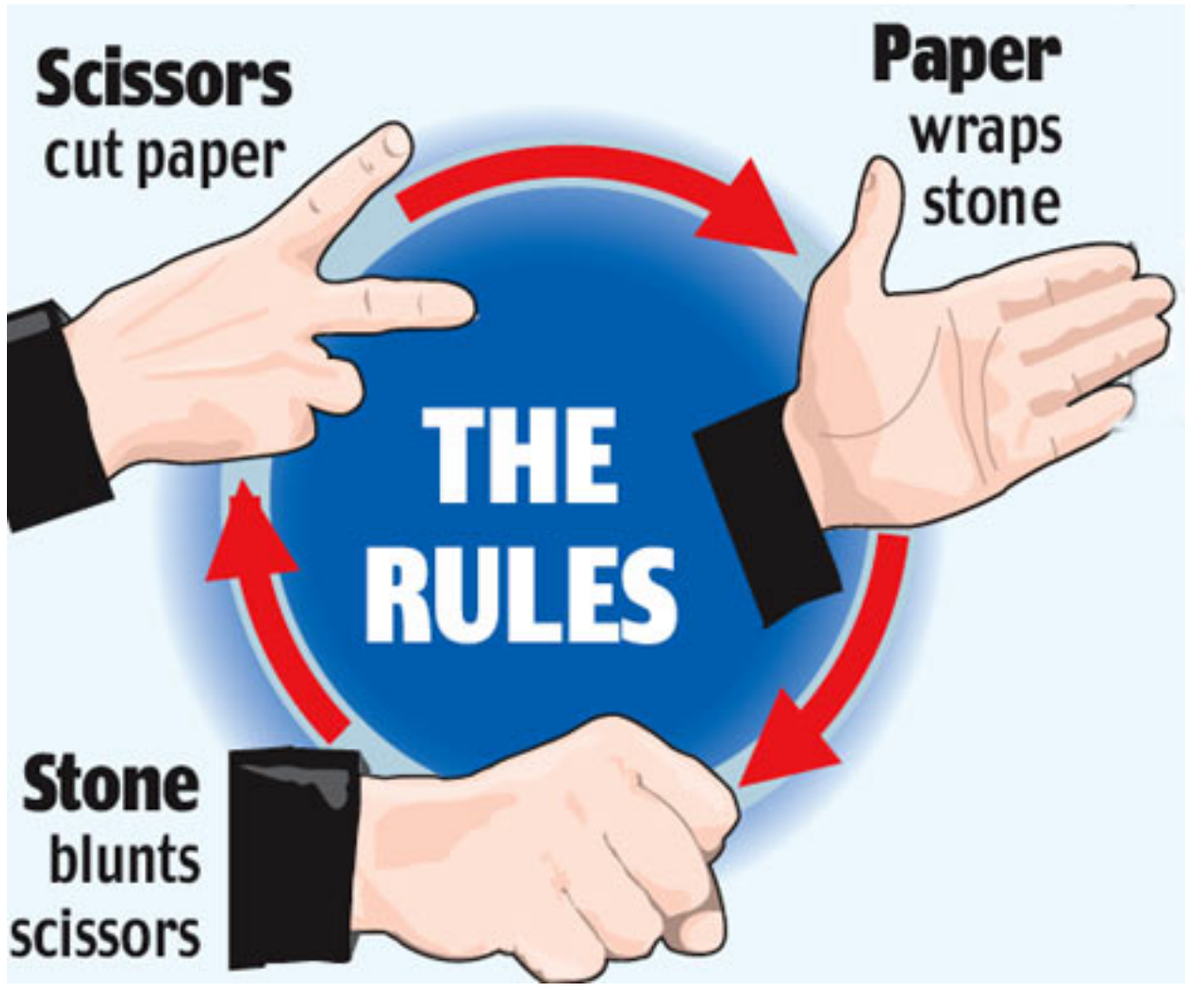
- Any two people with hands
- Two people compete against each other

What is the Goal?

- Pick the sign that beats your opponent's
- 2 out of 3 times?

What are the Rules?

- Each player picks a hand sign
- Both players make a sign at the same time
- The options are rock, paper, and scissors
- If one is rock and one is scissors, rock wins
- If one is scissors and one is paper, scissors wins
- If one is paper and one is rock, paper wins


Scissors
cut paper
Paper
wraps
stone
THE
RULES
Stone
blunts
scissors

Ex. 2: Frizzle Fraz

Who is the Player?

- Frizzle
- He/she competes against the environment

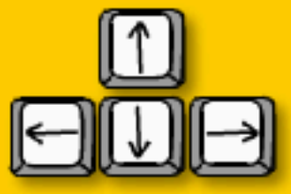
What are the goals?

- Bring the little Frizzles to a safe place

What are the Rules?

- Move with the arrow keys
- If you collect a little frizzle, then you get points
- If you collect all 4 keys, then you can open the door at the end of the level
- If you open the door, then you can go to the next level
- If you touch a bad guy, then you lose a heart
- if you lose all your hearts, you lose

How to Play



Use the arrows to move.

Collect all keys to open the door at the end of the level.

Rescue little frizzles for points! Finish the level to bring them to a safe place.

These two don't look friendly! You can't destroy these guys by jumping on them, so just avoid them.

OK

GirlsgoGames.com

What are your favourite games?

- Who are the players?
- What are the goals?
- What are the rules?
- Why is it fun?

Counting Game!

What makes a good rule?

Brainstorming Games

- Think of a **Player**
- Think of a **Goal** for your player
- Think of some **Rules**
  - things to **collect** or **avoid**
    - ex. collect coins, avoid monsters
  - how do you win?

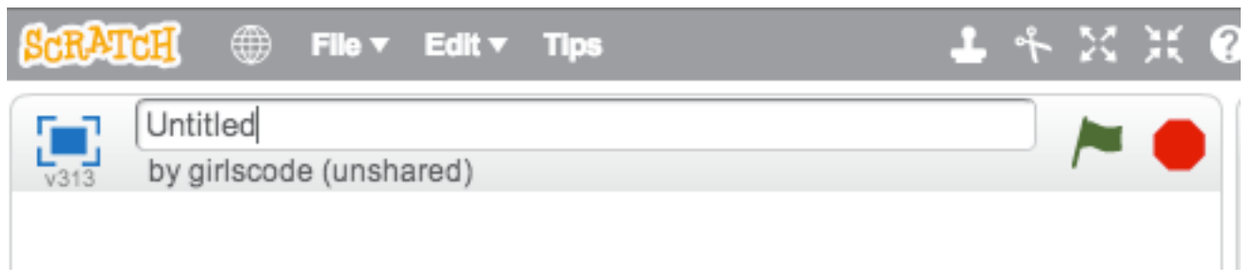
Making Games with Scratch

Getting Started

- Go to **scratch.mit.edu**
- Click on **login**
- Username: **girlscode**
- Password: **helloworld**

Start a New Project

- Click on **Create** at the top of the page
- Change the name from 'untitled' to your name



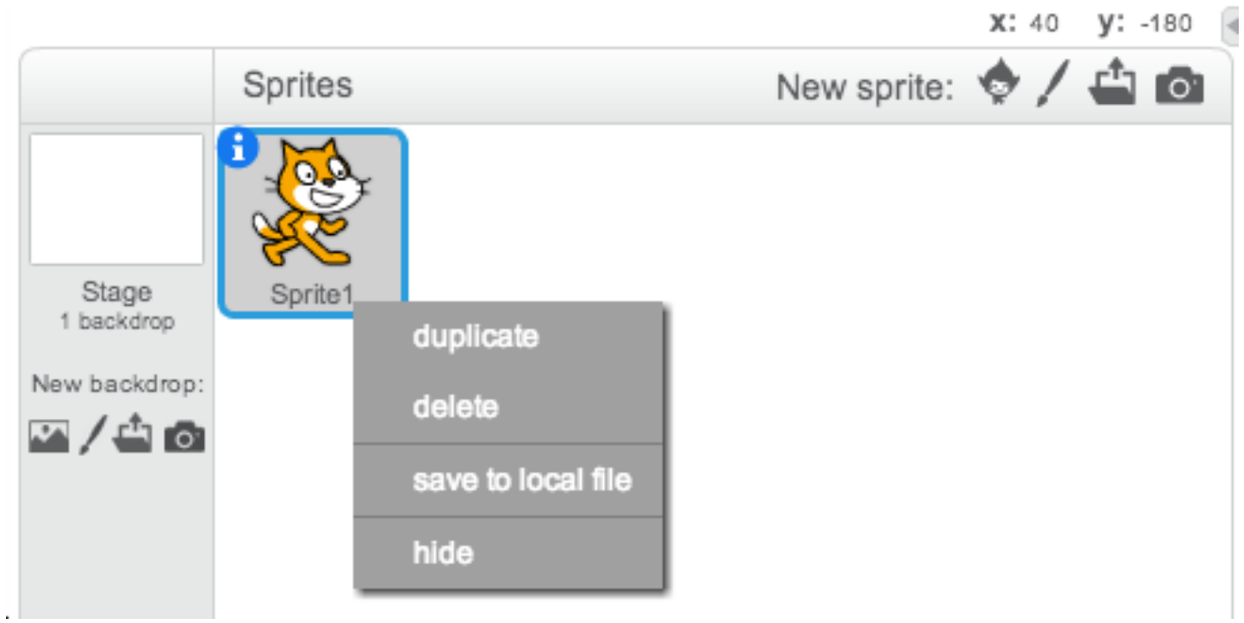
Making a Player

- Players and things in Scratch are called **sprites**

- Find **Sprite 1** in the Sprites Panel

- Right-click on **Sprite 1**

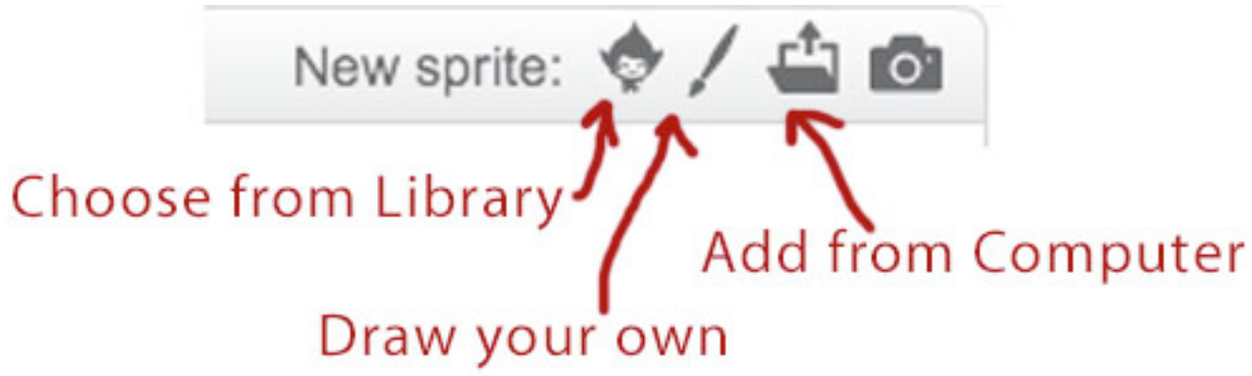
- Select **Delete**



Making a Player

- Now we'll make a new sprite

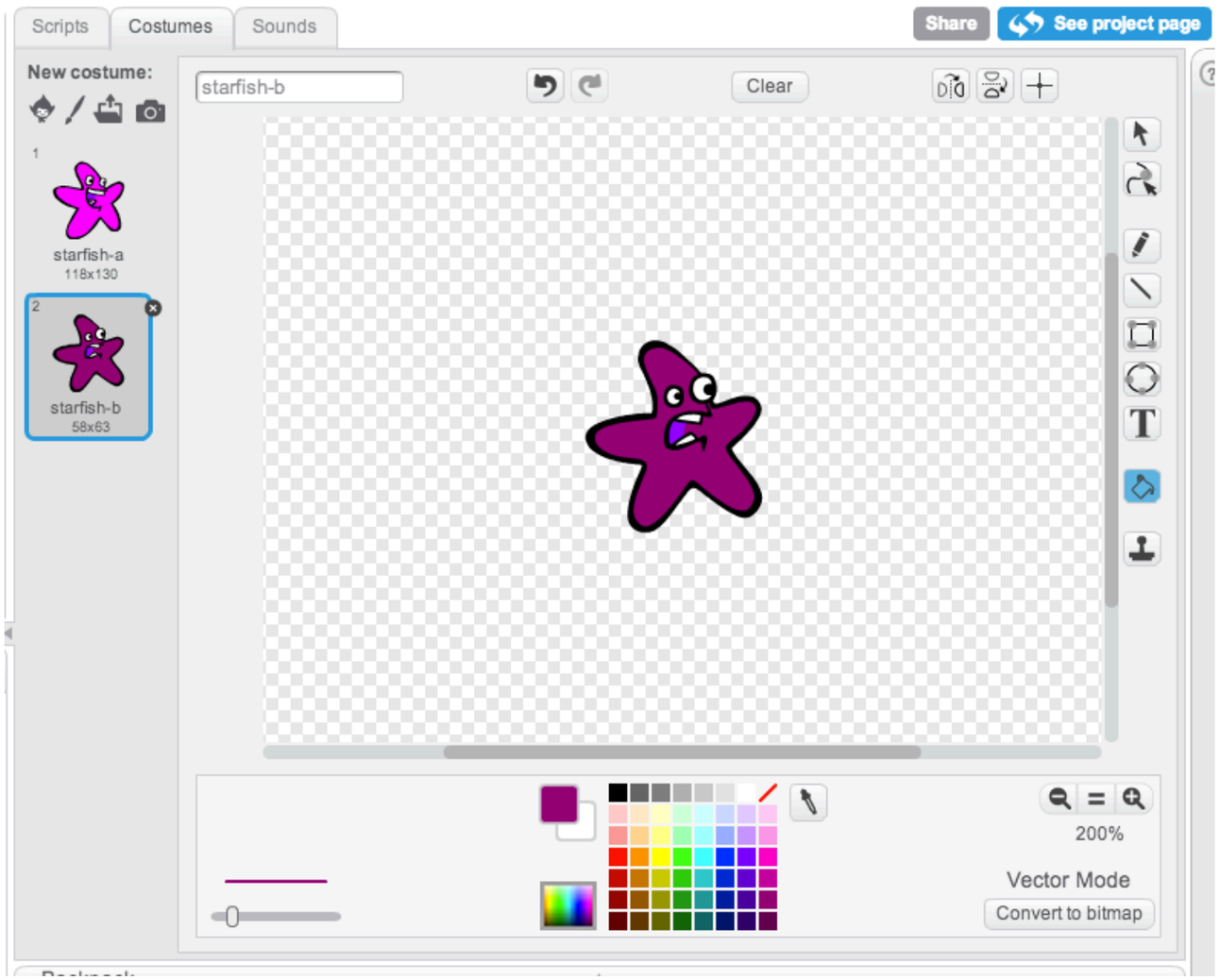
- You have 3 choices
  - use a sprite from the library
  - draw a sprite
  - upload from your computer



Changing your Player

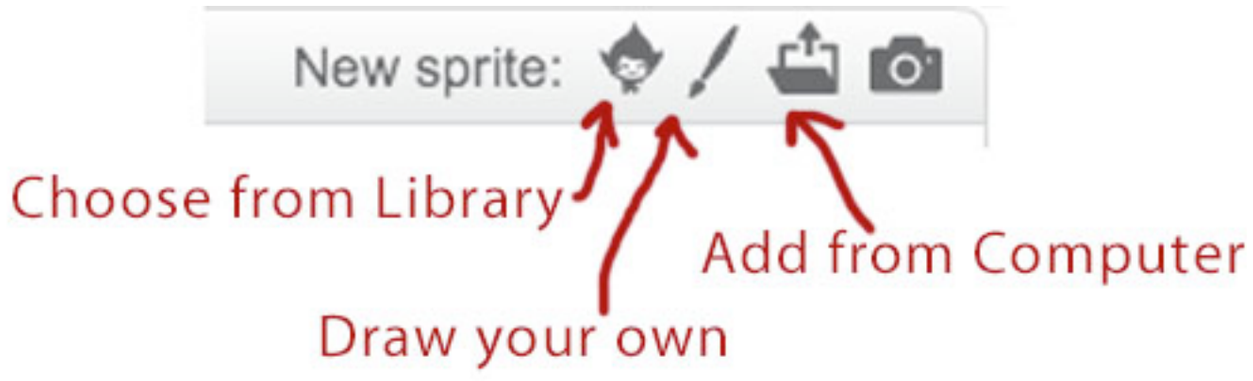
- If your player is the wrong size, you can make it smaller by clicking on the **costumes** tab

- You can also change the colour and add your own drawing



Add a Background

- Under **new backdrop**, you can add a background from the library, draw your own, or upload one from your computer



Make your Player Move

- We're going to make a **script** for our player
- A **script** controls the way the sprite acts and responds to events
- Telling your sprite what to do
- Click on your sprite in the Sprite panel
- Click on the **Scripts** tab

Add a Start Button

- The green flag will be a start button
- Drag the **When flag clicked** block from the **events** section into the script panel

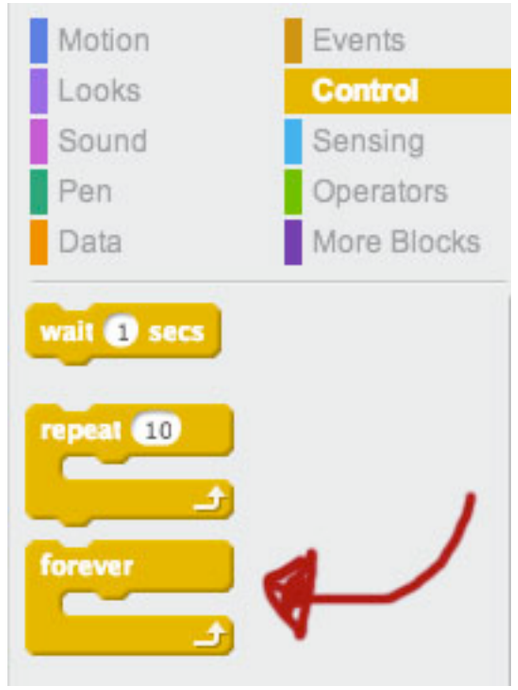
Moving

- Before we can make our sprite move, we need to tell it **when** it can move
  - when you press an arrow key
- Then tell it **what** to do
  - move in the right direction

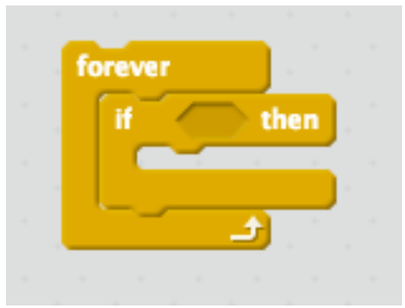
Moving

- When can the sprite move?
- It can move at **any time**
- When you press a certain key

- It can move at **any time:**
  - Find the **forever** block in the **control** section
  - drag it to the script panel underneath the **When flag pressed** block

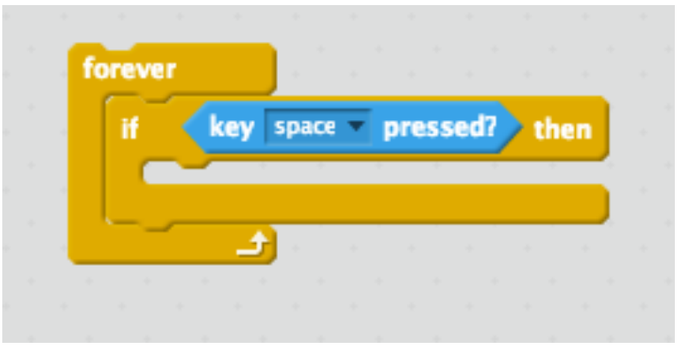


- When you press a certain key (right arrow):
  - This is an **if statement**
  - **if** the right arrow key is pressed, **then** move
    - drag the **if then** block **inside** the forever block



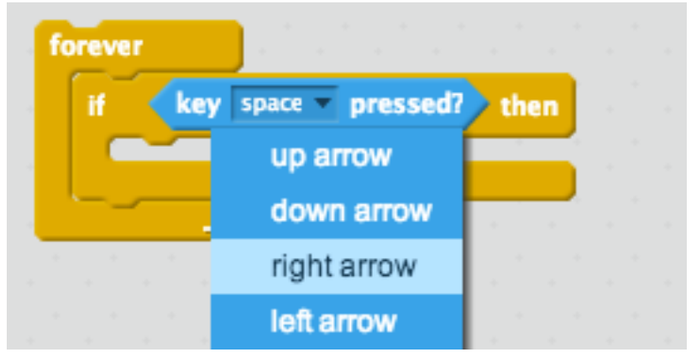
- **If** what?
  - If the right arrow key is pressed!

  - find the '**key ___ pressed?**' block in the **Sensing** section



  - drag it to the empty space in the **if then** block

- Click the drop-down where it says ‘space’ and pick ‘right arrow’



- Our script now says: **if right arrow key is pressed then...**

- **Then** what?
  - then move!
  - find the **move 10 steps** block in the **Motion** section
  - drag it **inside** the **if then** block

Try it out!

- Click on the preview panel
- press the right arrow key
- **He moves!**
- but only to the right...

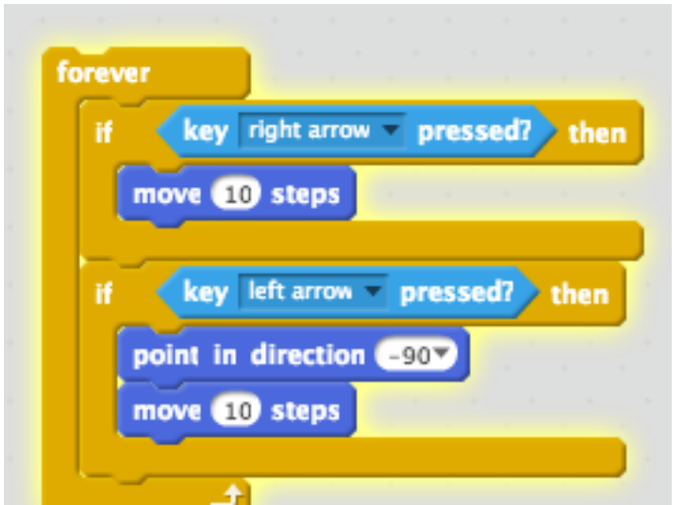
- We need to do the same thing for the **left arrow key**
- you can copy the script you already have!
- right-click on the **if then** block
- select **duplicate**
- Add it right beneath the other **if then** block

- Change the drop-down from **right arrow** to **left arrow**

- Try it out! Click on the preview panel and press your **left arrow key**

- **uh oh...**

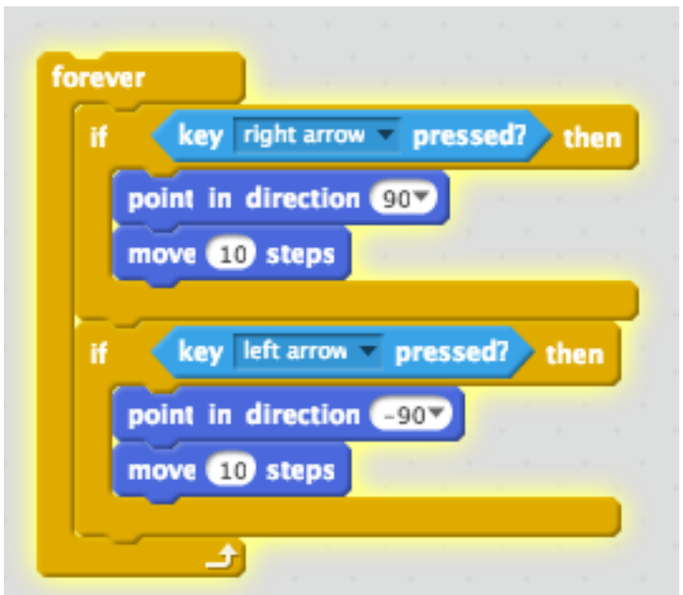
- It doesn't just have to move
- It needs to **point** in the direction we want it to go
- Drag the **point in direction** block **above** the **move 10 steps** block
- Click the drop-down and select **-90 (left)**



- It also has to point to the right when we want it to move right

- Add a **point in direction** block above the other **move 10 steps** block

- select **90 (right)** from the drop-down



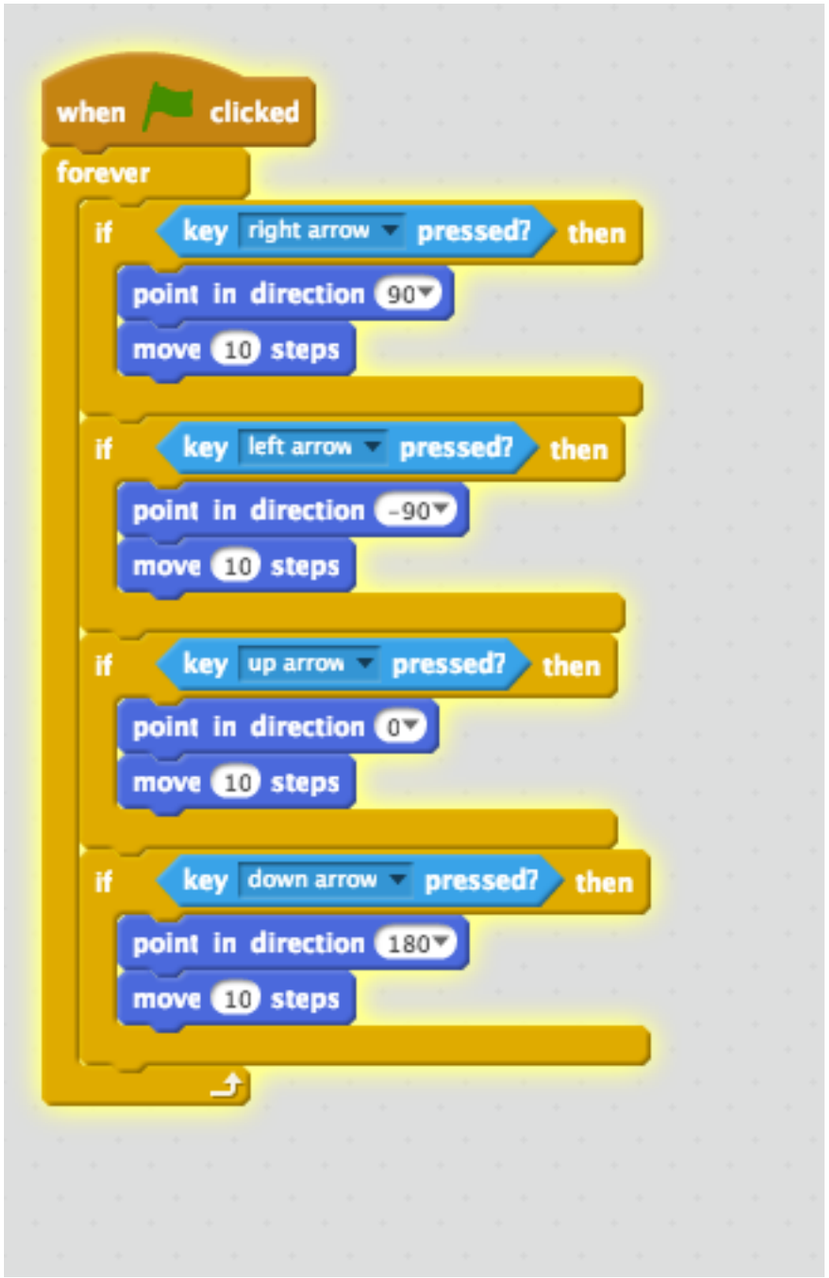
- Try it out!
- Now our player moves left and right
- But he turns upside-down when he goes left!

- Click on the blue **i** icon beside your sprite in the sprite panel

- Change the **rotation style** to back and forth (the arrow with two points)

Moving up and down

- Repeat the same process to make your sprite move up and down with the up and down arrow keys
- **Duplicate** one of the **if then** blocks, then change the drop-downs



Add another Sprite

- We're going to add an object for your player to collect
- Create a **new sprite** the same way you made your first one

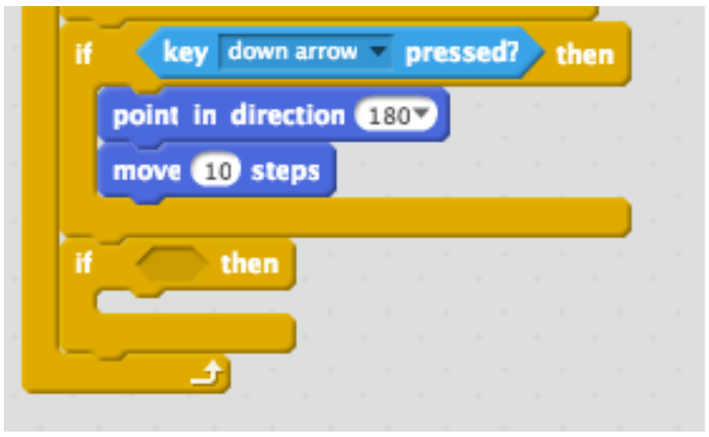
- We need a script to control what happens to our player when it touches the new object

- What would the **if then** statement say?

- **if** _____, **then**_____

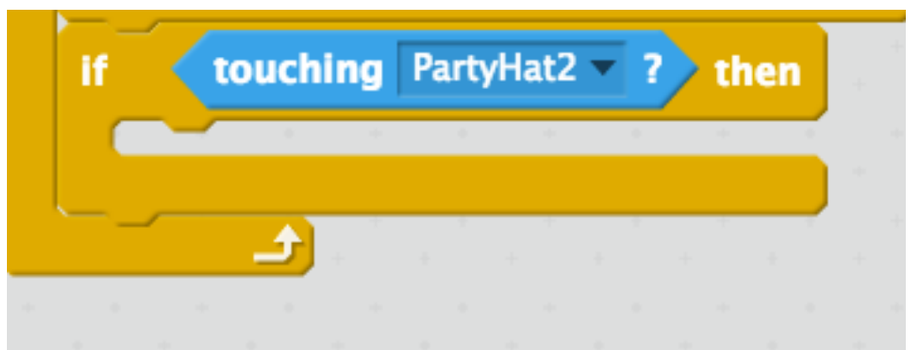
- **if** player touches object, **then** the object disappears

- Click on your player sprite in the sprite panel
- Drag a new **if then** block inside the **forever** block



- Drag a **touching ____?** block from the **Sensing** section into the blank space in the **if then** block

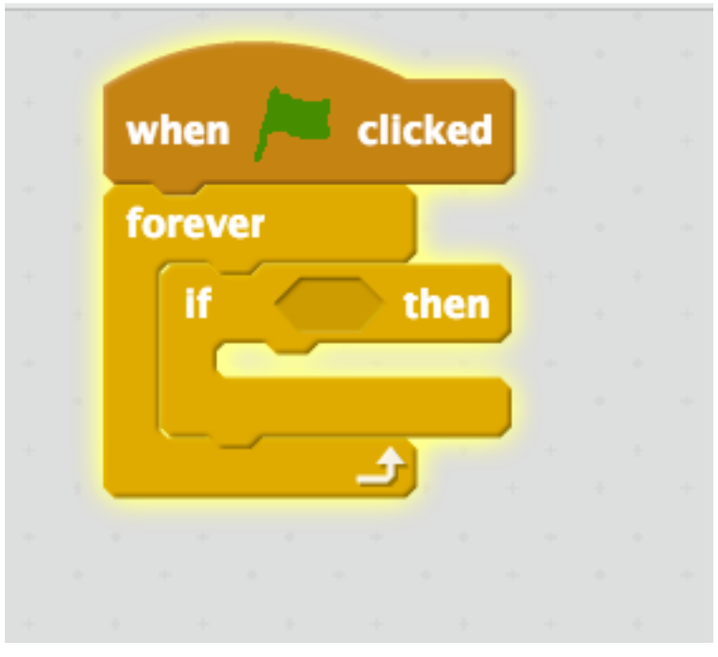
- Use the drop-down to select the name of your collectible object



- Then what?
- Make the object disappear
- We need to add a script to the object to make it disappear when the player touches it
- Whats the **if then** statement?
- **if** object is touching player, **then** hide object

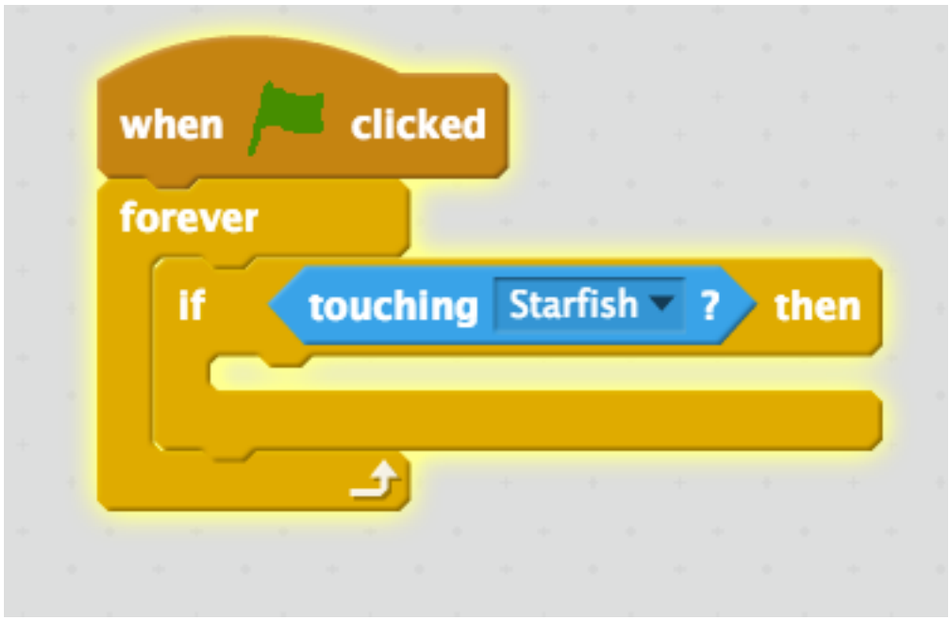
- Click on your object sprite in the sprite panel
- We'll start our script the same way we started the player script:
- with a **when flag clicked** block then a **forever** block

- Inside the forever block, we'll add our **if then** statement

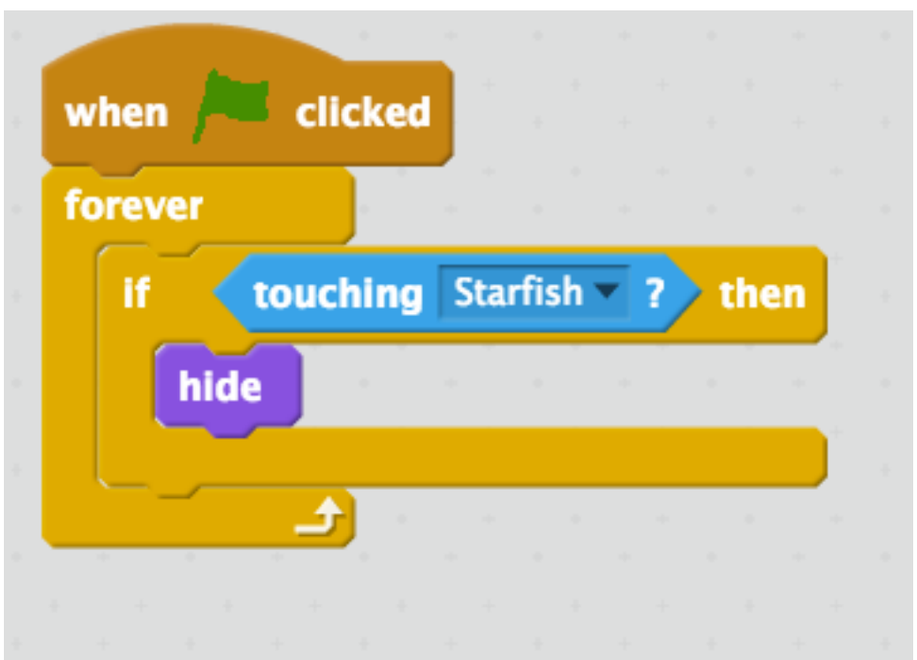


- Next drag the **touching ___?** block from the **sensing** section to the blank spot in the **if then** block

- Pick the name of your player sprite from the drop-down



- What's the **then** part?
- Disappear!
- Drag a **hide** block from the **looks** section inside the **if then** block



- When a player restarts the game, we want all the objects to show up, even if they collected them the last time they played

- So lets add a **show** block under our **when flag clicked** block

Try it Out!

- Your object should disappear when your player runs into it!

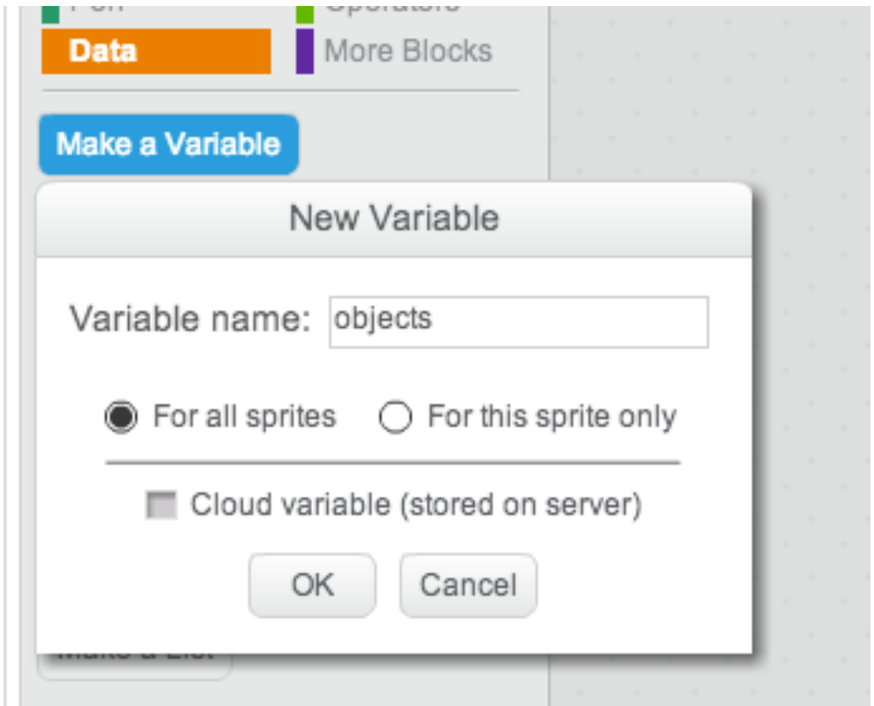
Counting Objects

- Collecting objects is more fun when you know how many you've got!
- We can keep track of the number of objects with a **variable**
- a variable is just a number that you can change

Add a Variable

- Click the **Make a Variable** button in the **Data** section

- Give your variable a name (like ‘objects’)



Show a variable

- We want to show the variable to players of our game
- Select your Player sprite
- Find the **Show variable** block from the **Data** section
- add it beneath the **when flag clicked** block on our Player
- Select your variable in the drop-down

- We also want the counting to always start at 0, so we'll add a **Set variable to** block after our **show variable** block

- And set the variable to 0

Change the Variable

- What should happen to the variable when a player collects an object?
- It goes up!
- Select your **object** sprite

- Drag a **Change variable by** block inside the **if then** block

- Make sure it's selecting the right variable

- Try it out!
- Your variable should change to 1 when your player touches your object
- But there's only one object to collect...

Making More Objects

- To make another collectible object, right-click on your object sprite in the sprite panel
- Select **duplicate**
- Do this as many times as you like!

Winning the Game

- Collect enough objects!
- **if** you collect 5 apples, **then** you win the game!

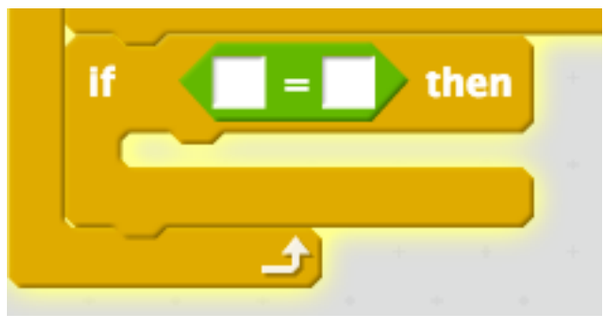
- Select your Player sprite from the sprite panel

- Add a new **if then** statement

- How do we know if they've collected 5 items?

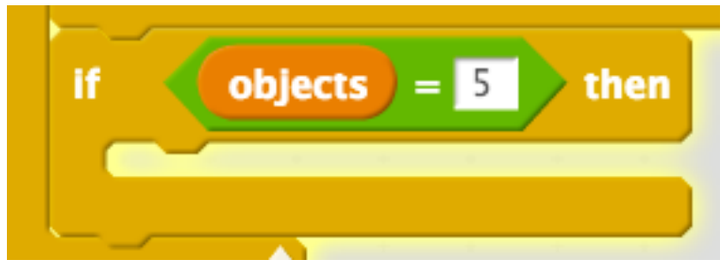
- If our **variable** is 5

- We need to **compare** our variable to 5
- And check if it **equals** 5
- Drag a ___ = ___ block from the **operators** section to the blank space in the **if then** block



- What is the first blank going to be?
- The variable!
- Drag the block with your variable name from the **data** section into the first blank

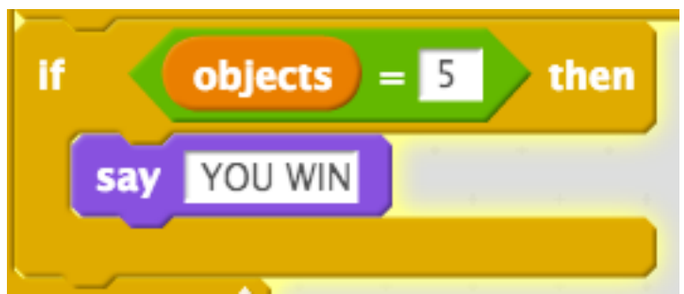
- Type a number into the second blank. This number is how many items you must collect to win



- To show the player that they've won, we're going to have our sprite say "YOU WIN!"

- Drag the **Say Hello** block from the **looks** section into the **if then** block

- Change the message to "You Win" or whatever you want.

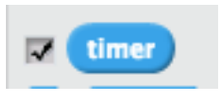


- Try it out!
- That was a bit too easy though...

Making it Harder

- This game is too easy because there aren't any obstacles or challenges
- Lets add a timer so that the player has to beat the clock!

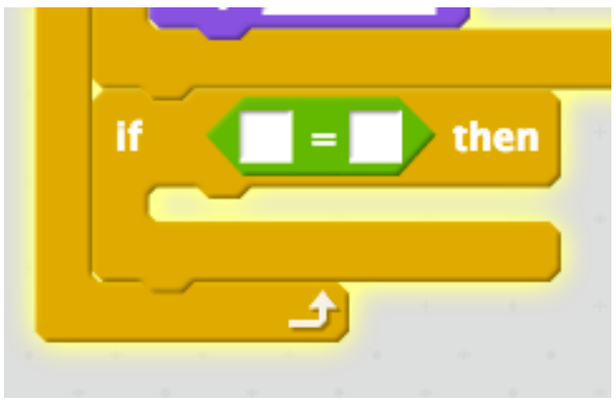
Adding a Timer

- In the **sensing** section, click the checkbox next to **timer** 

- this will put a timer on your screen

- Lets make a rule for our timer
- **if** the timer reaches 15, **then** the player loses

- Drag a new **if then** block into the **forever** block for your player
- Drag a ___ = ___ block into the blank space



- Drag the **timer** block from the **sensors** section into the first blank
- Set the second blank to whatever you want your time limit to be

- Then lets drag in a **say hello** block inside the **if then** block

- And change the text to **“You lose!”** or whatever you want.

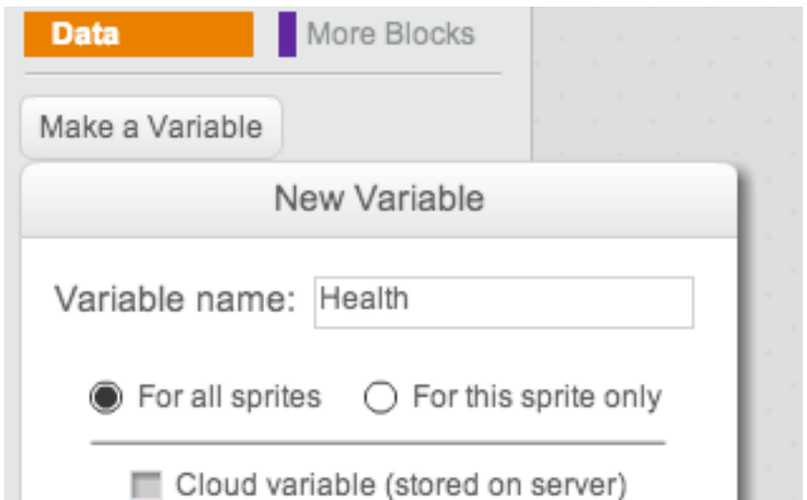
- But our timer just keeps going up and up and up...
- We need to reset it when you start a new game
- drag the **reset timer** block from the **sensing** section right after the **When flag clicked** block

Making Obstacles

- So far the only hard part about our games is collecting the objects in time
- But we can add **obstacles** to make the game more challenging
- Obstacles will **hurt** the player
- If they get too hurt, they lose

Adding Health

- How should we keep track of how much health the player has?
- With a variable of course!
- Create a new variable called **health**



- Lets make sure our **health** variable starts at a number greater than 0 and is shown to the player

- Add a **set variable to** block and a **show variable** block after the **when flag clicked** block

- Pick a number for how much health your player has and write it in the blank spot after **Set Health to...**
- How does the player lose health?
- By touching an obstacle!

- Lets add a new sprite for our obstacle. This can be something like a monster, or an environmental danger like spikes.
- Once you've created your new sprite, select it so you can add a script

- What do we want to happen when the player touches the obstacle?

- What's the **if then** statement?

- **if** the player touches an obstacle, **then** the player loses health

- The script for this one starts like the other scripts: a **When flag clicked** block followed by a **show** block.

- Add a **forever** block right after the **show**

- Inside the **forever** block, add in an **if then** block

- If what?

- If touching player!

- Then what?
- Player loses health!
- How do we keep track of health?
- With our health variable!

- Drag the **Change variable by** block into the **if then** block

- Change the number from 1 to -1

- We also want to hide the obstacle

- Drag a **hide** block

- Now our player's health goes down if he touches an obstacle

- But what happens when he loses all his health?

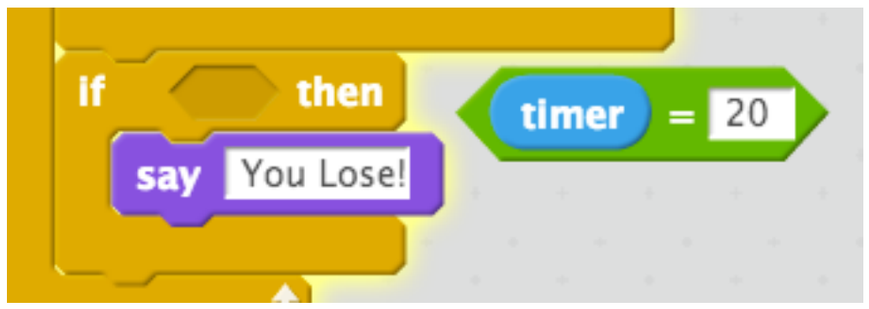
- Nothing!

- We need a rule for when our player's health gets to 0

- What's the **if then** statement?
- **If** the health variable is 0, **then** show the 'You lose' message
- That sounds familiar...

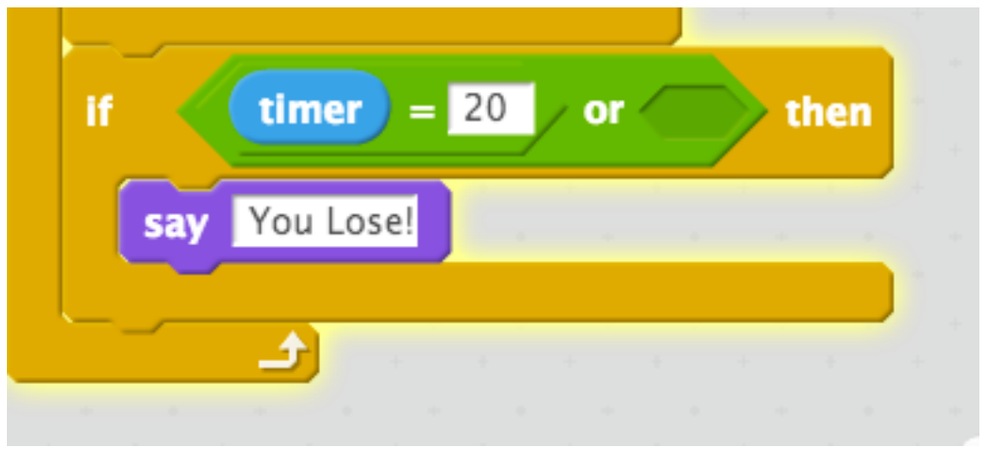
- Now there are two ways to lose:
- **If** the timer is 15 **OR** health is 0 **then** you lose
- We can change our ‘You lose’ script to check if **either** of these are true

- Drag the **timer = 15** block out of the **if then** blank and put it to the side

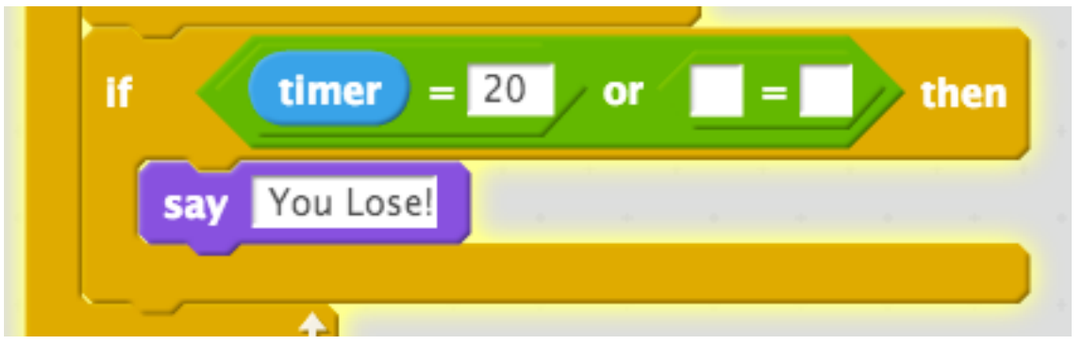


- Drag in the ___ **OR** ___ block from the **operators** section

- Drag the **timer = 15** block into the first blank of the ___ **OR** ___ block



- Drag a ___ = ___ block into the second blank of the ___ **OR** ___ block



- Drag the **health** variable from the **data** section into the first blank of the ___ = ___ block
- Type **0** into the second blank