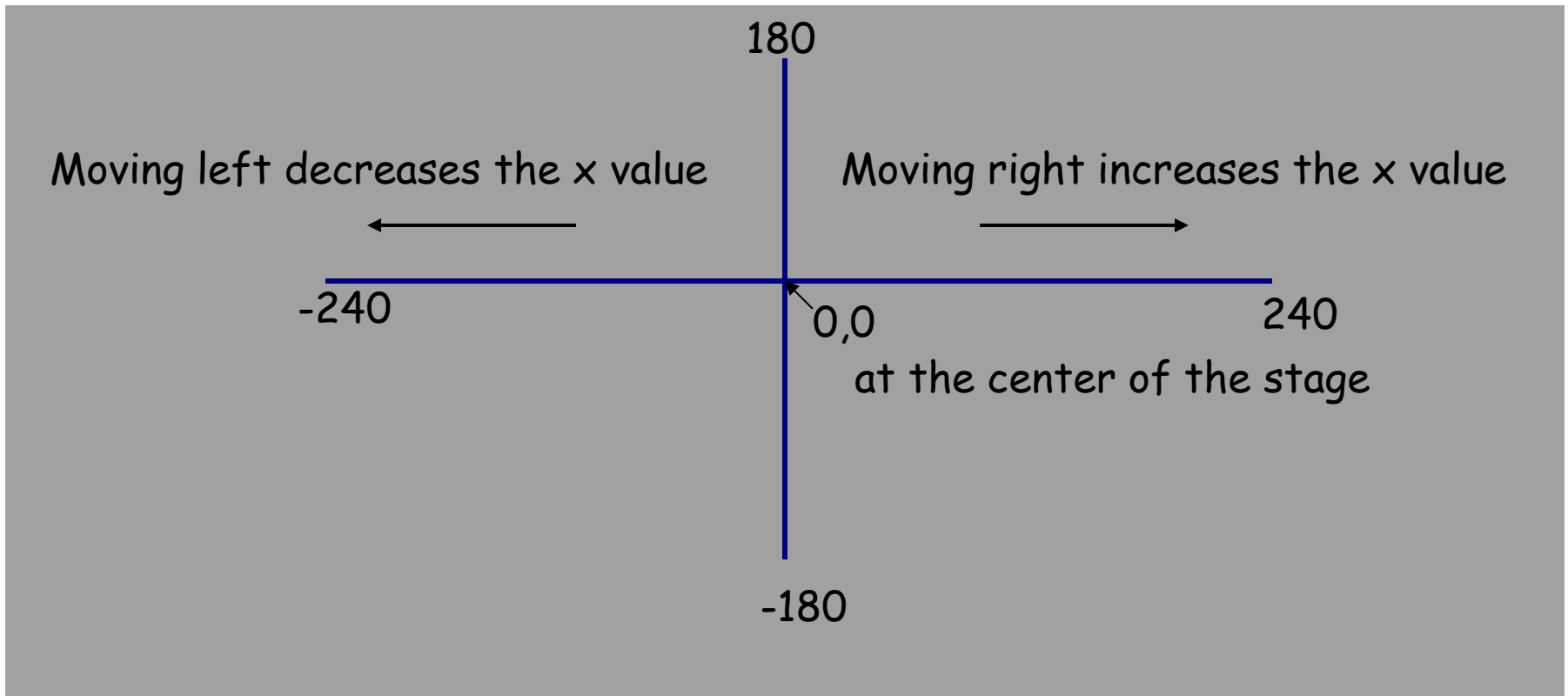# Create a Simple Game

## Directions by Mrs. Moraes

# Goals

- Learn about:
  - event handling
  - simple sequential execution
  - loops
  - variables
  - conditionals
  - parallel execution
  - message broadcasting

# The Scratch Stage

- **The Scratch stage is 480 pixels wide and 360 pixels high.**

180

Moving left decreases the x value

Moving right increases the x value

-240

0,0

240

at the center of the stage
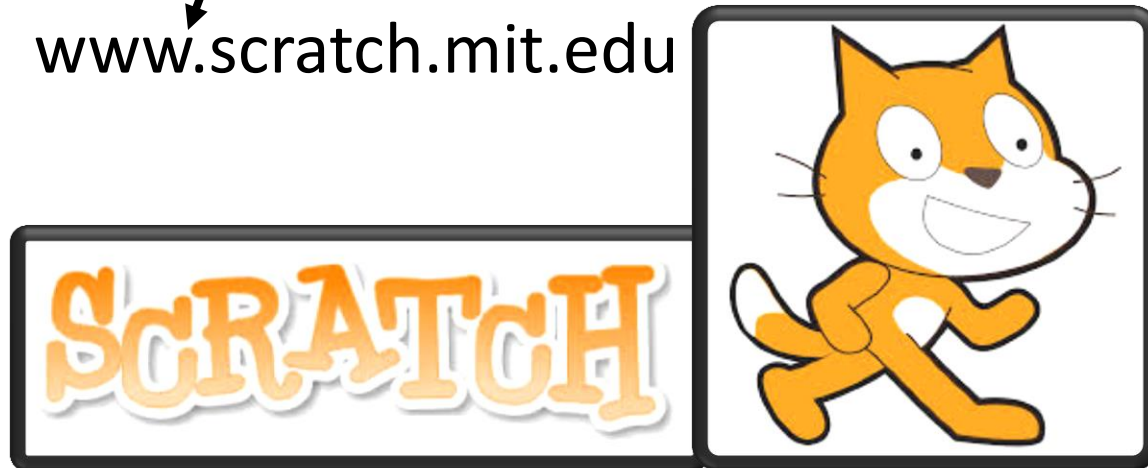
-180

# Game Description

- We will make a game where the player controls a car using the arrow keys to catch a falling Woman.  If the car misses the Woman, the game is over.
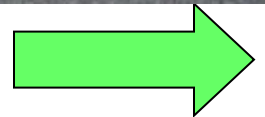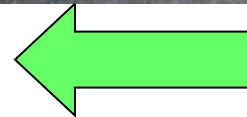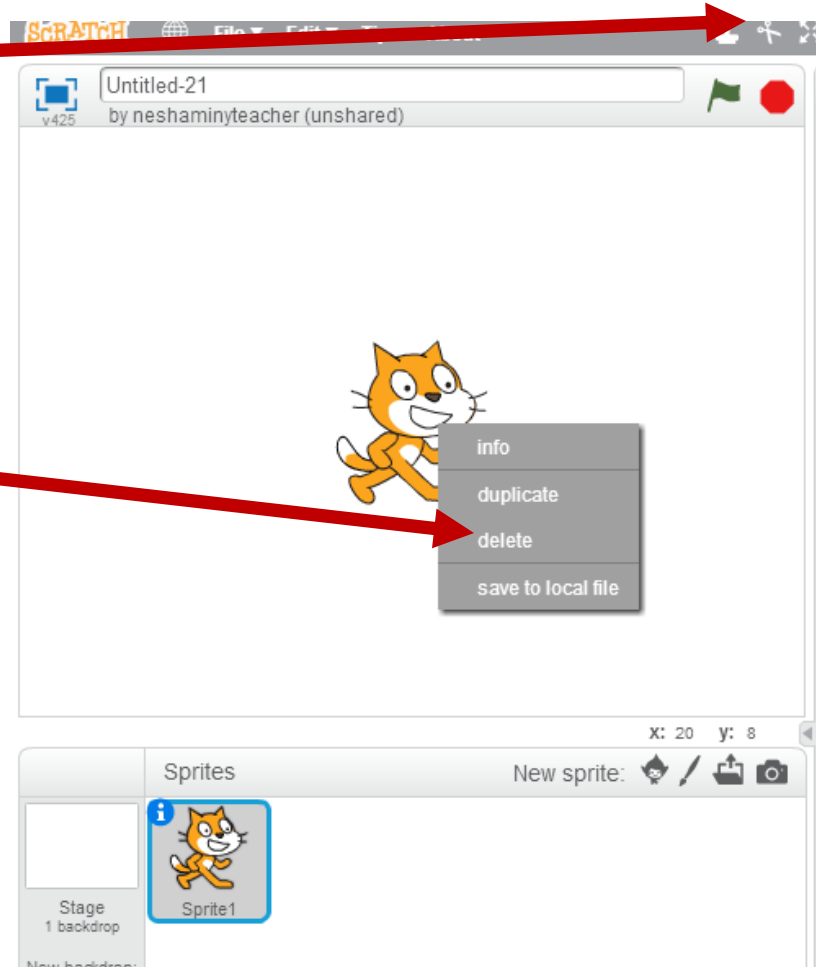
# Start up Scratch

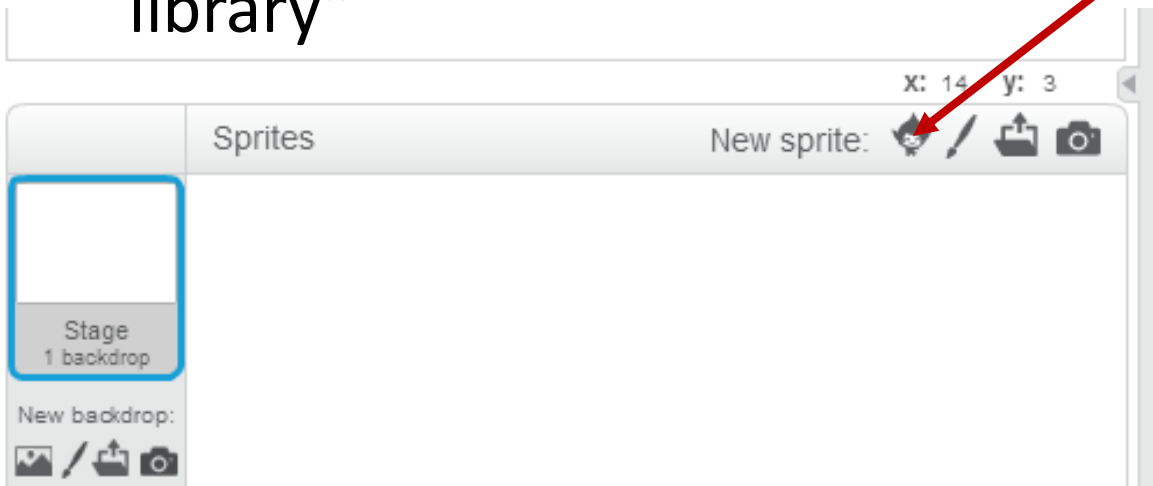- Log into Scratch and Create a new project

www.scratch.mit.edu

# Delete the Cat

- Click on the scissors and your cursor turns to scissors and then click on the cat to delete it
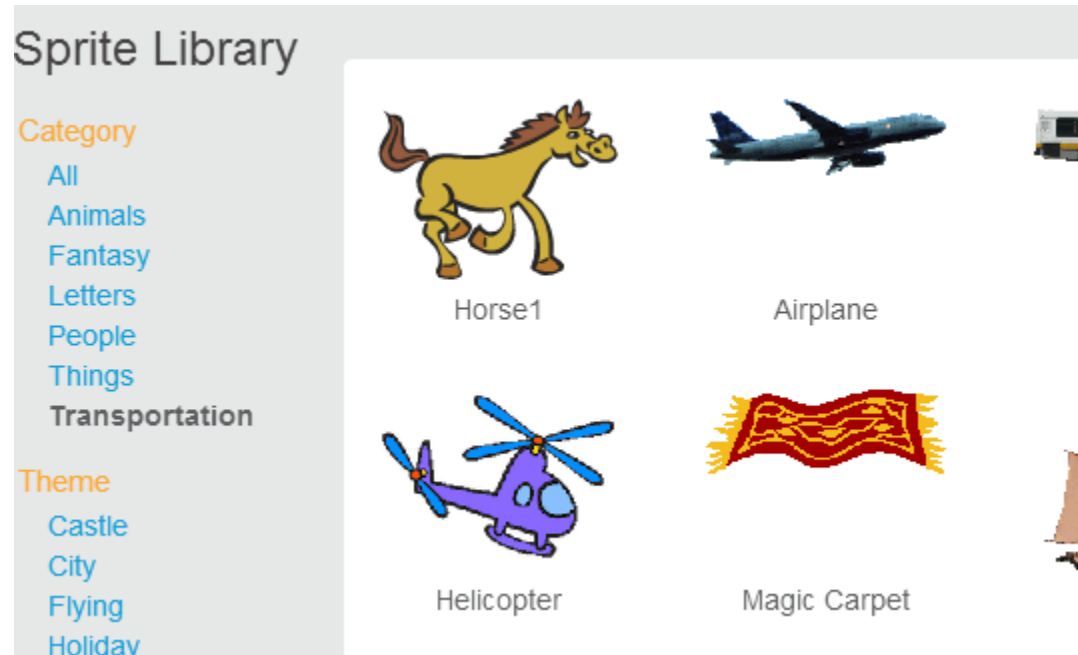
  or right click on the

  cat and pick delete

# Add the vehicle

- Click on the button with the picture of Gobo on it.  If
  - you hover over it, it says "Choose sprite from library"
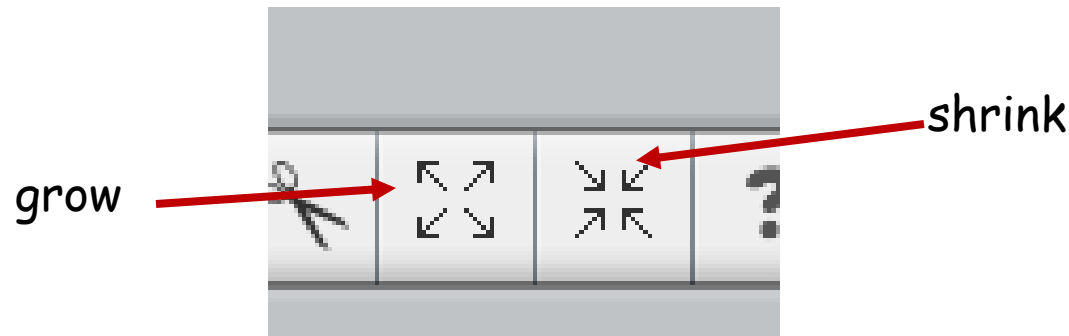
# Select your vehicle

- From the Transportation list, select the vehicle you wish to use:

# Move & resize the vehicle Sprite

- Move the vehicle sprite to the bottom of the window.

- You can make your sprite larger or smaller by using the "grow sprite" or "shrink sprite" icons.

- You click on one of these icons, then click on your sprite until it is the size you'd like.

*grow*

*shrink*

# Event Handling

- We want to control the car using the arrow keys.

    - When we click the left arrow the car should move left.
    - When we click the right arrow the car should move right.

    - This is a form of event handling or programming the computer to respond to user actions like mouse clicks and key presses.

# Programming the Arrow Keys

- Click on the vehicle sprite and then on the Scripts tab to drag out an Events Block "when space key pressed". Use the drop down key to change it from space key to left arrow key.
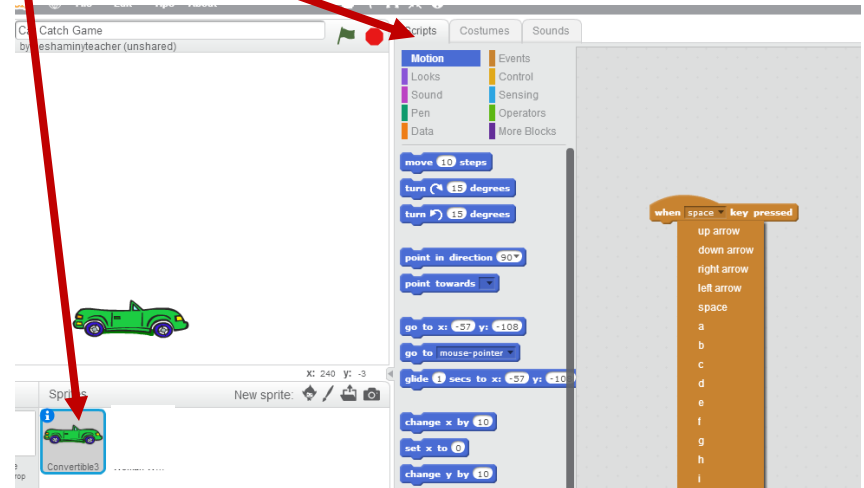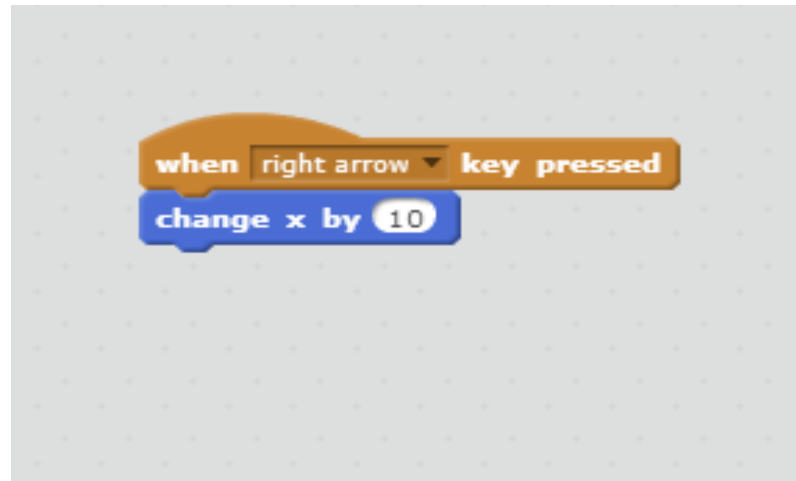
# Respond to left Arrow

- Add a Motion (blue) Block under the Event block to program the vehicle to move left (-10) spaces on the x axis every time the left arrow key is pressed.
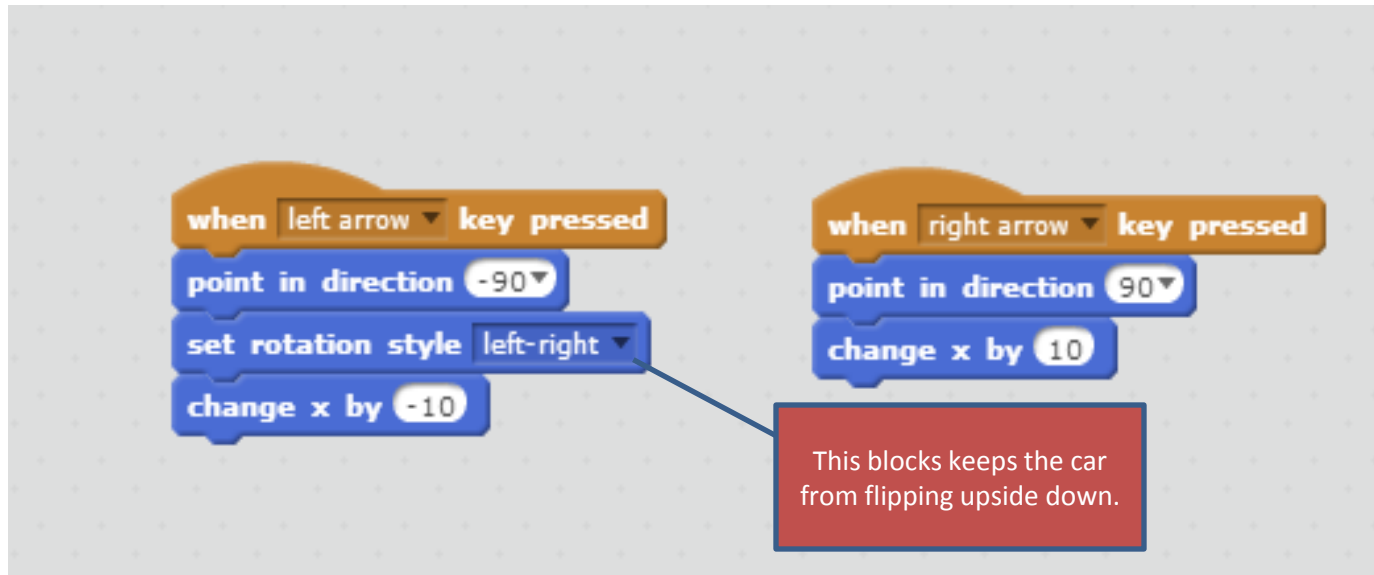
# Program the right arrow key

- Program the opposite movements
  for the right arrow keys.

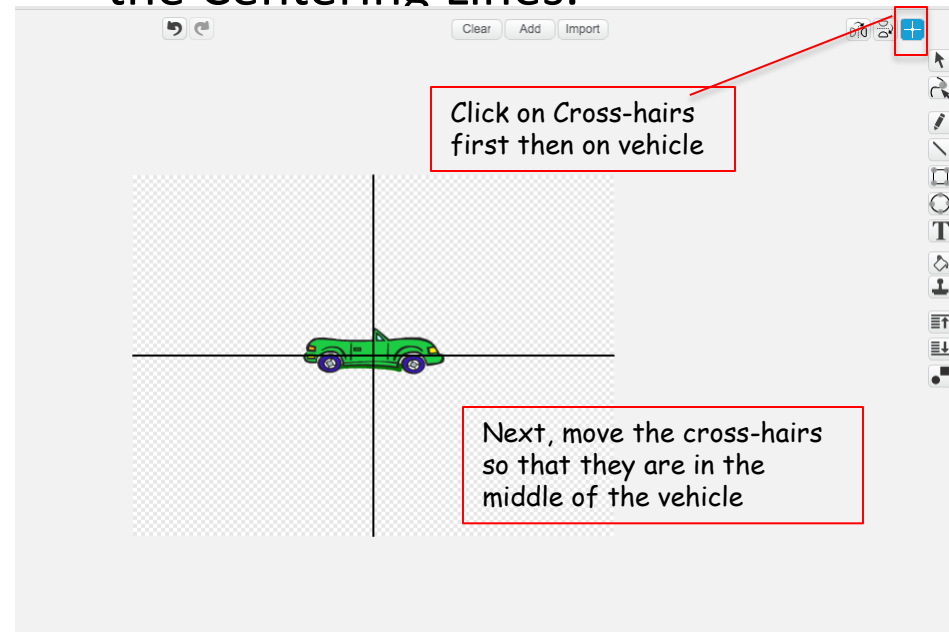# Point the vehicle in the correct direction

- Wouldn't it be nice if the vehicle would point to the left when moving to the left and vice versa?

- Let's add these 3 blocks to do this:



when left arrow key pressed
point in direction -90
set rotation style left-right
change x by -10

when right arrow key pressed
point in direction 90
change x by 10

This blocks keeps the car from flipping upside down.

# Test the vehicle sprite

- Does the vehicle move left when the left arrow key is pressed?

- Does it move right when the right arrow key is pressed?

- Does it point to the left/right when moving to the left right?

- If the vehicle seems to move up and down when the arrow keys are pressed your centering may be off. Go to the Costumes Tab and reset the Centering Lines.



Click on Cross-hairs first then on vehicle

Next, move the cross-hairs so that they are in the middle of the vehicle

# Add a stage (Backdrop)

- Click on the Stage.

  - Underneath it, go to new backdrop.

  - (There is also a place to the right that you can click).

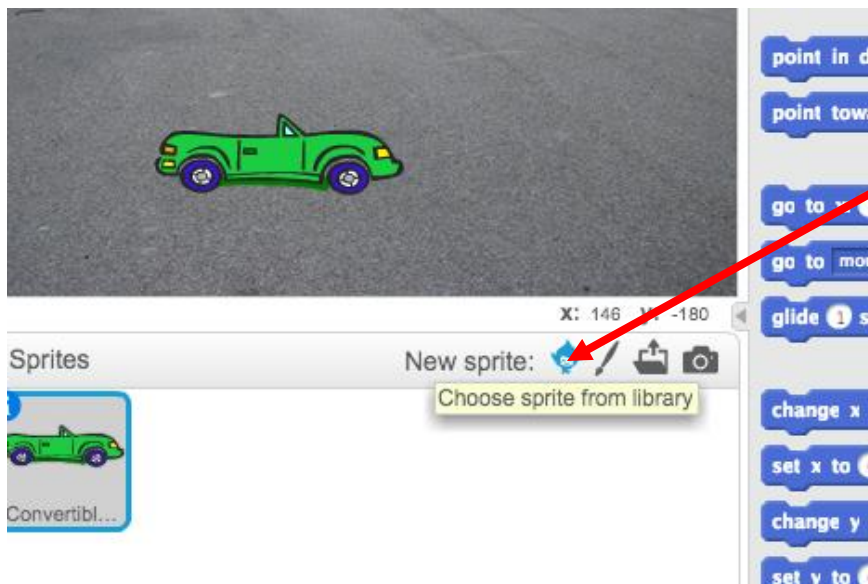  - Select the backdrop that you wish to use for your program.
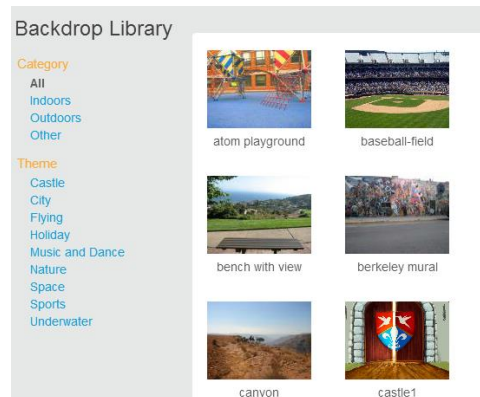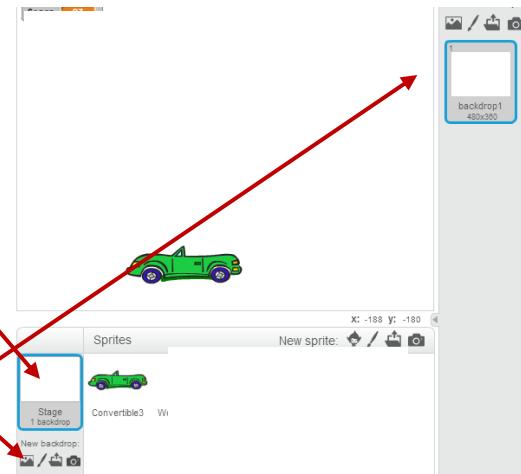
# I used "route 66" as a backdrop

# Add the falling Woman sprite



Click on the picture of Gobo (when you hover over it, it will display "Choose sprite from library").

Select the object that will be falling from the sky. I opened the People Category and selected Woman Waving. You may select what you wish.

# Size the falling sprite as desired and move it to the top

- Click and drag the second sprite to the top of the window.

- Resize it as needed.
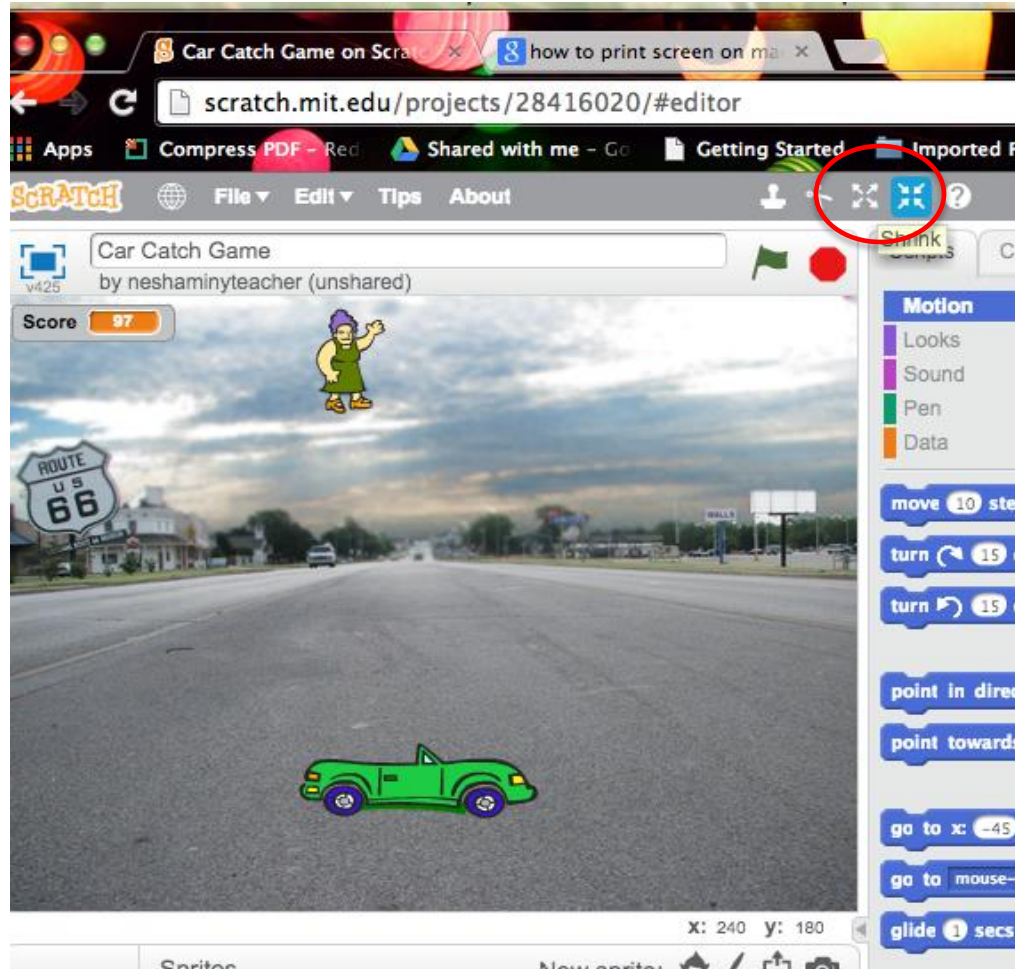
# Make the Woman Fall

- When the green flag is clicked we want the Woman (second sprite) to always start at the top and fall down.

  – Click on the Woman Waving sprite or whatever you selected as your second sprite and then drag out an Events Block (orange color) "When green flag clicked"

# Start the Woman falling

- Move the Woman to where you want her to start falling and then pull over the blue Motion Block, "go to x # y #"
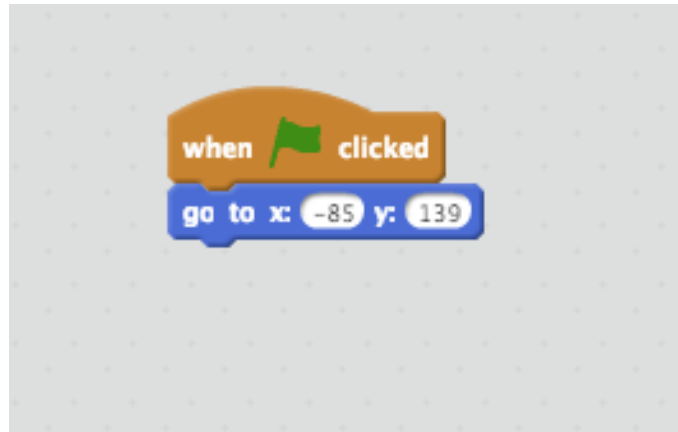
# Loops

- We want the Woman to continue to move down unless the car catches it
- How do we make this happen?
  - We could use lots of blocks one after the other
  - But, that would be slow and repetitive
- We need a way to repeat a block or set of blocks
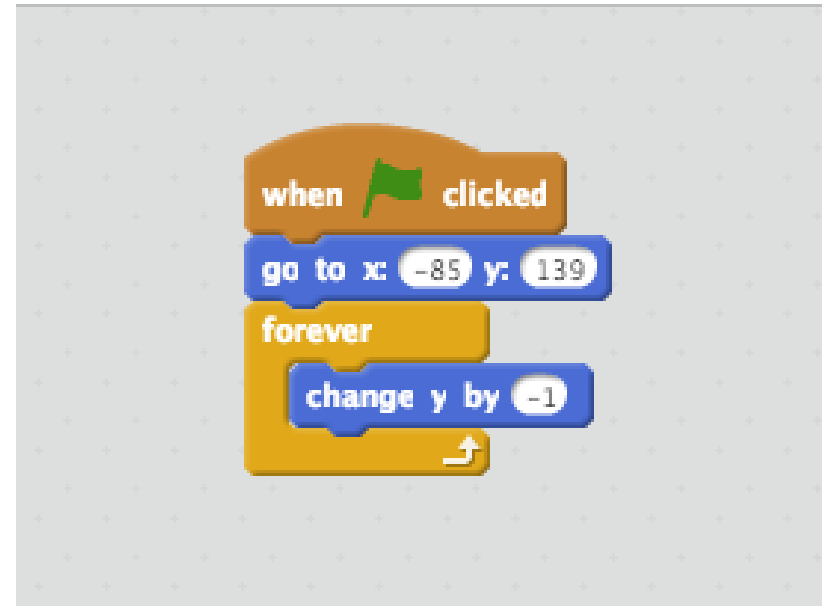  - This is called a loop or iteration

# Loops the smart way

Add a Forever Block (orange) to your script and inside of it add a Motion block (blue) that will forever change the y axis by -1

Click on the green flag to try it out!

Does it work?

Yes, but the Woman will not stop when she hits the car yet because we haven't programmed that part yet.

# Variables

- If we are going to keep track of the score
  - We want something to hold the current score
  - And we want to be able to change the score
  - We want the value to change or vary
    - This is called a variable

# Let's set the score!

- If the Woman touches the vehicle, then she is caught.

- Let's track how times we caught this falling woman with a score.

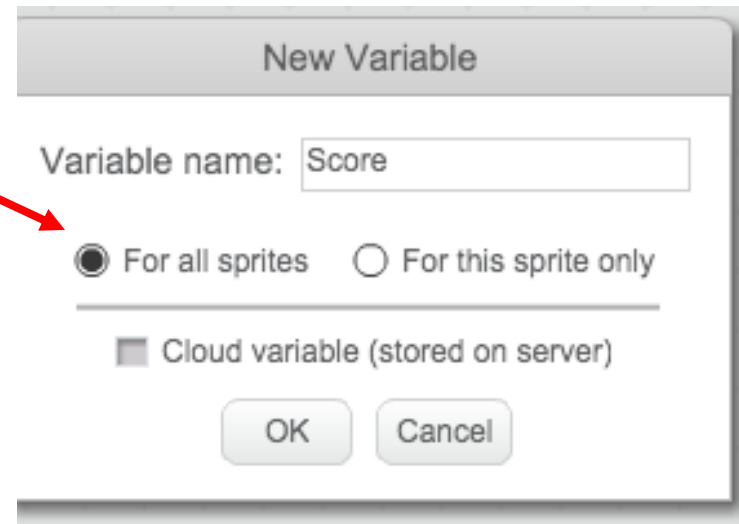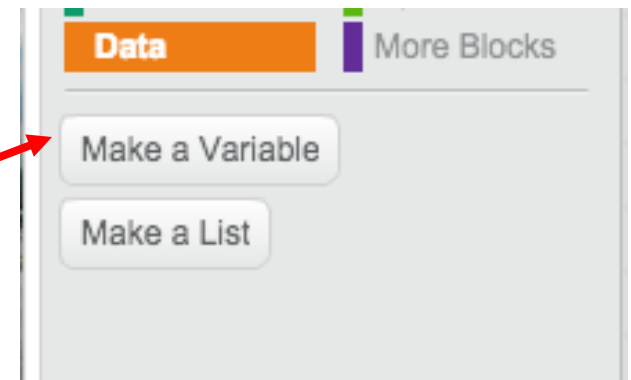  – The score will increase each time we catch her.



Don't let me fall!

I could be your Grand mother!

# Making a variable

- When we start the game, set the score to 0
- Click on Variables (orangish/red)
- Click on Make a Variable
- Name it Score and
   Check "For all sprites"

# Set score to 0

- Before you start keeping score, you must tell the program what score you are beginning with.

- We are beginning with a score of zero.

- From the Data Blocks, pull out a Set Score to 0 block.  Notice that the score will display on your game screen.

# If we catch the falling Woman, then . . .

- From Control, drag out an "if, then" block and put it in the "forever" block

- Add a Sensing Block, if "touching {whatever your sprite1 is named}"

- If this is true, then
- change the score by 1
  - (This is a Data Block)

  - Move the Motion Block outside of the If Loop so that it will Forever move down 1 space
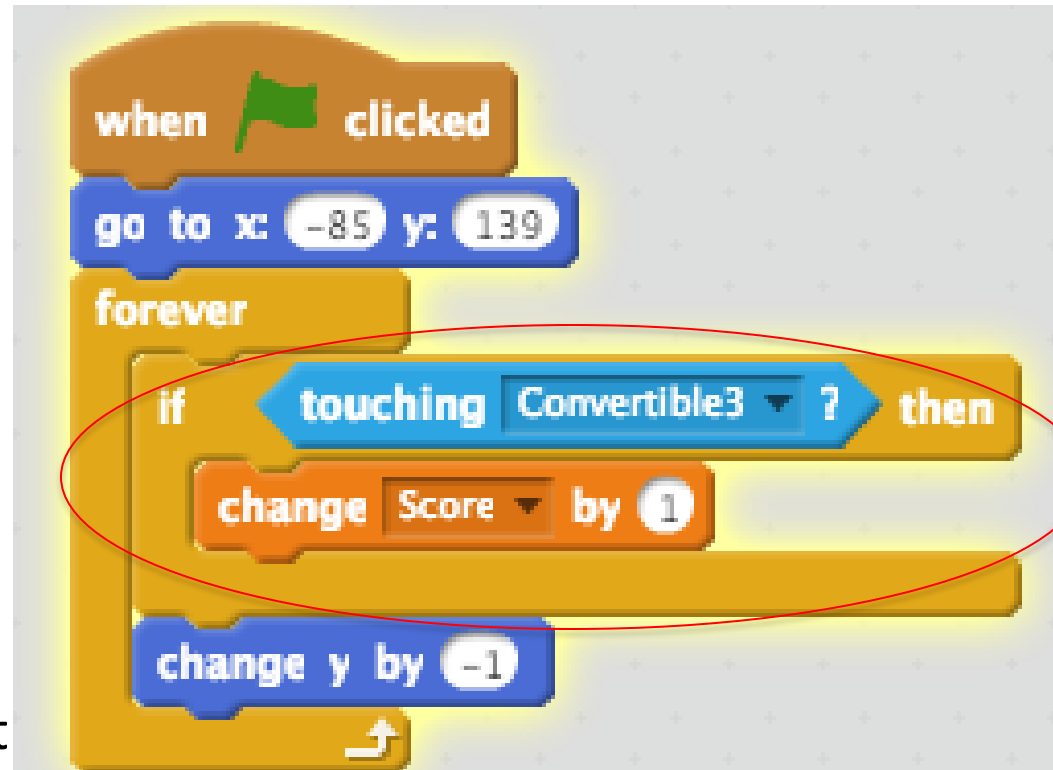
# Test the game out

- ## Not what you expected?

Computers only do what they are programmed to do.

You have not programmed it to stop adding the score every time the Woman touches the vehicle.

Let's do that next.

# Reset the Woman after scoring

- After scoring, program the Woman to move back to a random position at the top of the screen and continue falling.

- Drag out a Motion Block, "go to x: #, y #" and in the x position drop in the Operator Block "pick random 1 to 10"
  - Change the random 1 to 10 to -235 to 235

  - Change the y value to match the y in the first "go to x # y #"
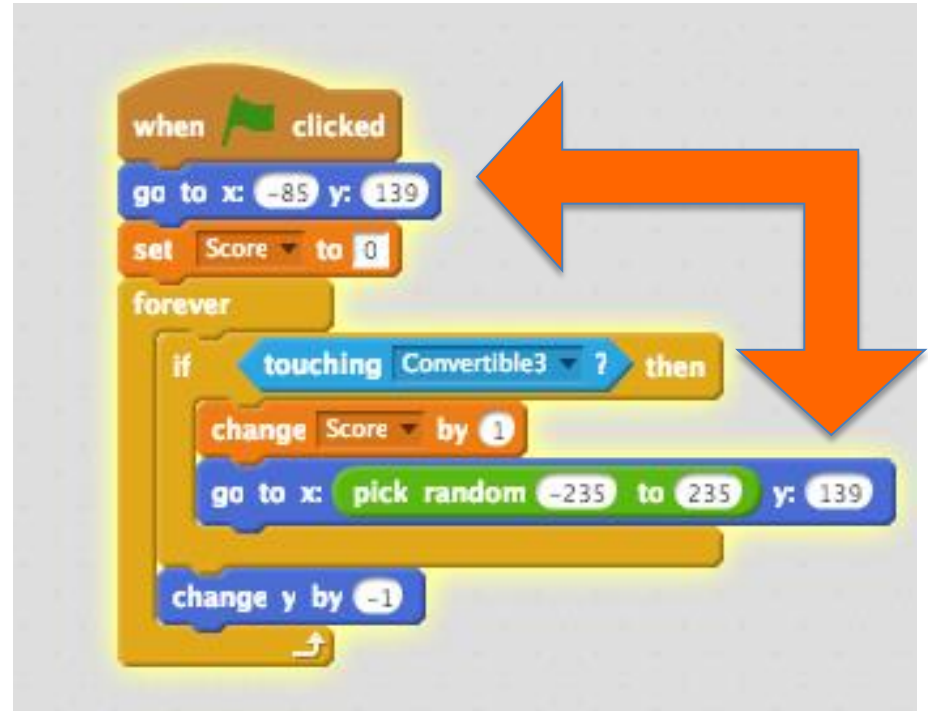
# Adding a Losing message

- If the car doesn't catch the Woman, she just gets stuck at the bottom of the screen.

- Let's tell the player that he or she lost by displaying a "You Lost" message.


- Click on the Paint New Sprite Button.
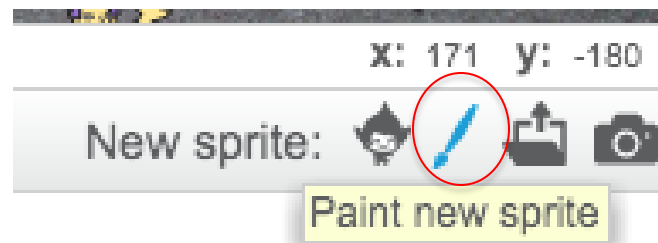
# Add a text sprite

– Click on the T for text

– Select the Font Style

– Pick the color

– Type You Lost!

– Modify the font size (First use the selection tool to select the text, then resize the box to enlarge the text)
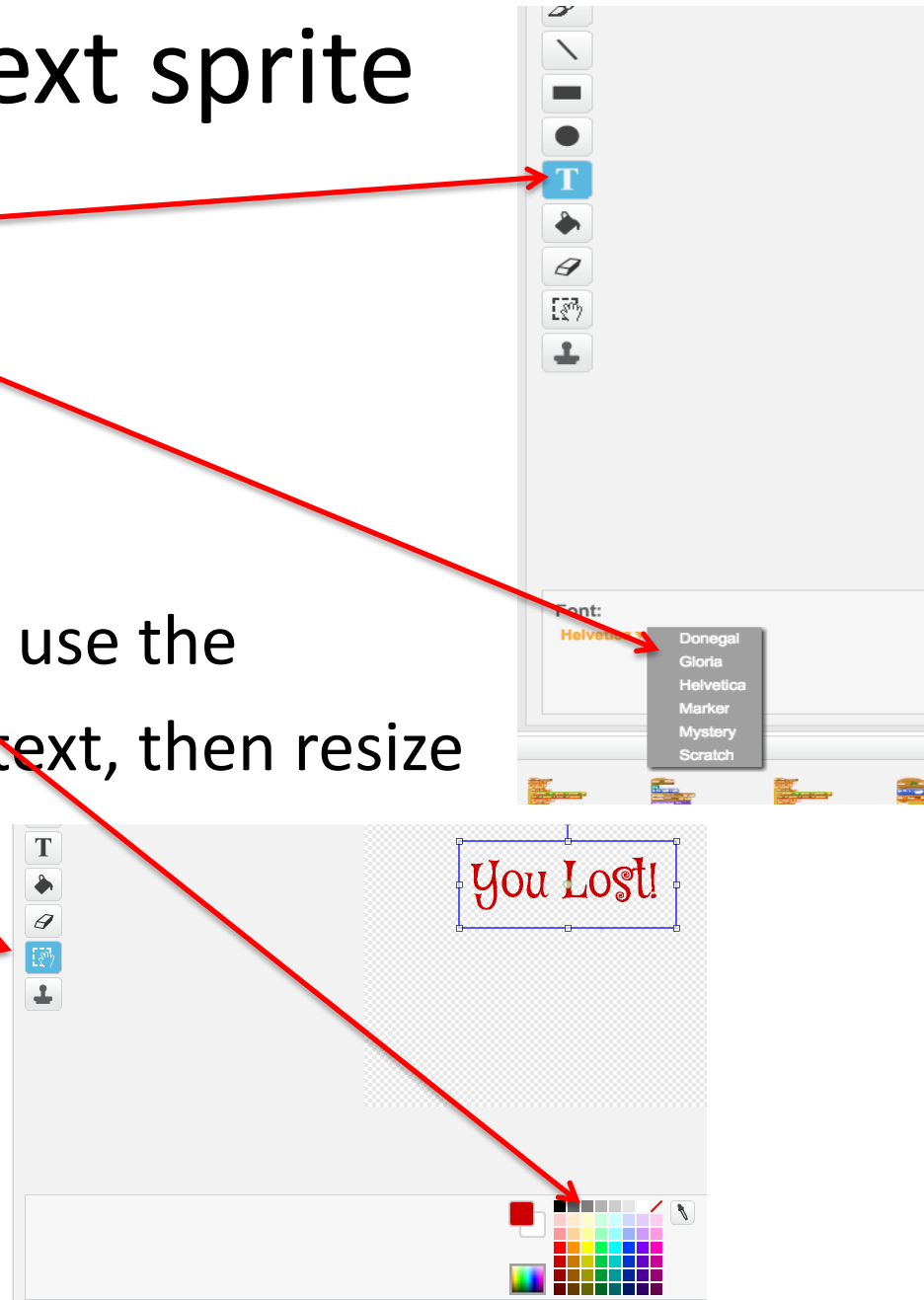
# Hide the sprite

- We don't want to tell the player that he/she lost when the game starts.

  - Click on the You Lost Sprite and add the following script:
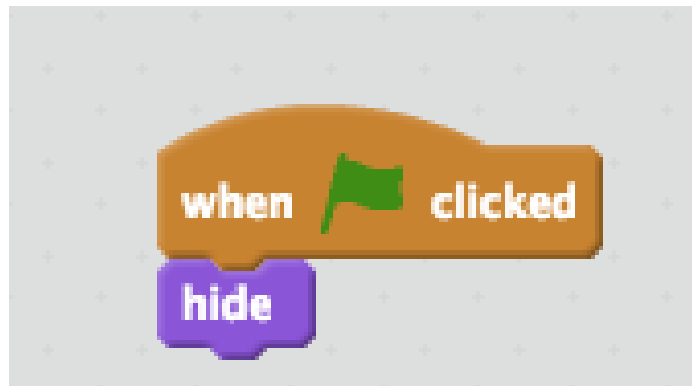
# Broadcast a message

- Sprites communicate by passing messages.  One sprite broadcasts the message and other sprites react to it when they receive it.
  - We need to create a message for when the game is lost so that the scripts will stop running.  Add this is the bottom of your Woman Waving Sprite:

# Receive Lost

Click on the Lost Game Sprite and add a script so that it will display the Lost Game Message when the game is over.

# Test your game

- Click the green flag

- If you want, adjust the speed of the ball
  - (Increase the amount it changes in y)

- Or modify the looks of the sprites using the "Costume" tab

# Other Ideas

- Add a sound when you lose
- Add a sound when you win
- Change the look of the falling sprite when it hits the ground
- Add the ability to win when you reach a certain score
  - Track the amount of time it takes to win
- Speed up the ball over time
- Add more sprites to catch
- Add a sprite to avoid