

T-SCRATCH-Level2 Workbook



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Chapter #1: Introduction to Scratch

Key Terms:

- **Scratch:** Animation based block coding language
- **Programmer:** Someone who programs a software
- **Computer programming:** Ways to tell a computer to do something for you
- **Software:** Program that can be run on a computer and creates an outcome
- **Animation:** Creating motion using a collection of photos placed one by one

Why Learn Programming?

So, let's start off with what coding is. Coding is a set of instructions which a computer can understand and execute. Coding is very imperative in programming because computers are like children; they are very obedient and liberal but they know very little, this makes it necessary that you know how to express yourself using terms that they understand and have the same mentality as them so that you are able to elaborate to them on how to efficiently accomplish a large task.

In this day and age, it is very important for students to learn coding as a foundational discipline like Science, Math, English, or History. This is because there are much more consumers of technology than developers.

Data from the Bureau of Labor Statistics shows that over the next 10 years, it is estimated that there will be 1.4 million jobs in computer science with only 400,000 graduates qualified to do them. The Week of Code is an initiative which seeks to unveil the mystery surrounding coding and show students and adults that anyone could learn the basics of coding.

Coding is also important in the classroom because it requires many skills such as computational thinking, analysis of problems, developing understanding, creating algorithms, managing resources, verification of requirements, and implementation of ideas.

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Since technology is very useful, handy, and flexible, learning coding can benefit you because you can become skilled with technology and use it to teach yourself concepts relating to your classes such as a vocabulary game.

With Scratch, you can program your own interactive stories, games, and animations — and share your creations with others in the online community.

You can play the video game created by You isn't that cool!

Scratch helps young people learn to think creatively, reason systematically, and work collaboratively — essential skills for life in the 21st century.

What Are Animations?

A simulation of movement created by displaying a series of pictures, or frames. Cartoons on television is one example of animation. Animation on computers is one of the chief ingredients of multimedia presentations. There are many software applications that enable you to create animations that you can display on a computer monitor.

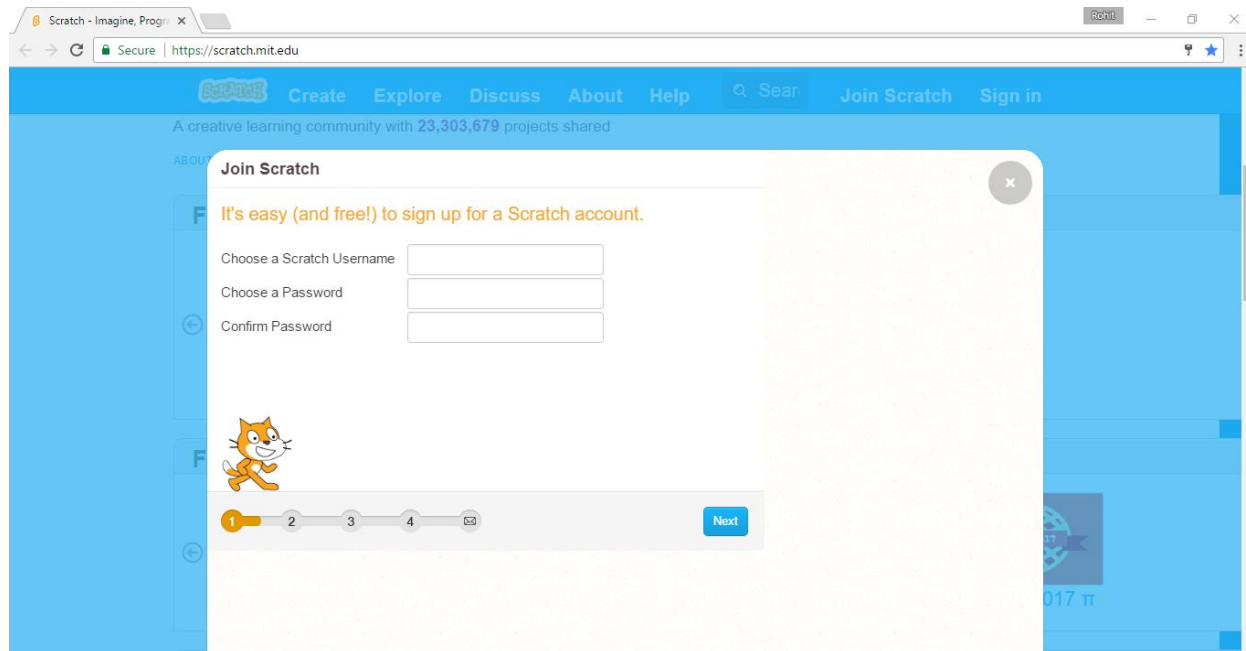
Note the difference between animation and video. Whereas video takes continuous motion and breaks it up into discrete frames, animation starts with independent pictures and puts them together to form the illusion of continuous motion.

How to Create an Account on Scratch:

1. Go to www.scratch.mit.edu

2. Click Join Scratch

Your screen should look like this



3. For your username, pick something you will remember that is NOT your name. In addition, choose a password. Note down your username and password in some place where you won't lose it.



4. Your screen should now look like this. Answer the questions.

Scratch - Imagine, Program, Share X

Secure | <https://scratch.mit.edu>

Create Explore Discuss About Help Search Join Scratch Sign in

A creative learning community with 23,303,679 projects shared

ABOUT

Join Scratch


Your responses to these questions will be kept private.

Why do we ask for this info?

Birth Month and Year - Month - - Year -

Gender ☐ Male ☐ Female

Country - Country -



1 2 3 4

Next

5. Your screen should look like this now:

Scratch - Imagine, Program, Share X

Secure | <https://scratch.mit.edu>

Create Explore Discuss About Help Search Join Scratch Sign in

Featured Projects


Join Scratch

Enter your email address and we will send you an email to confirm your account.

Email address

Confirm email address

☐ Receive updates from the Scratch Team



1 2 3 4

Next

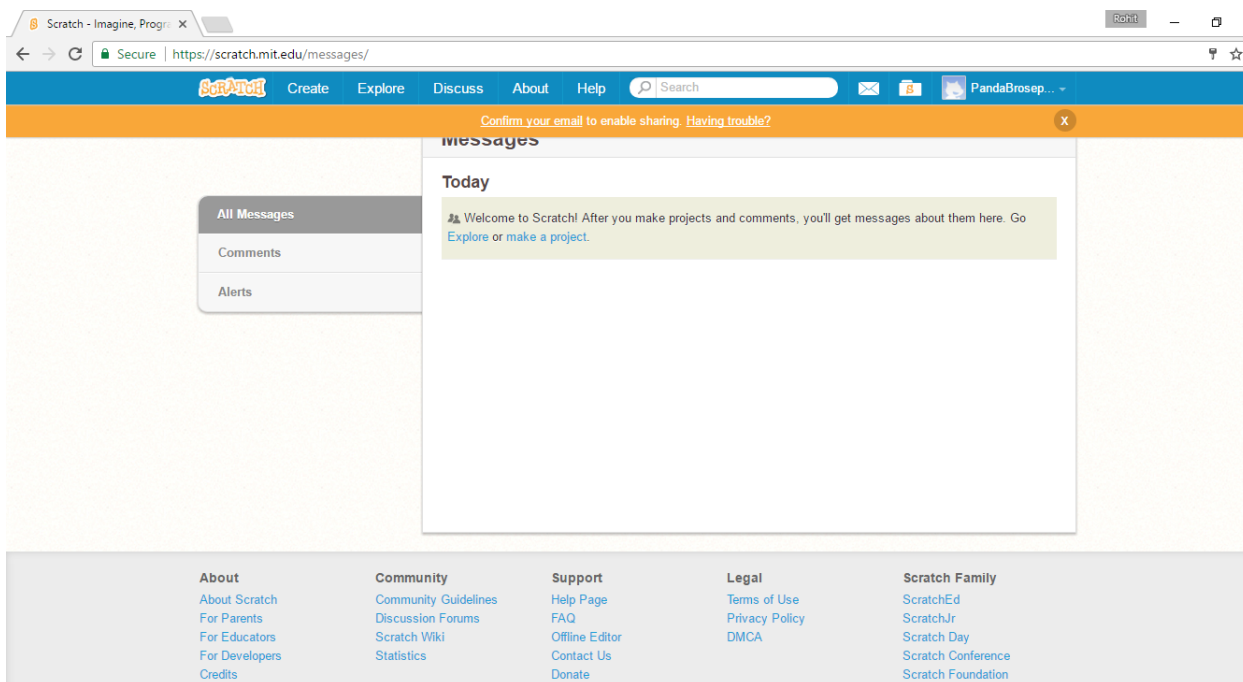
Fill it out with a parent's email

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6. Now click “ok go” and go to the mail button. Screen should look like this:



7. Have your parent confirm Scratch by checking their email.

8. Now, your teacher will have you join the CT STEM Kids Club Studio.



Name_____ Date_____

Homework: Introduction to Scratch

1. Briefly explain what Scratch is:

2. What are 5 things you would like to make in this class?

3. When it comes to making a username and password, what should you never do?

- a. Use your name as the username
- b. Tell your friends your password
- c. All of the above
- d. None of the above

4. Unscramble and Define (extra credit)

- a. TCHSRCA
- b. CMPTUERO

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Chapter #2: Fibonacci Series

Key Terms:

- **Blocks:** Where commands are stored.
- **Command:** Something that is told to be done
- **Keyword:** A word that allows to execute a command
- **Sprite:** An image that can be controlled by code
- **Backdrop:** The scenery of your project
- **Script:** Set of instructions to be executed

Objective:

The objective of this game is to make a Fibonacci Series. A Fibonacci Series game replicates *Math Fibonacci Series* function. They are a series of *Fibonacci Numbers* which make the sum of the 2 previous numbers. For example, 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, are first few numbers of this series.

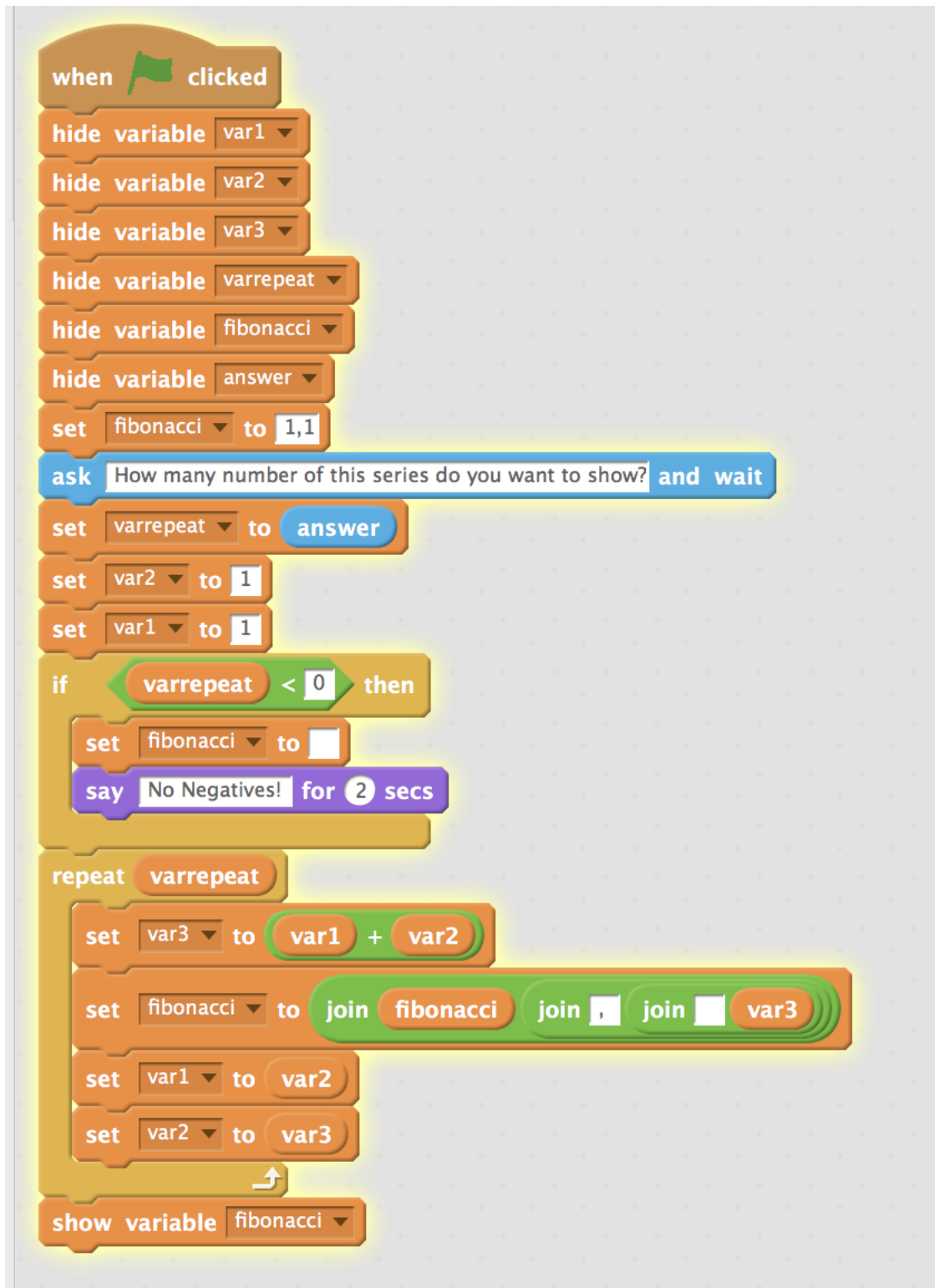
It was named after Leonardo Pisano, who was born in Italy.

Steps to do the projects:

1. To get started, go to scratch.mit.edu and start a new project.
2. Next you can either keep the cat or replace it with a new sprite. Please do the same thing with the backdrop.
3. Given below is the code for your sprite. It will tell you what to do with the variables and how to make the Fibonacci series.
 - a. This code tells the game to hide the following variables:
Var1, Var2, Var3, Varrepeat, fibonacci, answer
 - b. Ask - "Howmany number of this series do you want to show?"
 - c. If the number they pick is a negative number, then show an error and blank fibonacci series.
 - d. Repeat the process of creating the fibonacci number based on users' pick.
 - e. Show fibonacci series



Hint: In the code “*set varrepeat to answer*”, please make sure it is the blue “*answer*” and not the one in data.



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Name_____ Date_____

Homework: Fibonacci Series

1. Describe how you made the Fibonacci Series game.

2. Who created the Fibonacci Series and where was he born?

3. What will be the 5th, 10th and 15th number of Fibonacci Series? First calculate yourself and then verify your result via program



4. Alter the Fibonacci Series game program so that it also has negative values and it can produce the following series:

-21, 13, -8, 5, -3, 2, -1, 1, 0, 1, 1, 2, 3, 5, 8, 13, 21

5. Describe how you fixed the code.

Chapter #3: Penalty shootout

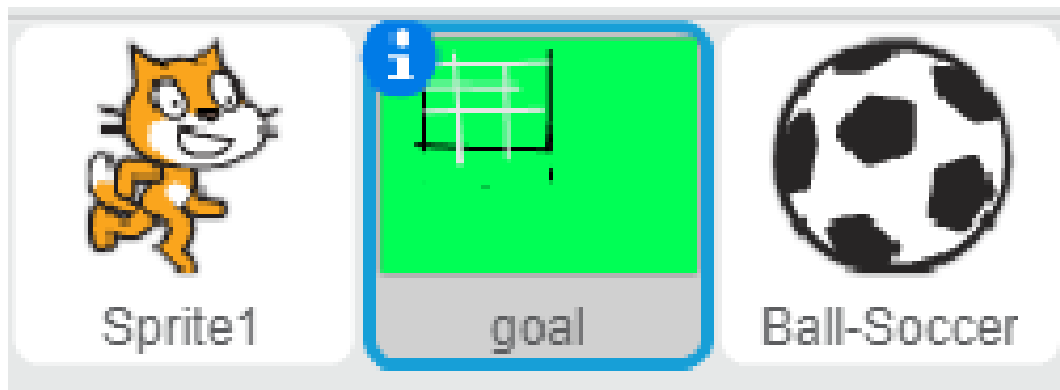
Key Terms:

- **Blocks:** Where commands are stored.
- **Command:** Something that is told to be done
- **Keyword:** A word that allows to execute a command
- **Sprite:** An image that can be controlled by code
- **Backdrop:** The scenery of your project
- **Script:** Set of instructions to be executed

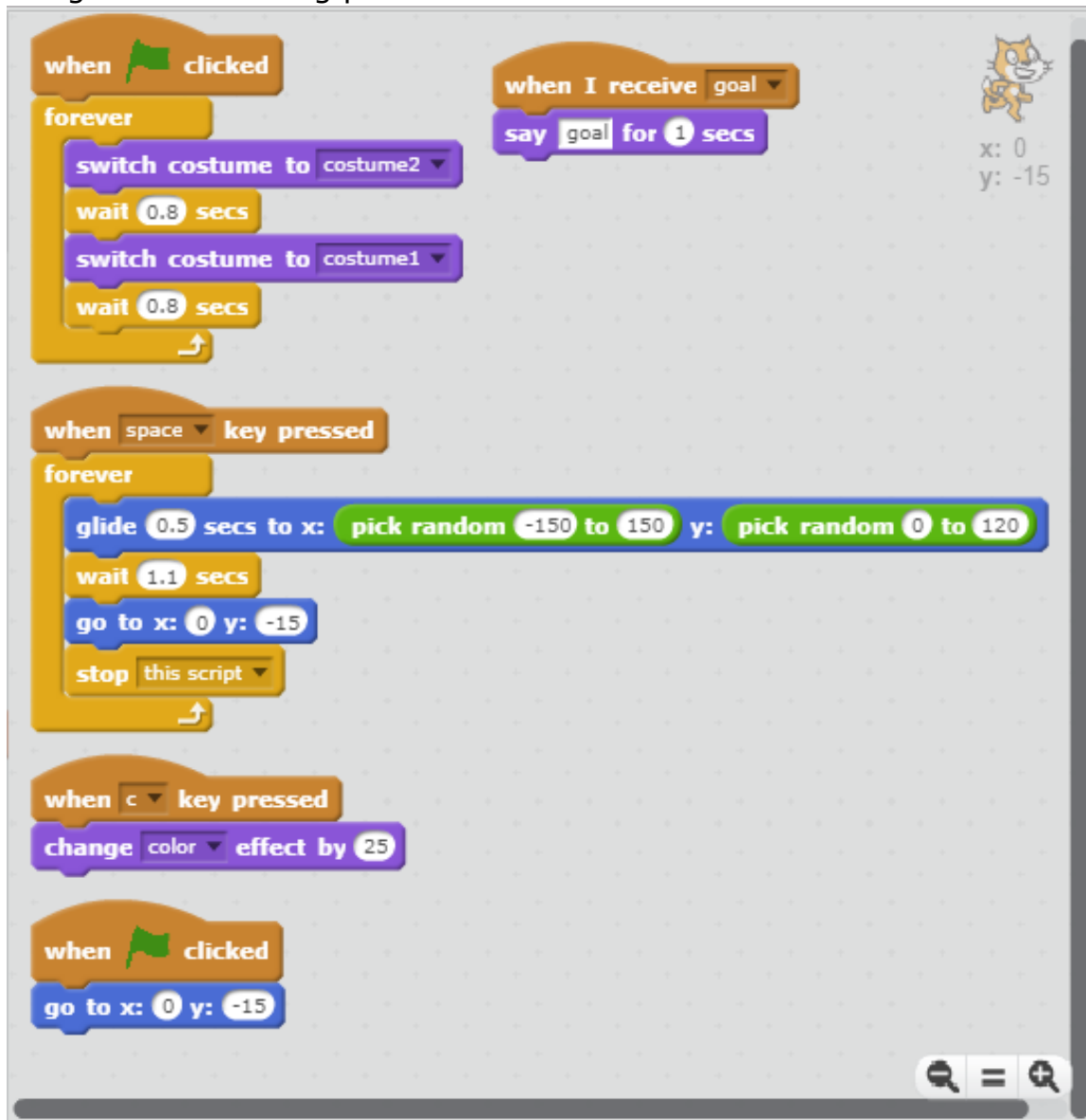
Objective:

The objective of this game is to make a penalty shootout. A penalty shootout is where you have a soccer ball and a goalkeeper, and you are trying to control the ball to score a goal while the goalkeeper is blocking you.

1. To get started, go to scratch.mit.edu and start a new project.
2. Keep the cat sprite or you may make your own sprite. Then create the other 2 sprites, goal and soccer ball.



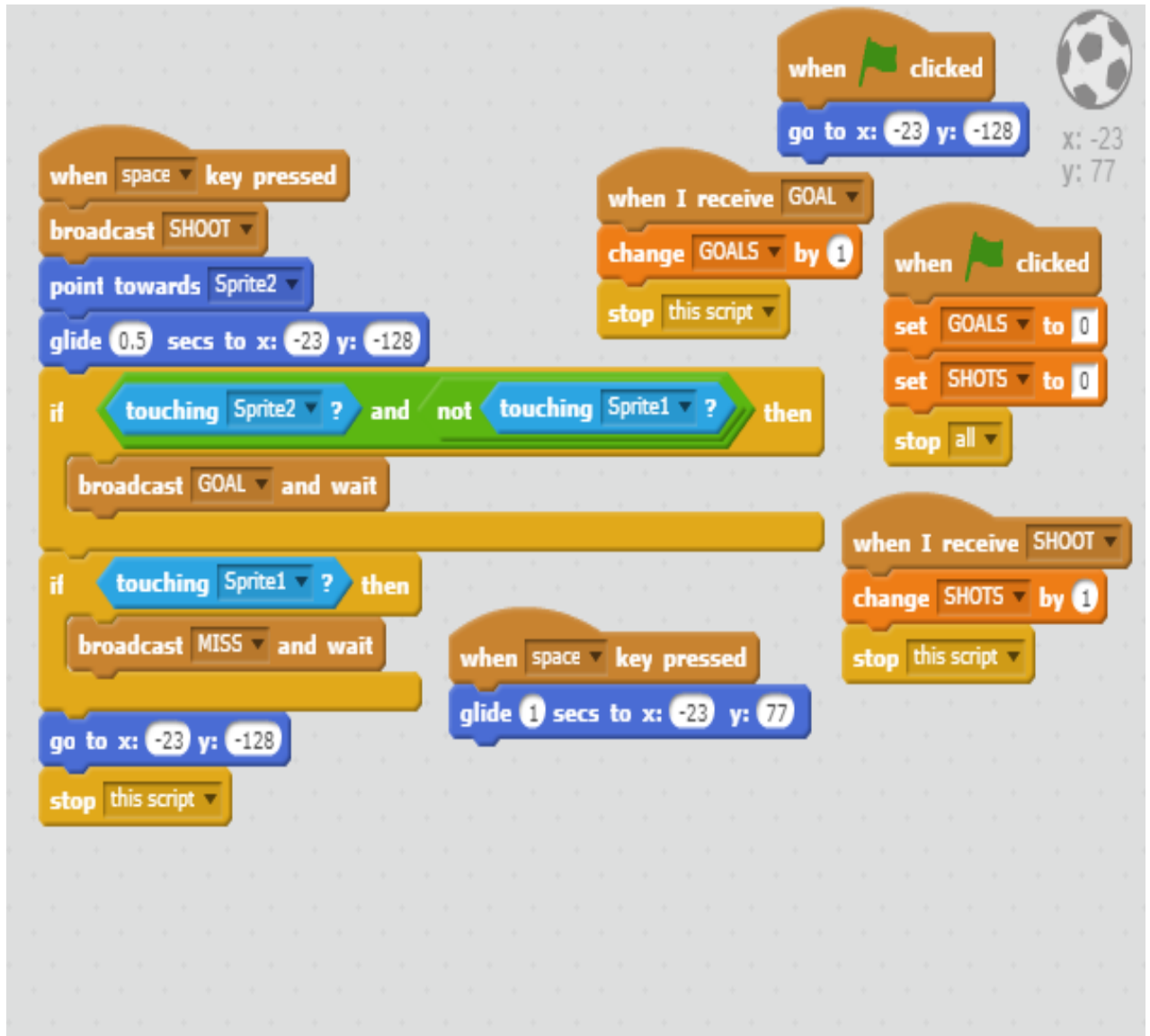
3. The following code is for the cat (Sprite 1 or the sprite you created) sprite. Since he is the goalie, he has lots of functionality (code). The following code explains how he is going to dive and change color. He will change color if you click "C". When you click on the green flag, he will go to the starting position.



4. The following code is for the goal sprite. When the green flag is clicked, the goal sprite goes to its starting position. If the goal sprite is touching the soccer ball, then it will broadcast "goal".



5. The following code is for the soccer ball sprite. This code is a most complex code in the game. It will explain how the sprite moves its x-position, y-position, goals and shots. Sprite1 is the cat or whatever you chose and sprite 2 is the goal.





Name _____ Date _____

Homework: Penalty shootout

1. Briefly explain how you made the penalty shootout game:

2. What is a penalty shootout?

3. What sport does the penalty shoot-out come from and why do they do a penalty shoot-out?



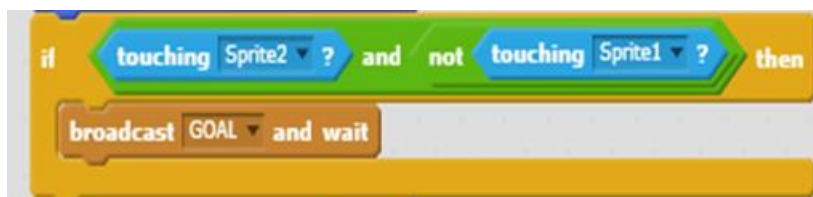
4. What does the following code mean (In other words, what the following code does in the game):

a. "When C key pressed change color effect by 25"



b.

c. "When space key pressed, glide 1 secs to x:-23 y:77 "



d.

Chapter #4: The Interview

Key Terms:

- **Blocks:** Where commands are stored.
- **Command:** Something that is told to be done
- **Keyword:** A word that allows to execute a command
- **Sprite:** An image that can be controlled by code
- **Backdrop:** The scenery of your project
- **Script:** Set of instructions to be executed

Objective:

In this game your goal is to make an interview. An interview is when a host or hostess asks questions to a guest and the guest answers them.

Steps to do the projects:

1. To get started, go to scratch.mit.edu and start a new project.
2. First, make the sprites, keep the cat. They are from the sprite library and this is how they look like:



Sam

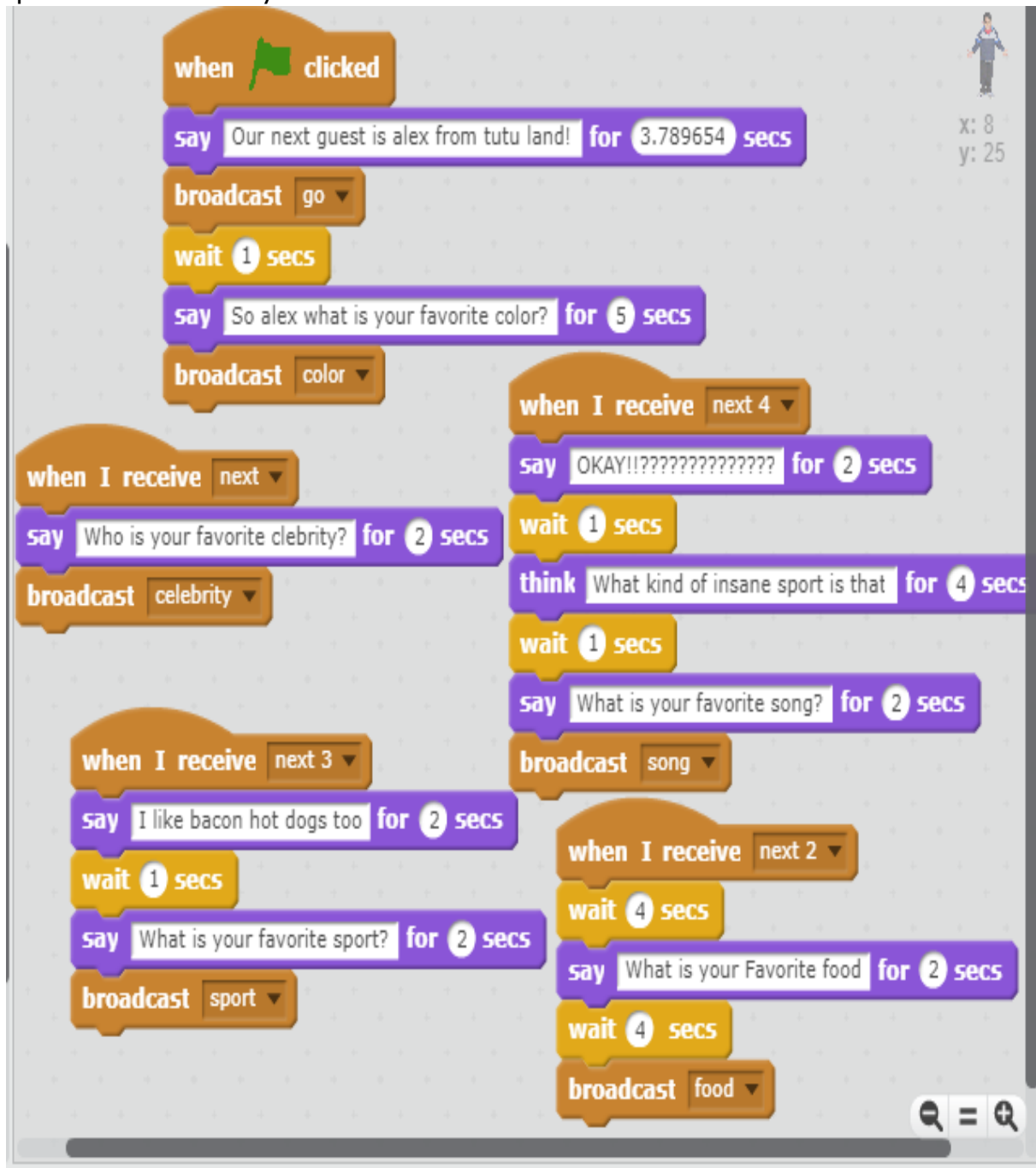
And



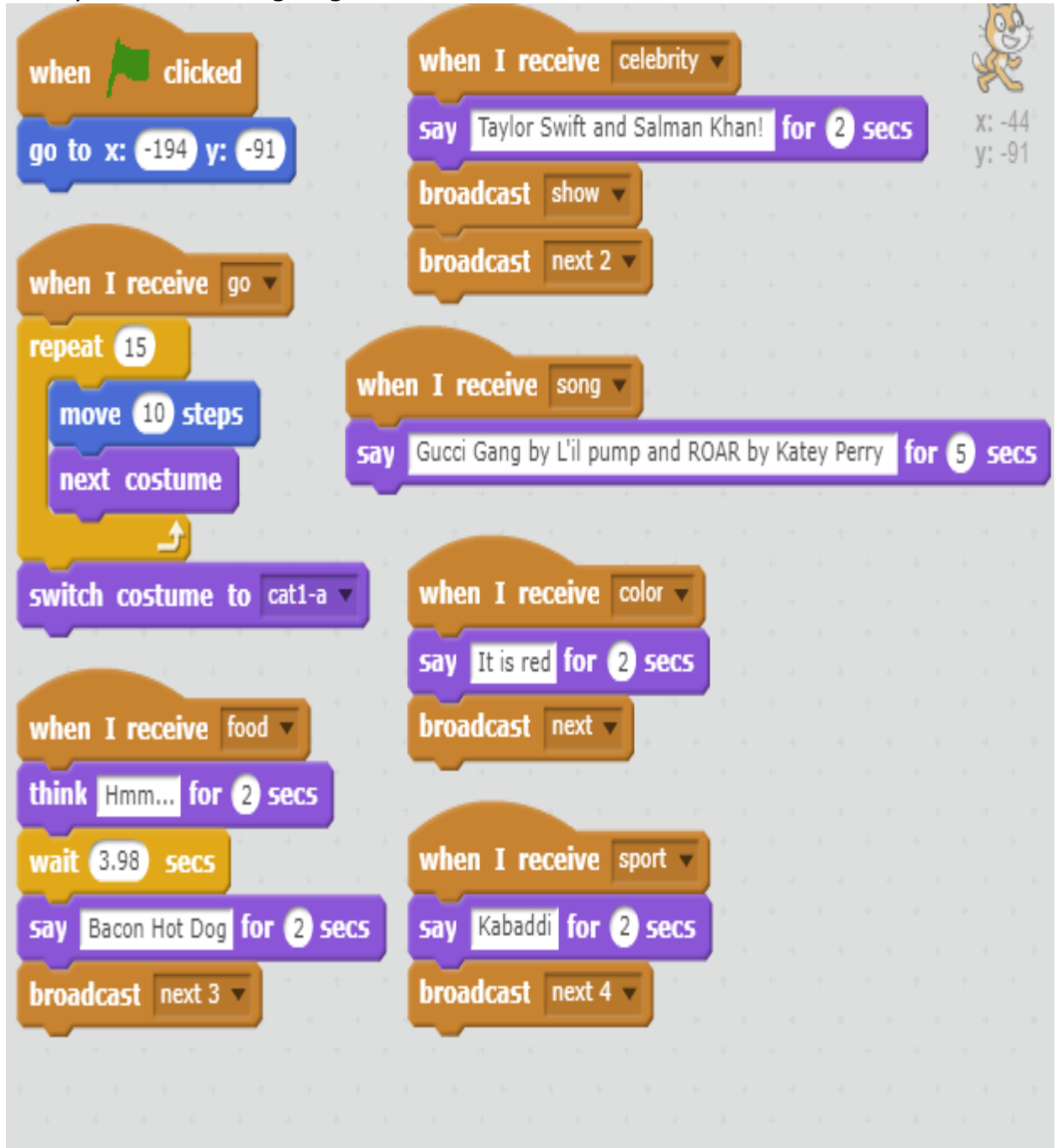
Microphone Stand

3. Given below is the code for the "Sam" sprite. Repeat the similar code for everybody. It explains all the questions. You may change the

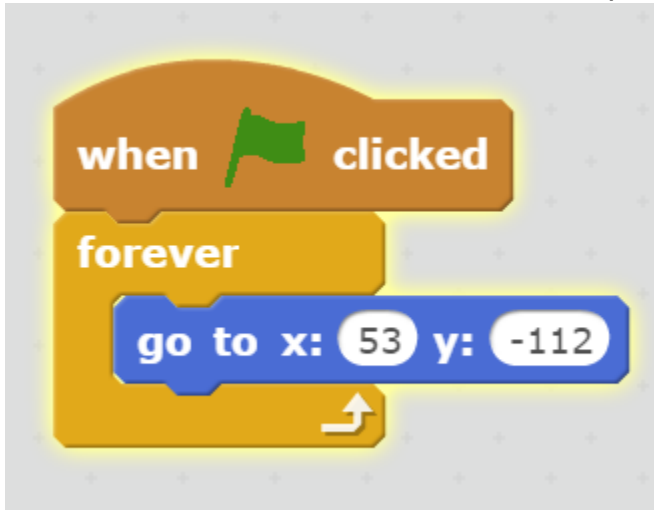
questions to what you like.



4. Given below is the code for the sprite cat. It explains what it is going to say and how it's going to move:



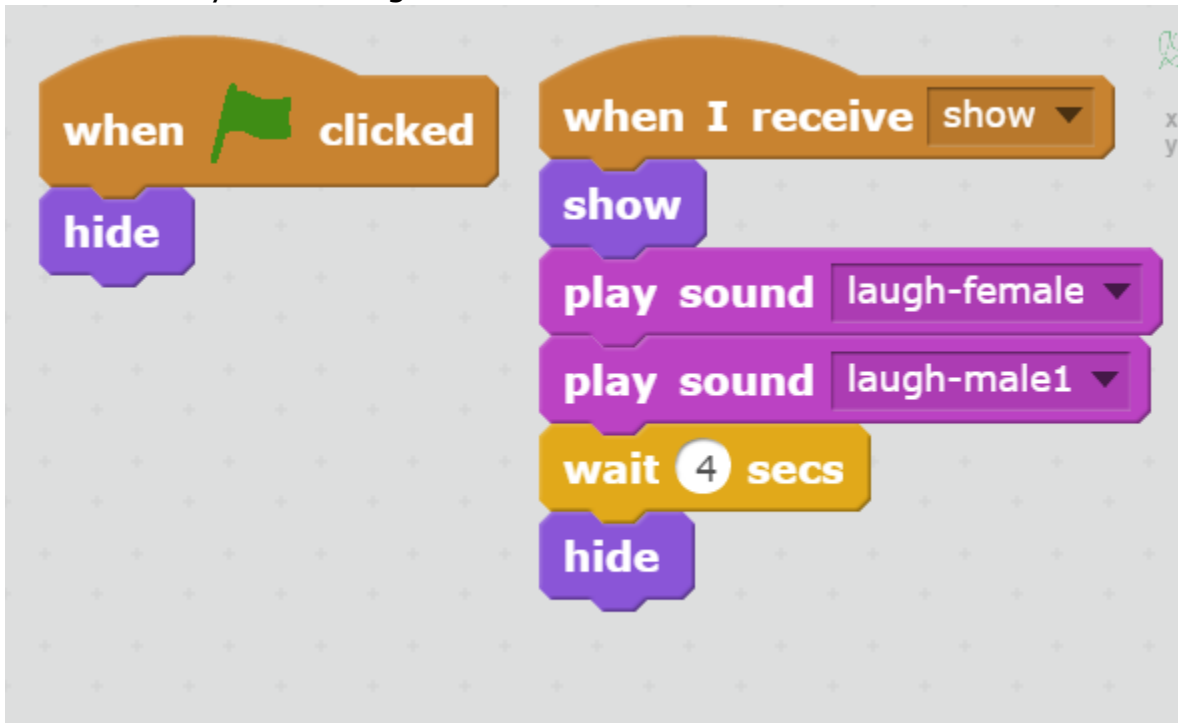
5. Given below is the code for the microphone stand.



6. Now, Make a sprite in which Sam gets REALLY surprised, it looks like this:



7. Name it crazy face and given below is the code for this:







Name _____ Date _____

Homework: The Interview

1. Explain how you made the game The Interview?

2. Think of an interesting question that can be added to this game.

3. Make a game that puts all your favorites when you are asked the questions.

Chapter #5: Pong Game

Key Terms:

- Blocks: Where commands are stored
- Command: Something that is told to be done
- Keyword: A word that allows you to execute a command.
- Sprite: An image that can be controlled through code.
- Background: The scenery of your project.
- Script: Set of instructions to be executed.

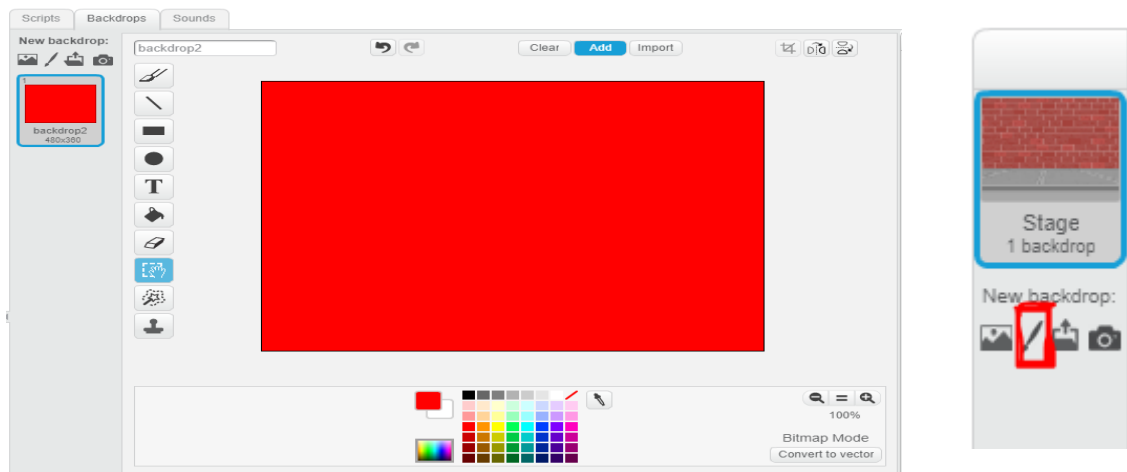
Objective:

In this chapter, students will learn how to create a pong game. Pong is famous for being the first ever video game in history. To get started, they should log into their account at scratch.mit.edu and create a new project. Once they are done with their project, they should add it to the CT Stem Studio.

Your goal is to accomplish a game, where there are two blocks, which try to block a moving ball from hitting their walls. If the ball hits your wall, then the other person gets a point.

How to build the Pong game:

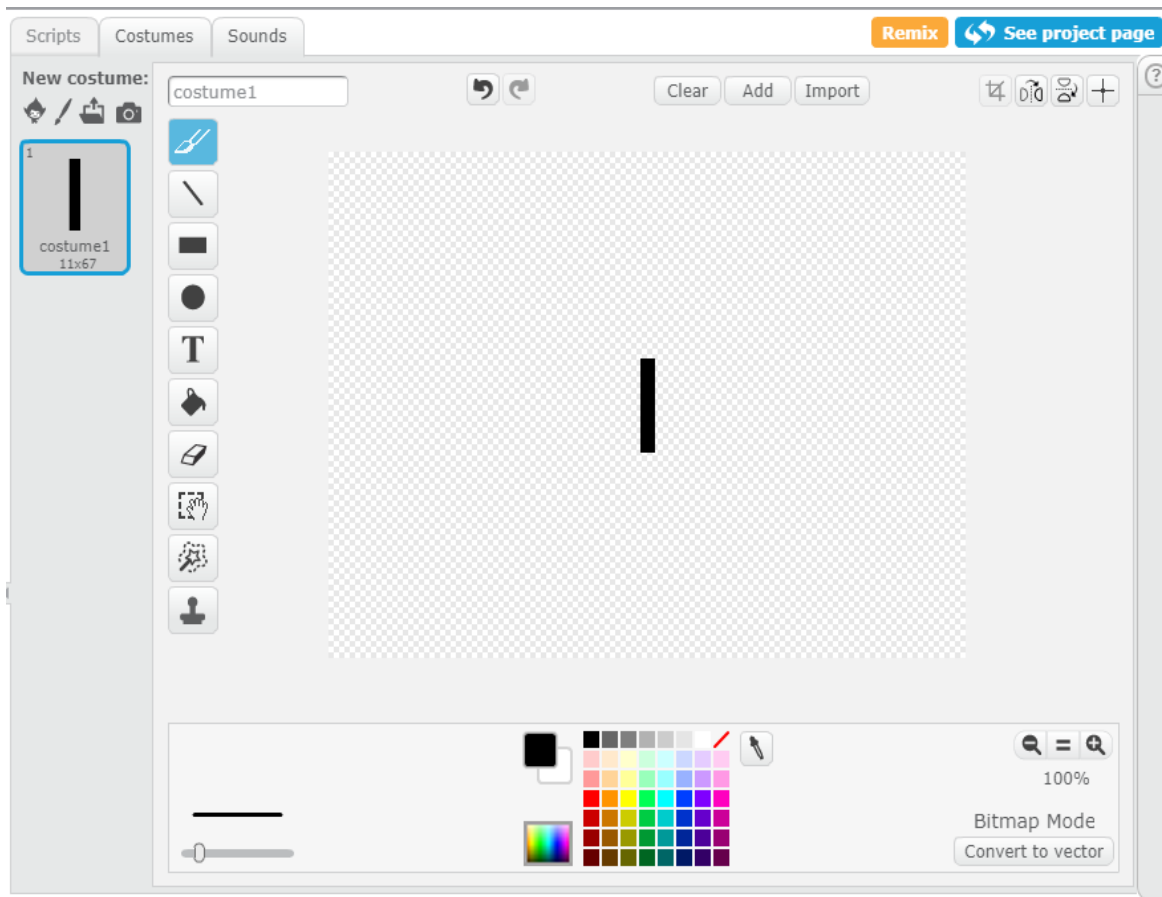
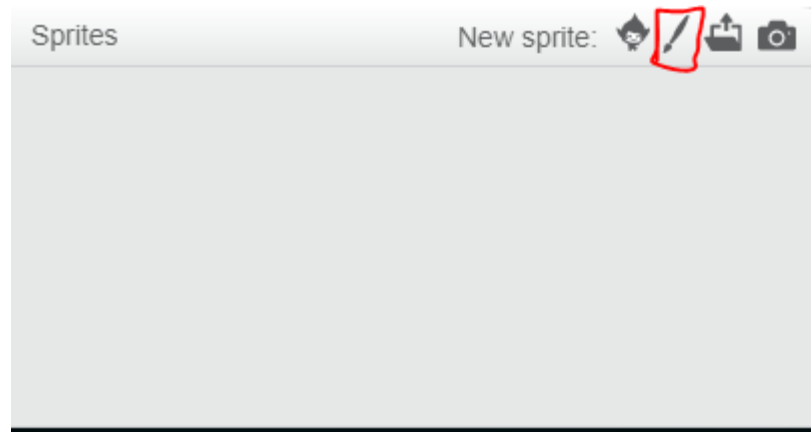
1. First, students must decide the background. They can either keep it as white, or make a new one in the Backdrop section.



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2. Next, they should make sprites. Two of the sprites are the blocks that will hit the balls. So, they should go to the new sprite section, and click the pen. Then, they should make a block and duplicate it.

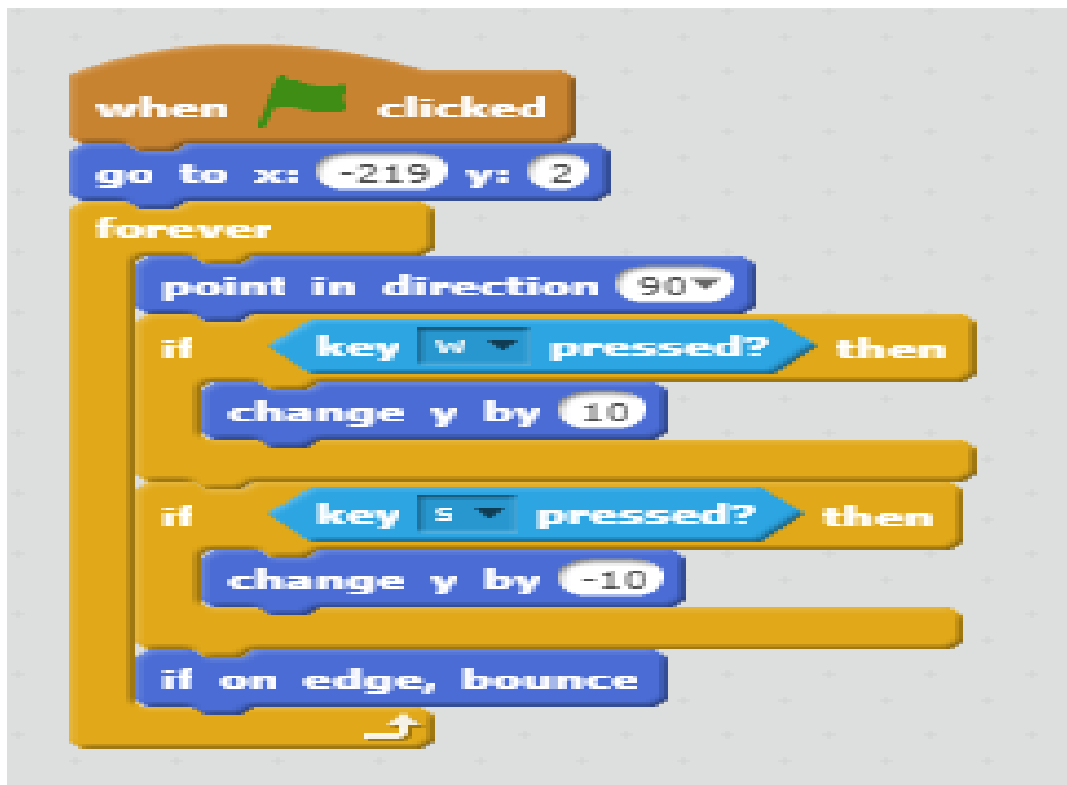


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3. After this, students should write the function for the blocks.

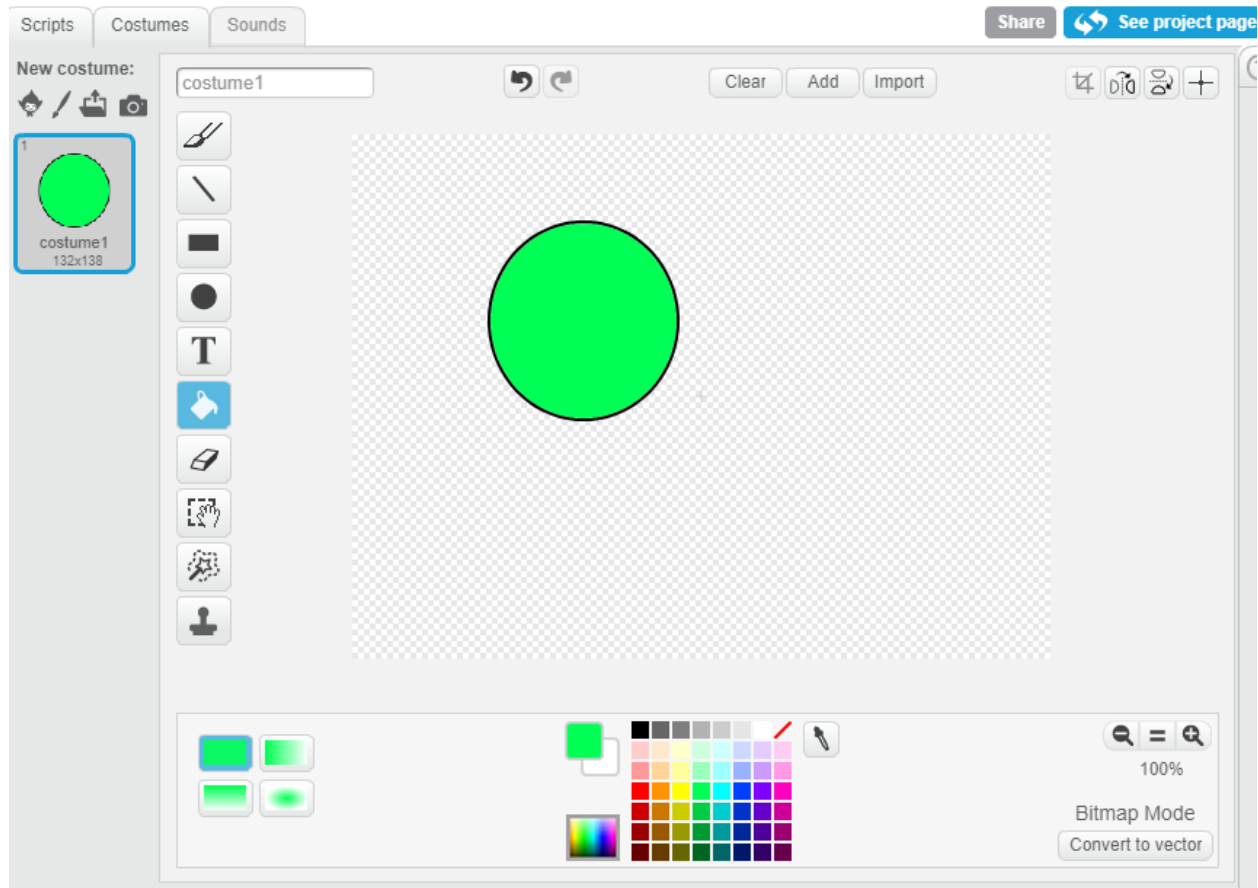
The block moves based on the key the user presses. It starts off in a certain place. When you click w and s (or up and down) the block goes up and down respectively. Then, you should duplicate this block and switch w and s for up and down.



4. Next, you have to make the ball.

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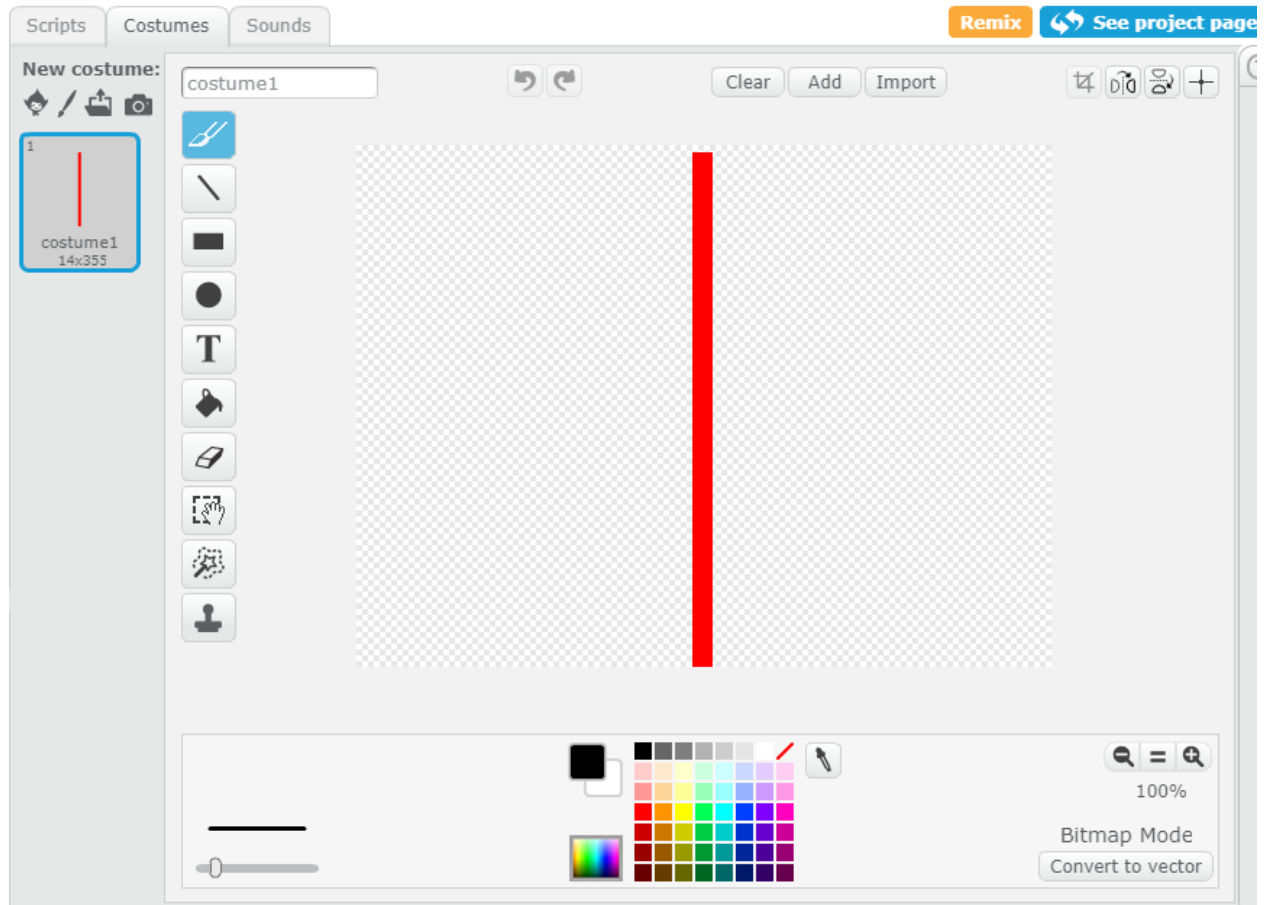
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5. Then, you make the functions for the ball:

This ball is always moving. If it hits the wall, the opposite player will receive one point. If it gets blocked nothing happens. Either way, it bounces off afterwards.



6. Finally, you have to make the wall for points.

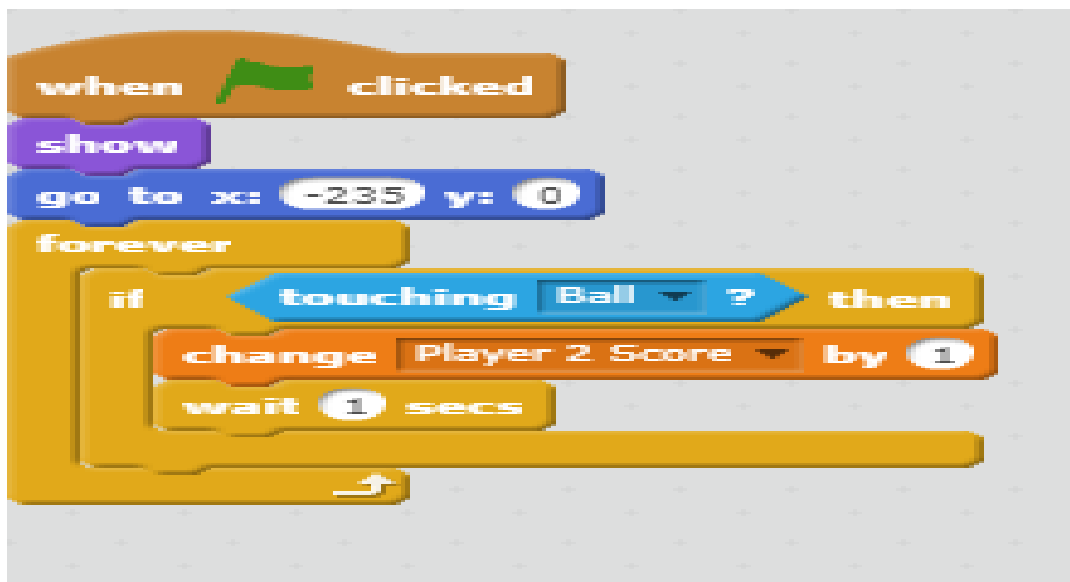




7. Next, make the code.

This point wall is a tracker. When the ball touches it, it adds one point to the opposite team. Duplicate this wall to the other side and change the code so that the opposite team gets the points.

Once you are satisfied with their project, they should add it to the CT Stem Studio.





Name _____ Date _____

Homework: Pong

1. Briefly explain the process of making Pong:

2. Connect the keywords with their definition.

Command A word that allows you to execute a command.

Sprite The scenery of your project.

Blocks Set of instructions to be executed.

Background An image that can be controlled through code.

Keyword The scenery of your project.

Script Something that is told to be done.



3. For your final assignment, you have to look up the history of this game.
When was Pong game made first? Who created it? Why is it so special?

Chapter #6: Snake Game

Key Terms:

- Blocks: Where commands are stored
- Command: Something that is told to be done
- Keyword: A word that allows you to execute a command.
- Sprite: An image that can be controlled through code.
- Background: The scenery of your project.
- Script: Set of instructions to be executed.

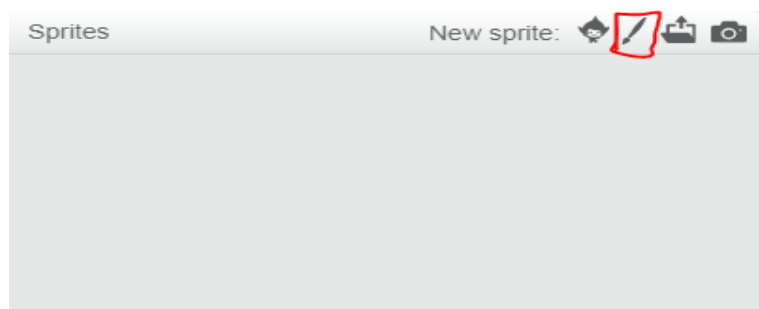
Objective:

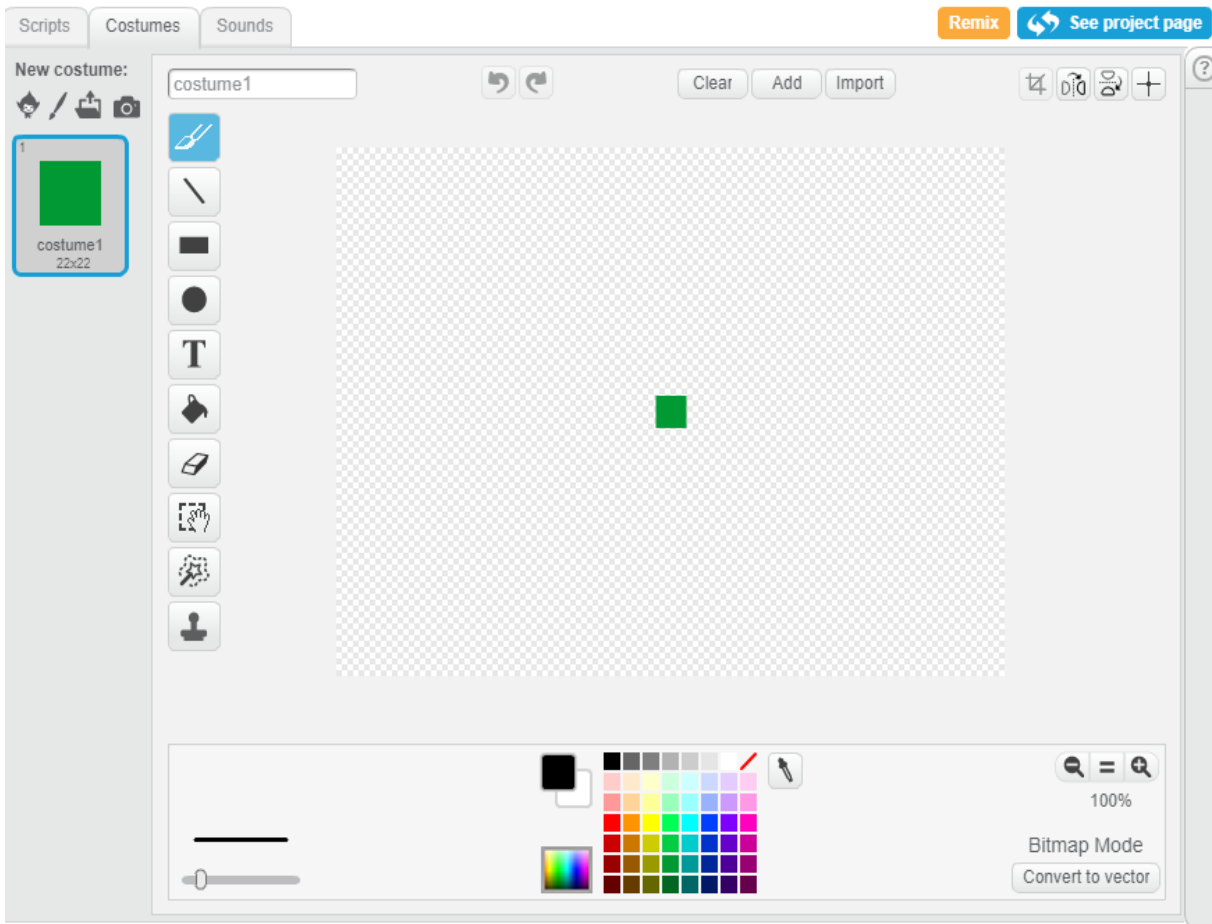
In this chapter, students will learn how to create the game. Snake is a famous video game which was default installed into some older cell phone brands. To get started, they should log into their account at scratch.mit.edu and create a new project. Once they are done with their project, they should add it to the CT Stem Studio.

Your goal is to accomplish a game, where a snake chases an apple around a stadium and if it touches the wall, it dies.

How to make Snake game:

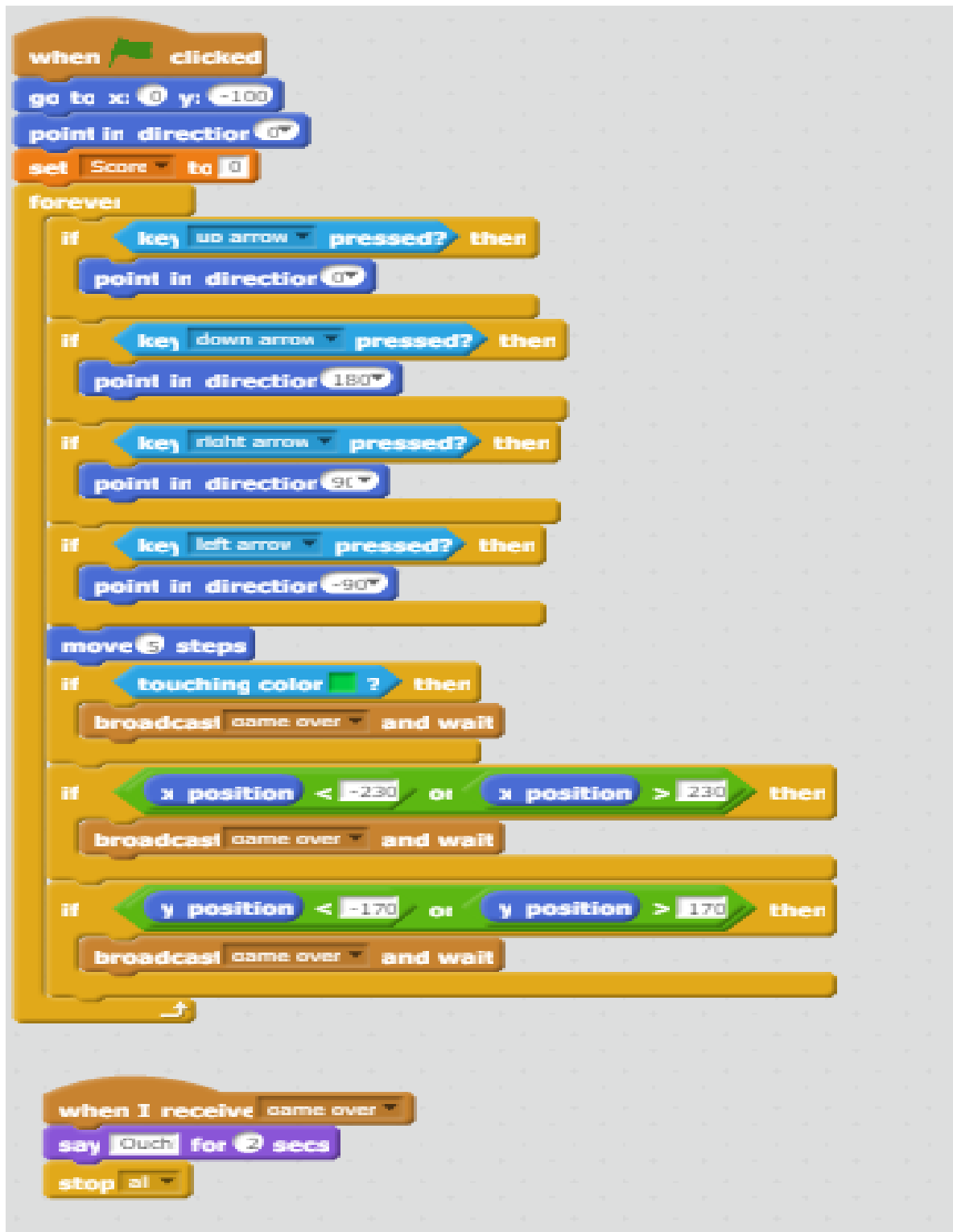
1. First, students must decide the background. We will keep it as a blank white screen.
2. Next, they should make sprites. The first sprite is the head of the tail. So, they should go to the new sprite section, and click the pen. Then, they should make a block and duplicate it.



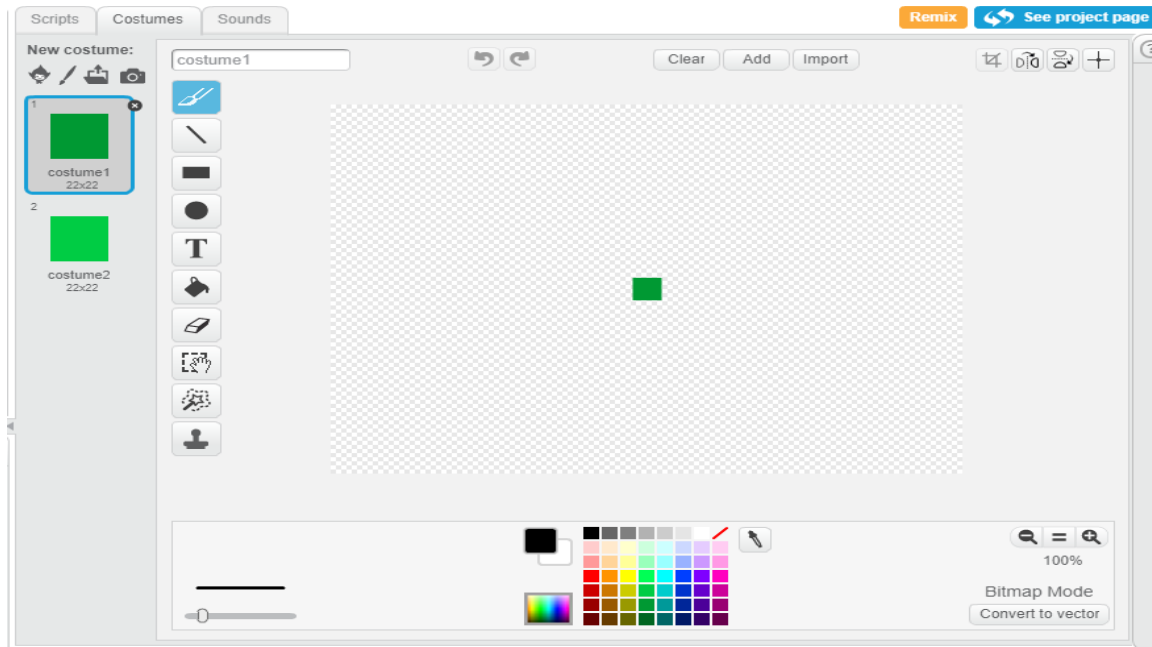


3. After this, students should write the function for the blocks.

The head moves based on the key the user presses. It starts off in a certain place. When you up, left, right and down the block goes up, left, right and down respectively. Then, you should set the settings so that when the x coordinate is less than what is occupied by the wall, the player dies. duplicate this block and switch w and s for up and down. Next, you have to make the ball. Also, make the setting so that when it touches anything for the color green, you die as well.



4. Next, you make the body of the snake.

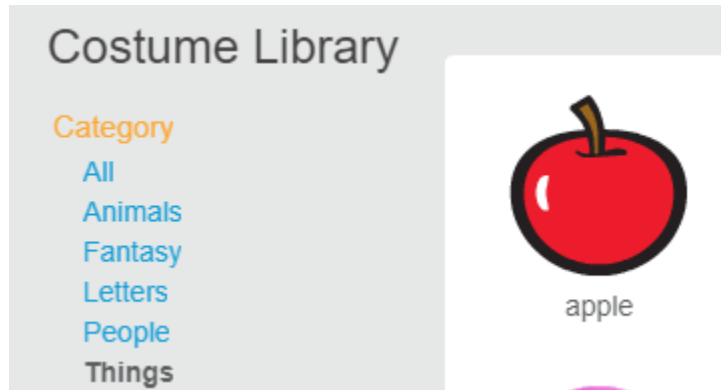


5. Then, you make the functions for the body:

The body is always going to it's head, and it creates a clone of itself, changes the costume. Then depending on the score, it changes it's costume.



6. Finally, you have to make the apple.



7. Next, make the code.

This apple is constantly moving. So, whenever it touches the snake, the score increases and it randomly moves to a new spot.



8. Once you are satisfied with their project, they should add it to the CT Stem Studio.



Name _____ Date _____

Homework: Snake

1. Briefly explain the process of making Snake:

2. 2. Connect the keywords with their definition.

Command A word that allows you to execute a command.

Sprite The scenery of your project.

Blocks Set of instructions to be executed.

Background An image that can be controlled through code.

Keyword The scenery of your project.

Script Something that is told to be done.





Chapter #7: Maze Game

Key terms:

- Script: Set of instructions to be followed.
- Command: Something that is put in a script that is told to be done.
- Sprite: A character that is controlled by a script
- Backdrop: The setting or background the character is in.
- Keyword: A word that is used to execute a command.

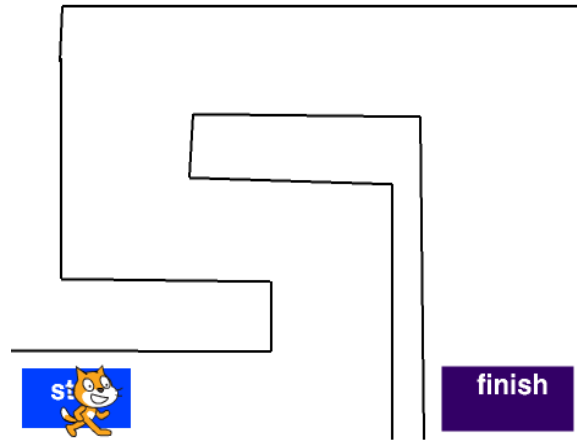
Objective:

In this chapter, students will learn how to create a simple maze. The Goal is to accomplish a game where you have a sprite that is able to move with the touch of a button on your keyboard. If the sprite touches the outline of the maze the sprite is sent back to start.

How to build a maze:

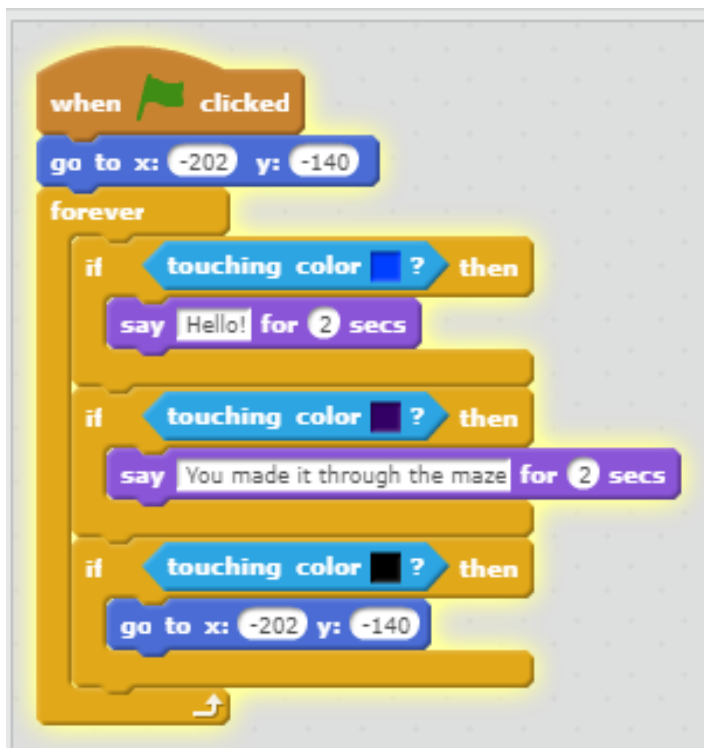
1. To begin they should log onto scratch.mit.edu. After they have signed in or logged in they should click create so they can create the maze when they have finished the code they should add it to the CT stem studio.
2. First students must create their backdrop. All they have to do is create a maze backdrop like a maze you do on paper. Make the lines of the maze a dark color preferably black so that if touched it's pretty obvious. Then you have to create a start and finish. Make sure the start and finish are both colors that are nowhere else on the screen or else the code won't work. To create a backdrop click the small paintbrush on the bottom left side on the screen.



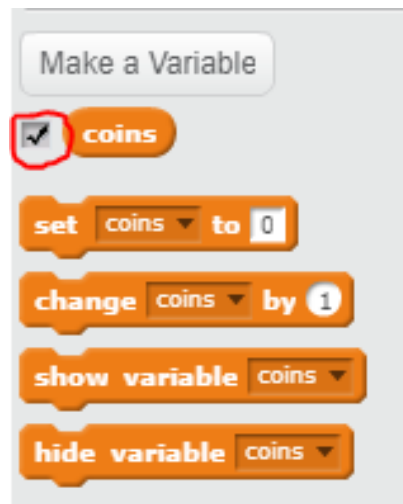


3. You may keep the Cat sprite or change it to something else.
4. Next you have to create the sprites. The first sprite you have to make is the sprite that is going to be moving through the maze. You can take a sprite from the library or create your own. Then you have to code this sprite to move up, down, left, and right. When I started the project I had this sprite so I just shrunk it down you can change this sprite if needed.

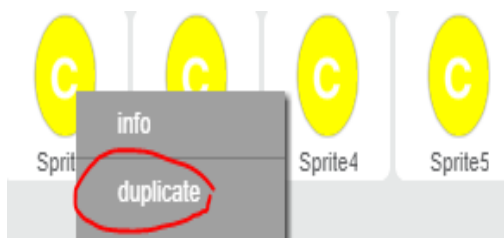


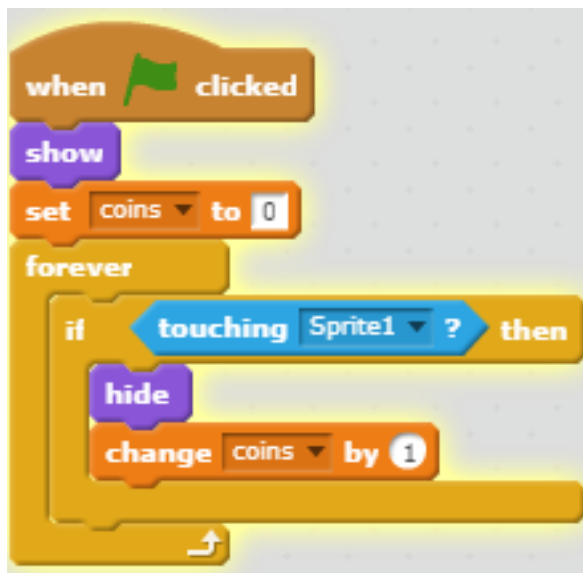
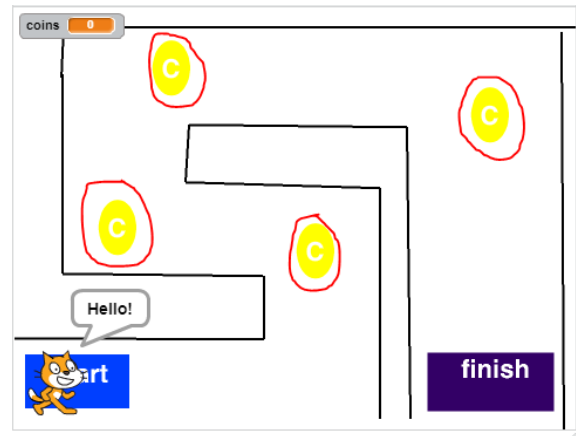


5. So now to add onto the maze, you will be working on how to add coins. First you have to click data. Then you have to click make a variable. Name the variable coins. Make sure that the checkmark next to the word coins is there.



6. After you have made the sprites all you have to do is make 1 coin sprite, put the code for it and then duplicate it as many times as you want. Then you have to place the coins where you want them to be on the screen. The code for all of the coins is the same.





7. If you want to you can add one piece of code to the character that is doing the maze to talk for example when the sprite touches the first coin then it will say good job. You can repeatedly do that for more than one coin if you like and that's it.



Name _____ Date _____

Homework: Maze game

1. Briefly explain how you built the Maze game?

2. Connect the key words to their definition:

Script	A word that is used to execute a command.
Sprite	Set of instructions to be followed.
Command	A character that is controlled by a script.
Backdrop	Something that is put in a script that is told to be done.
Keyword	The setting or background the character is in.

3. Explain some new codes you learned throughout this project:



Chapter #8: Platformer Game

Key Terms:

- **Blocks:** Where commands are stored.
- **Command:** Something that is told to be done
- **Keyword:** A word that allows to execute a command
- **Sprite:** An image that can be controlled by code
- **Backdrop:** The scenery of your project
- **Script:** Set of instructions to be executed

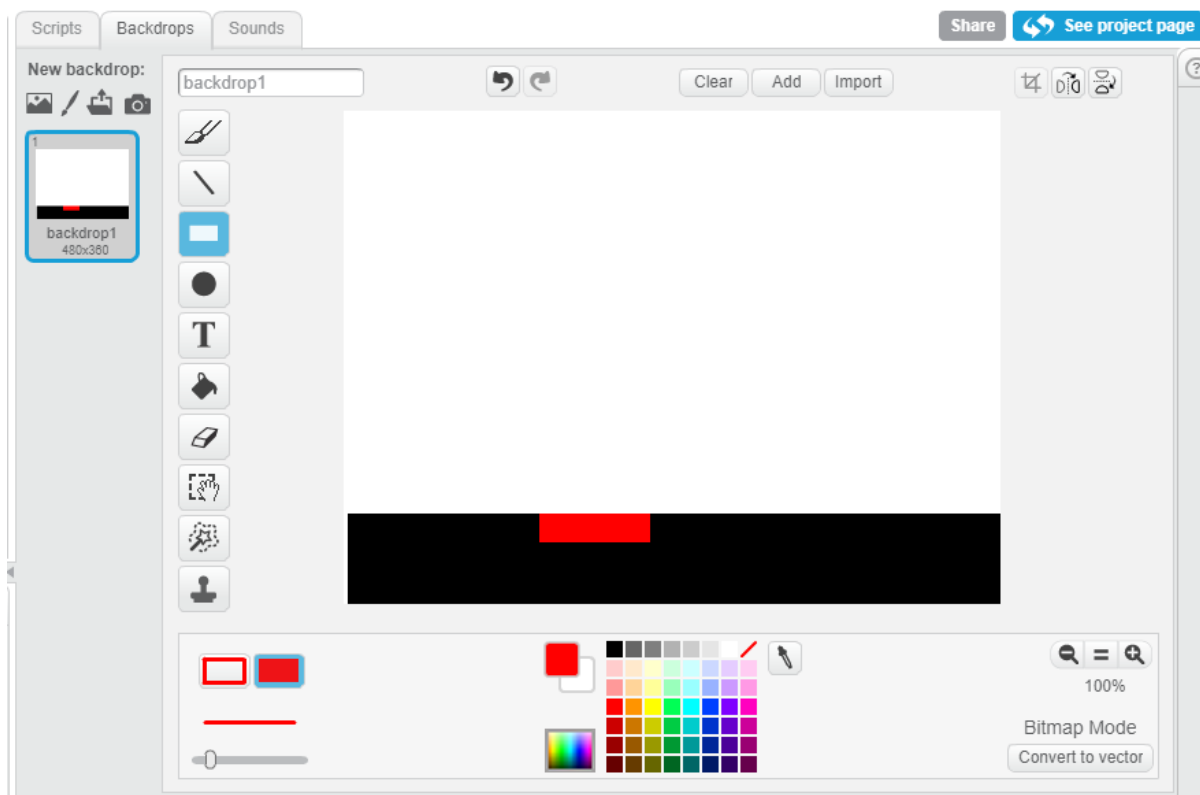
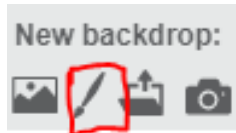
Objective:

In this chapter, students will learn how to create a platformer game. To get started, they should log into their account at scratch.mit.edu and create a platformer game. Once they are done with their project, they should add it to the CT Stem Studio.

Your goal is to accomplish a game where your sprite can move left, right, up and down and reach the finishing spot.

How to build a platformer game:

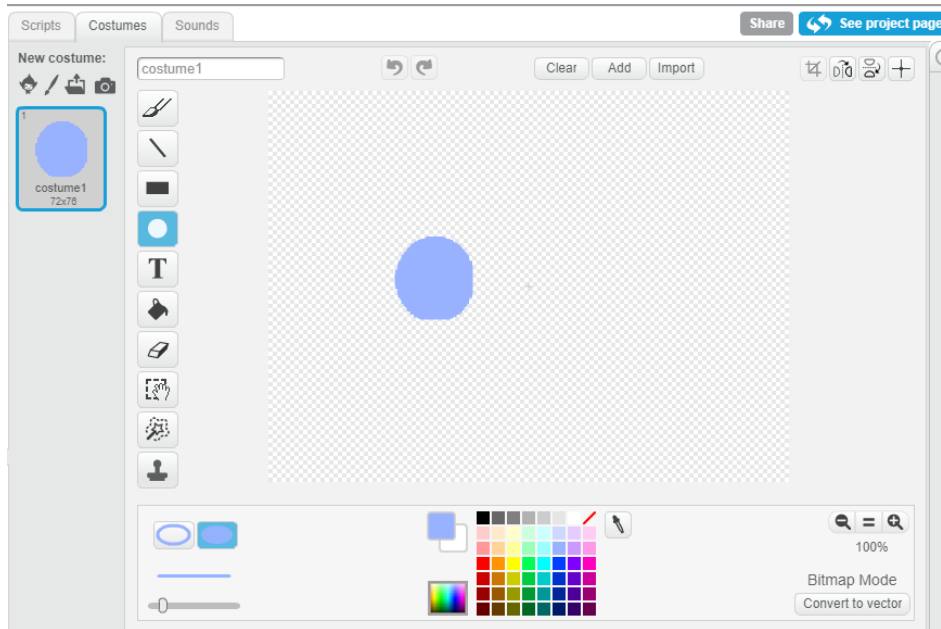
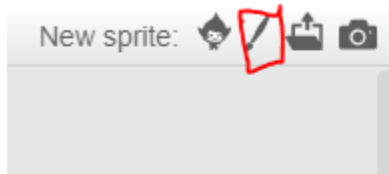
1. First, students must make their background. We will keep it a blank white screen with a black colored ground. So, they should go to the new backdrop section, and click the pen. Then they should make their ground.



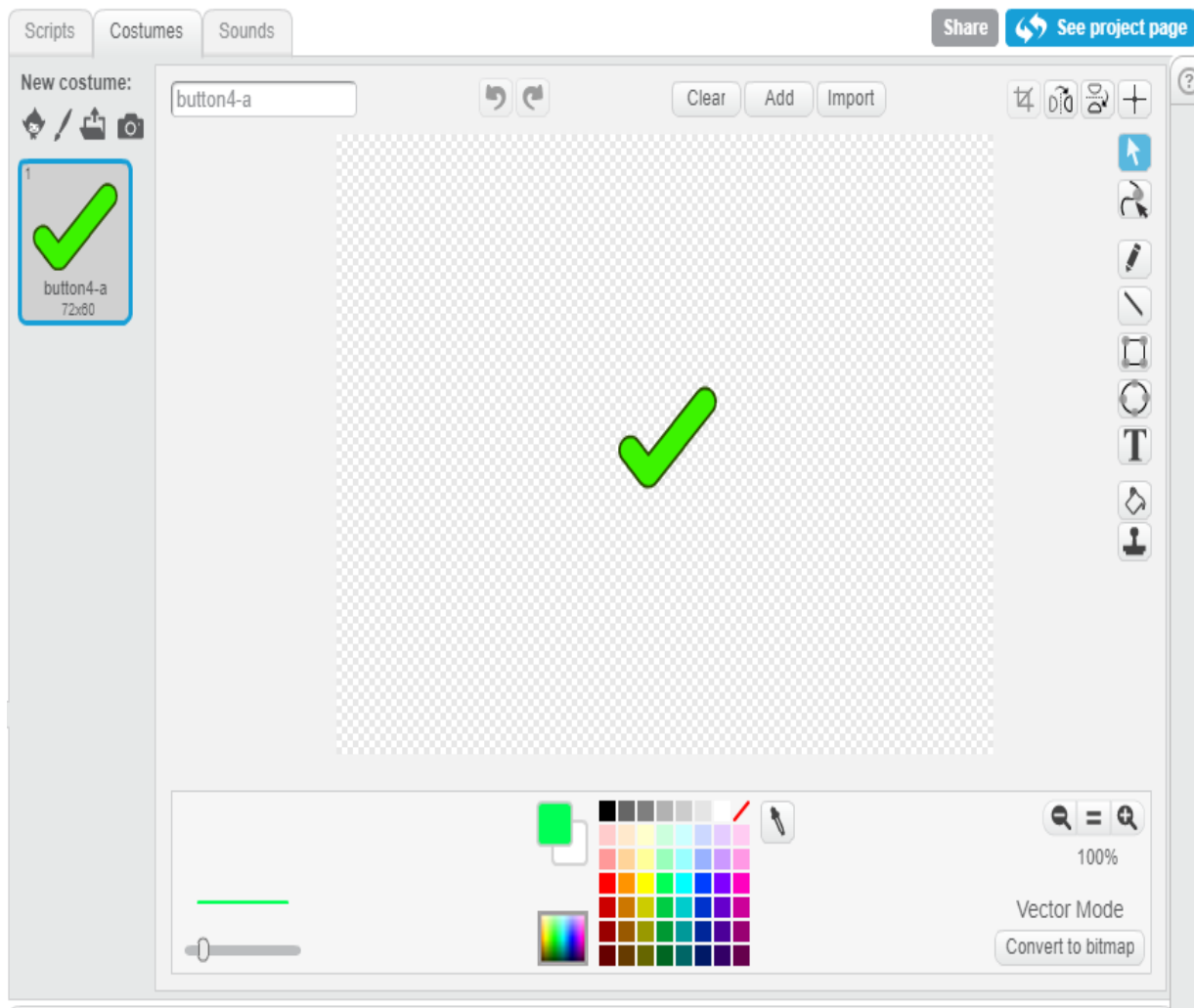
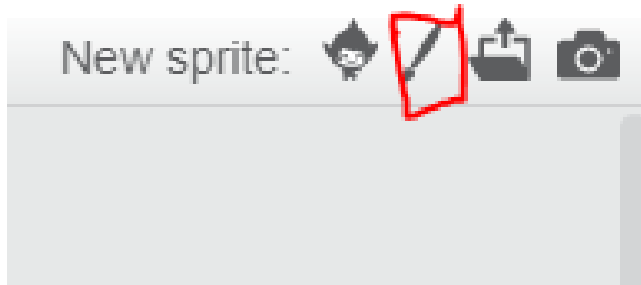
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2. Next, they should create the character who will be moving.



- Students should make their ending sprite which is the shape of a checkmark.







4. Depending on how high your ground is place the character/sprite 1 in the beginning of the screen and the ending character/sprite 2 at the end of the screen. Remember this is where your sprites will be for each round.



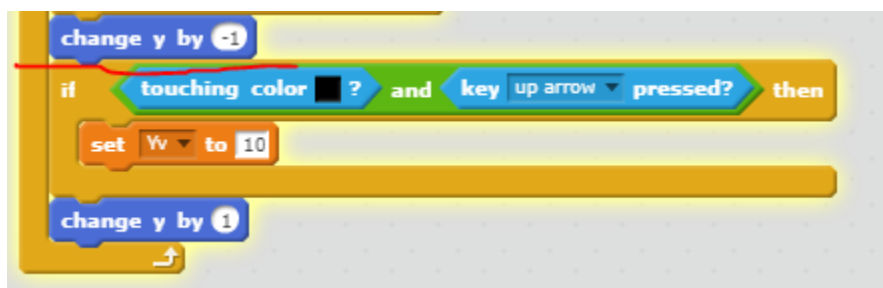
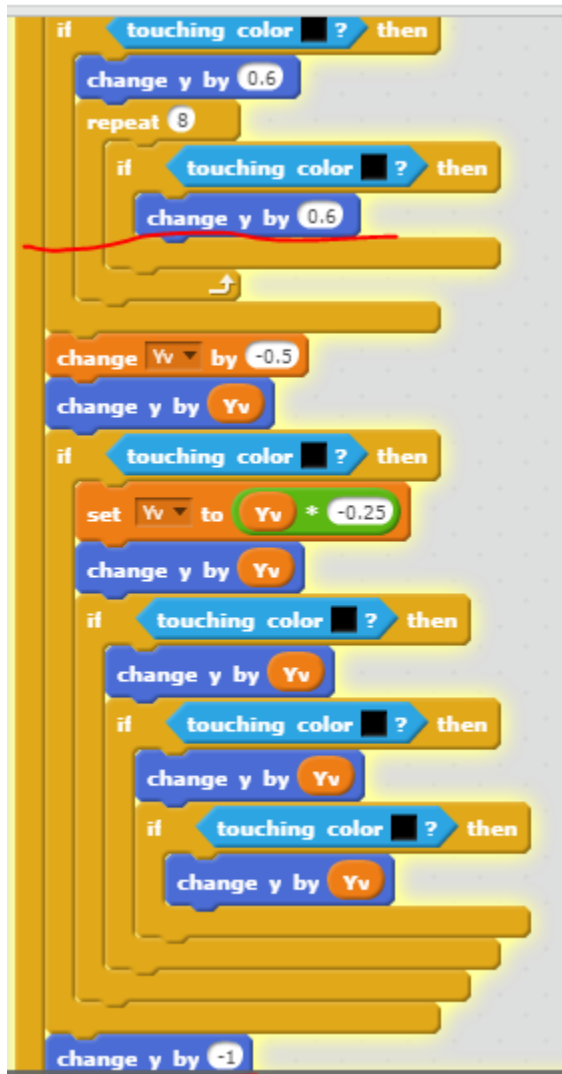


5. The code below is the code for the sprite one, the character, playing the game. Make the go to x and Y to wherever your sprite starts at. The character moves based on the keys the user presses. The character can move up, down, left and right. For your information: The code was too long to put on one page so the screenshot was split into two.



this is

the same as the other code.

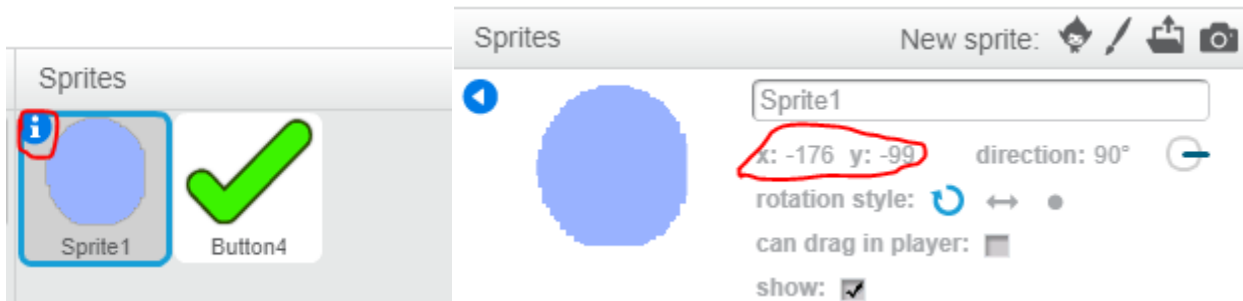


The red lines indicate where you start and where you stop.

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6. Depending on where sprite 1 is go to the I in the corner of the box that is around the sprite and check the x and y and put those numbers in the block that says go to X_ and Y_. Put this code in sprite 1.



This code is from the other piece of code you do not have to do this again this change the circled parts to the coordinate that your sprite has.



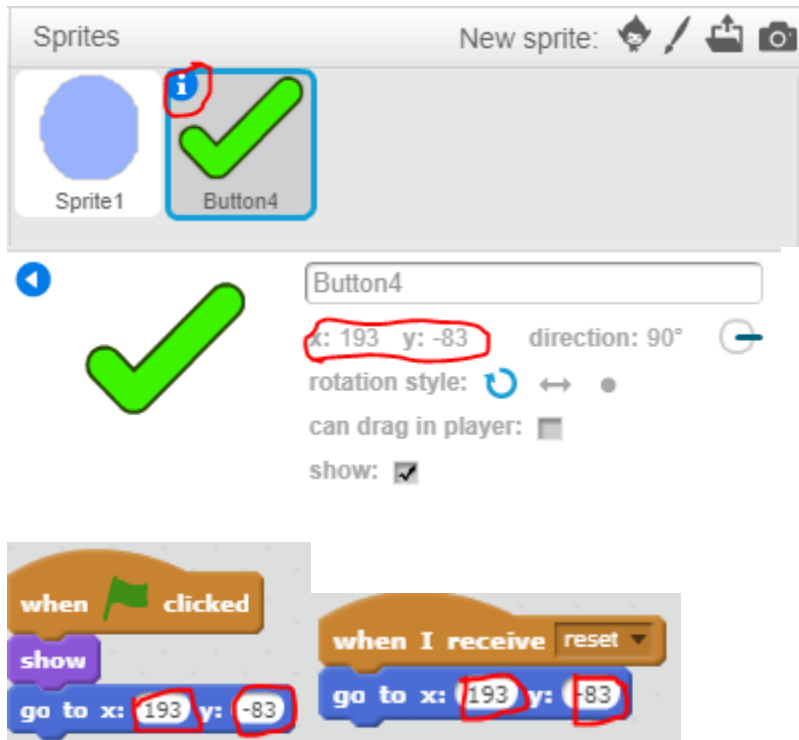
7. Students should write the code so that when the character touches red (lava) the character will go back to the beginning level. Put this code in sprite 1.



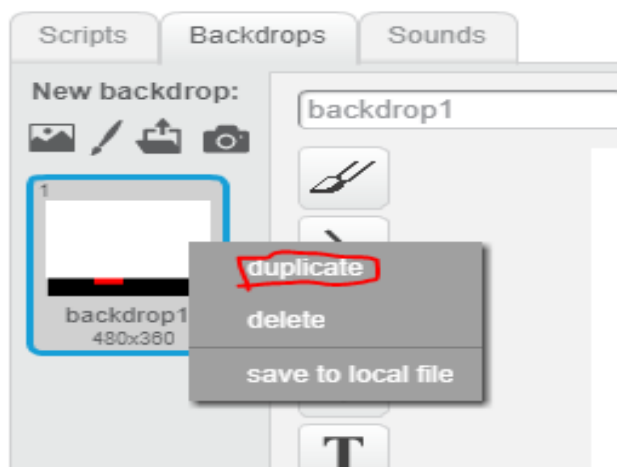
8. Students should write the function for the blocks. These sets of code will help sprite 1 get to the next level. Put this code in sprite 2.



9. Depending on where sprite 2 is go to the I in the corner of the box that is around the sprite and check the x and y and put those numbers in the block that says go to X_ and Y_. This code is for sprite 2.

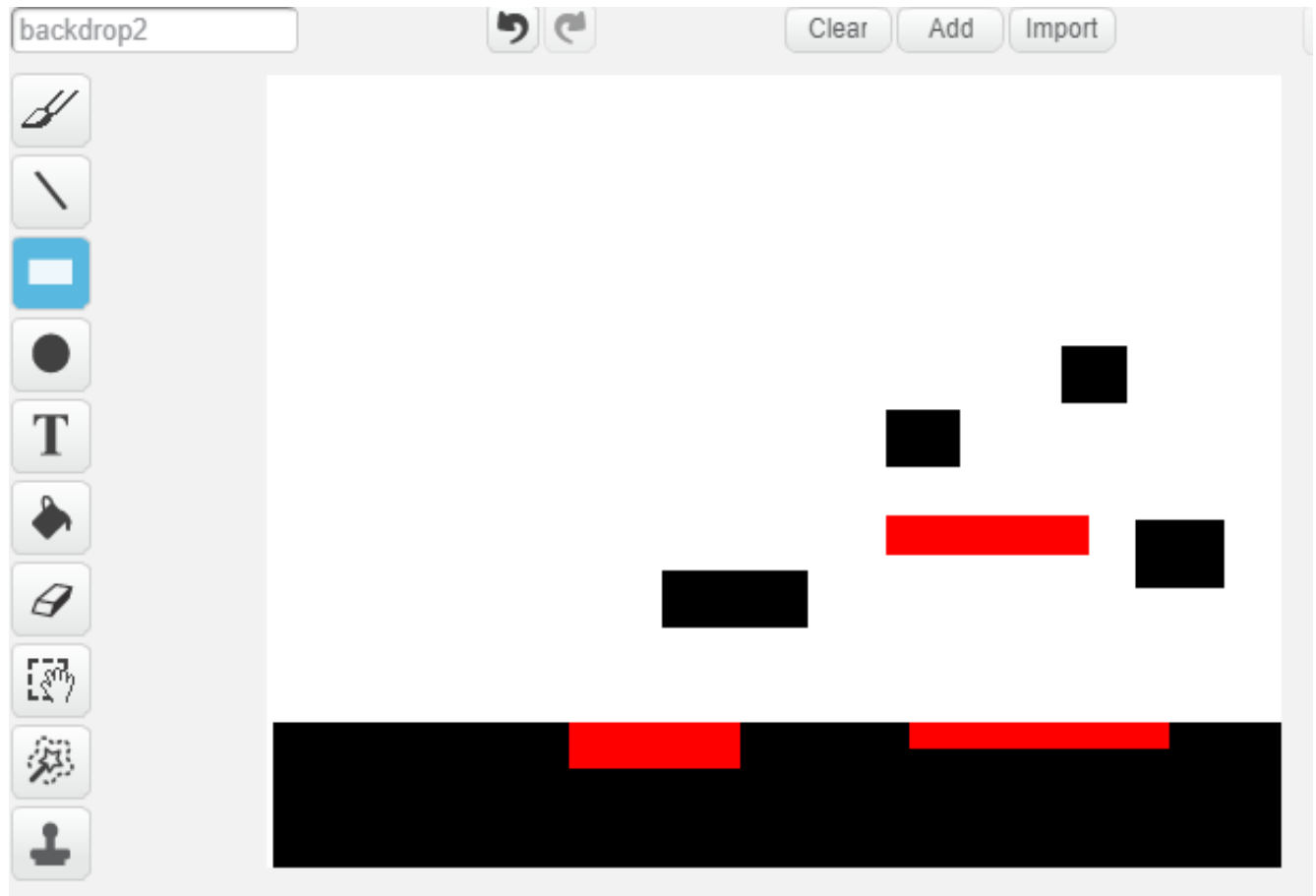


10. Students can make more levels by duplicating the first backdrop and adding lava and obstacles. This is optional.



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1. Once students are satisfied with their project, they should add it to the CT Stem Studio





Name _____ Date _____

Homework: Create a Platformer Game

1. Briefly explain the process of making a Platformer Game part 1:

2. Connect the keywords with their definition.

Sprite	Where different commands are stored.
Script	The background of your project.
Blocks	A character that is controlled through script.
Command	Pieces of code that are used to control sprites.
Backdrop	Scripts that are told to be done.

3. What is the objective of the Platformer Game?

Chapter #9: Basketball Trivia Part I

Key Terms:

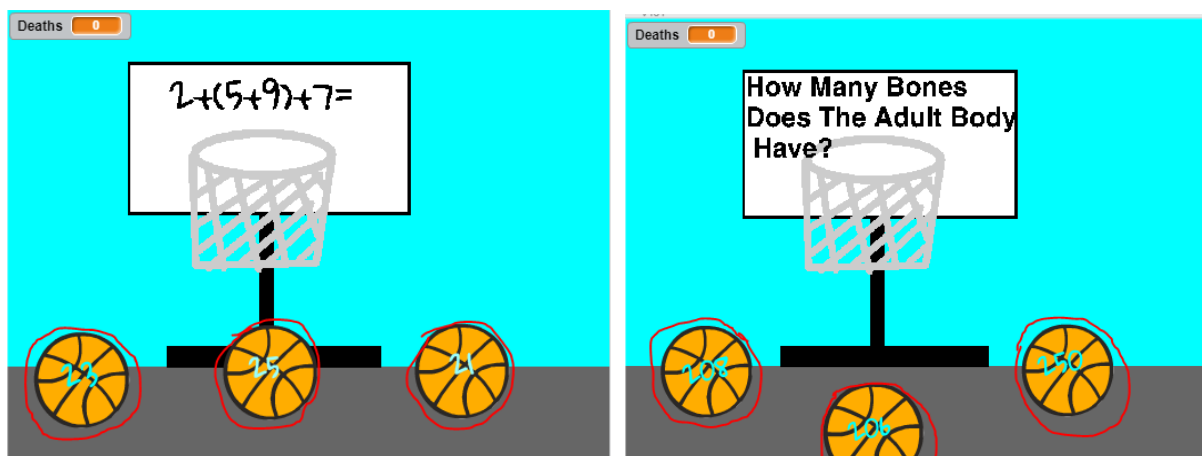
- **Blocks:** Where the commands are stored.
- **Command:** Something that is told to be done.
- **Motion:** The art of moving.
- **Script:** An image that is controlled through code.

Objective:

The objective of this is to click the right answer to the questions and make it through the game with the least amount of deaths. This is a 1 player game.

How to make a basketball Trivia Part I:

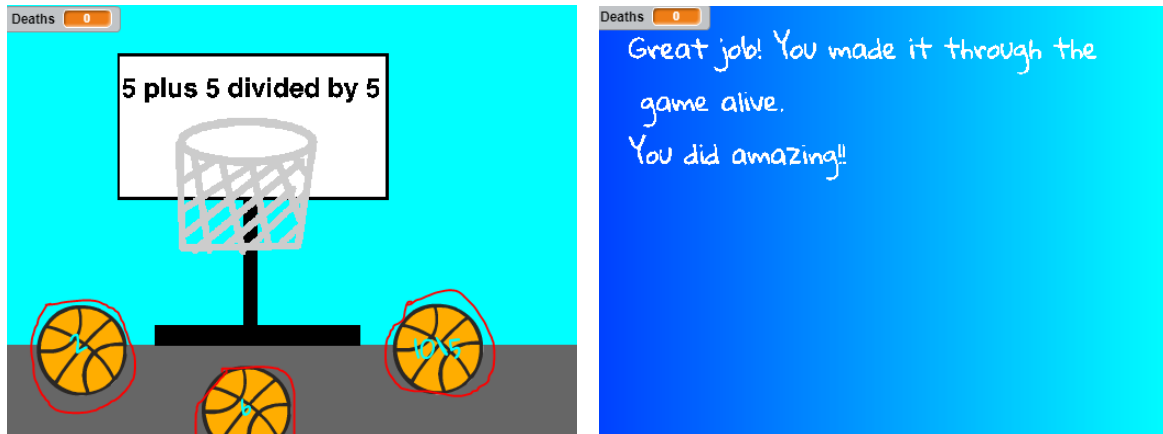
1. Log on to scratch.mit.edu to start making the game.
2. You have to start by making the backdrops for the basketball game. Please make sure the questions are in black so that the people playing can read it properly. (Red lines are the sprites and you don't have to make them on the backdrop).



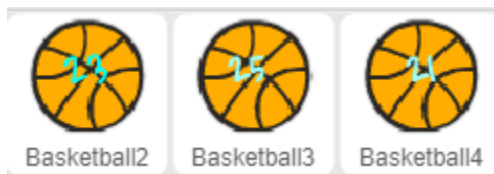
To type in your backdrop, you click the "T" icon in the create sprite or create backdrop section and starts typing where you want to.

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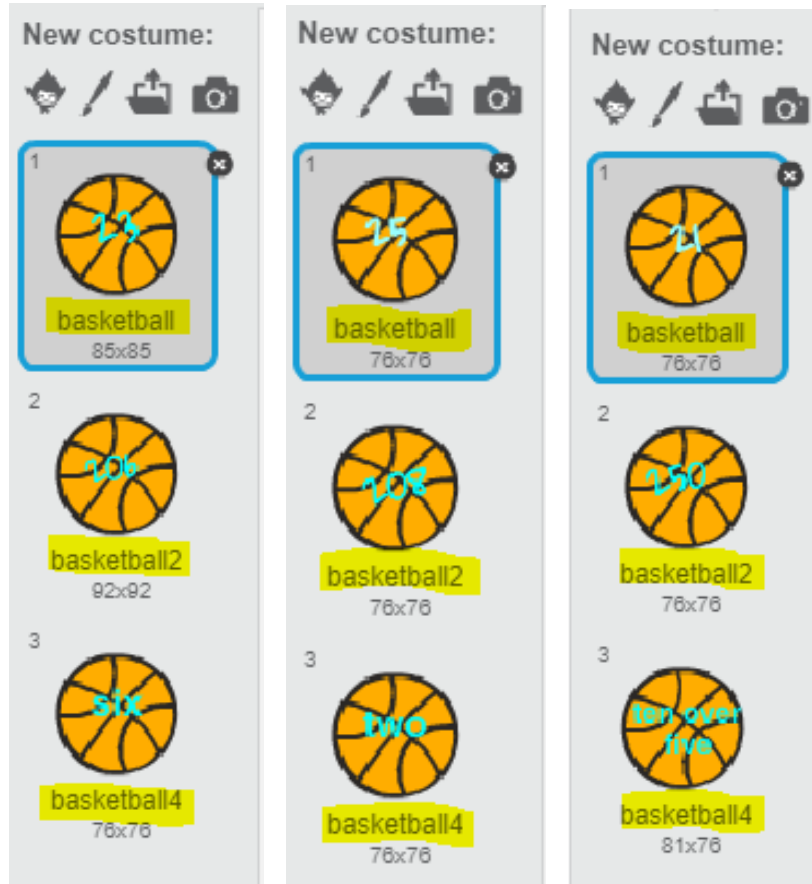
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3. You have to make 3 different basketball costumes. One is called 23, 25 and 21. You can get the basketball from the sprite library.



4. You have to make 2 more costumes for each basketball, as shown below. (206 and six go under sprite called basketball 23), (203 and two go under the sprite basketball 25), (250 and ten over five (like fraction) go under the sprite basketball 21).





Name _____ Date _____

Homework: Basketball Trivia Part I

1. Briefly explain how you made the Basketball Trivia Part I:



Chapter #10: Basketball Trivia

Part II

Key Terms:

- **Blocks:** Where the commands are stored.
- **Command:** Something that is told to be done.
- **Motion:** The art of moving.
- **Script:** An image that is controlled through code.

Objective:

The objective of Part II is to finish the Basketball Trivia game you have been working on.

How to make a Basketball Trivia Part II:

1. Log on to scratch.mit.edu and open the Basketball Trivia Part I game you created. If you missed the last class (or you don't have the Part I saved then please re-do them using the previous instruction. You may also take the copy of the Part I created by your co-students.)
2. Go into the Variable section and make a variable called *Deaths*. This is needed so that if the person playing gets the question wrong then the variable deaths, increases by 1.

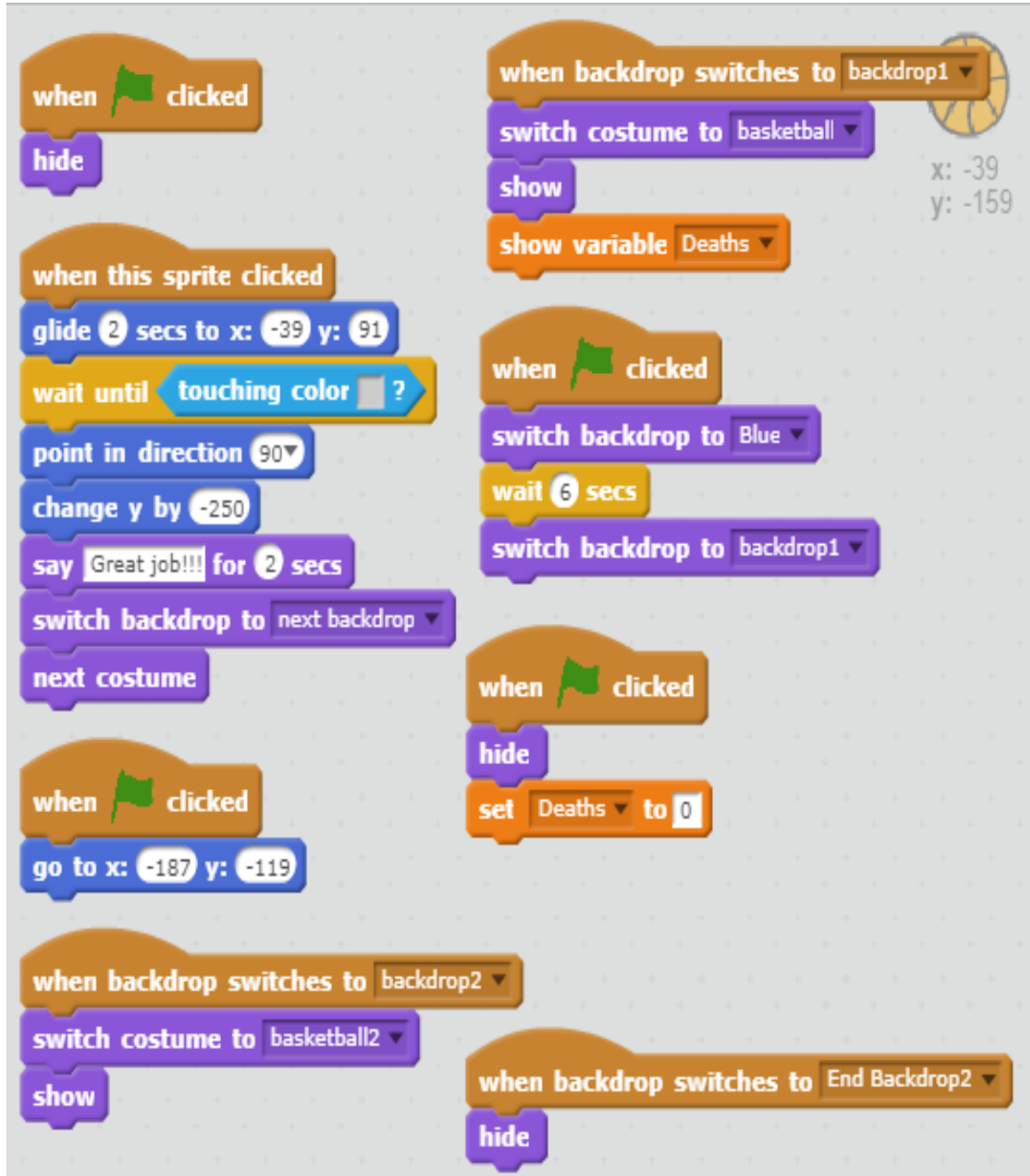


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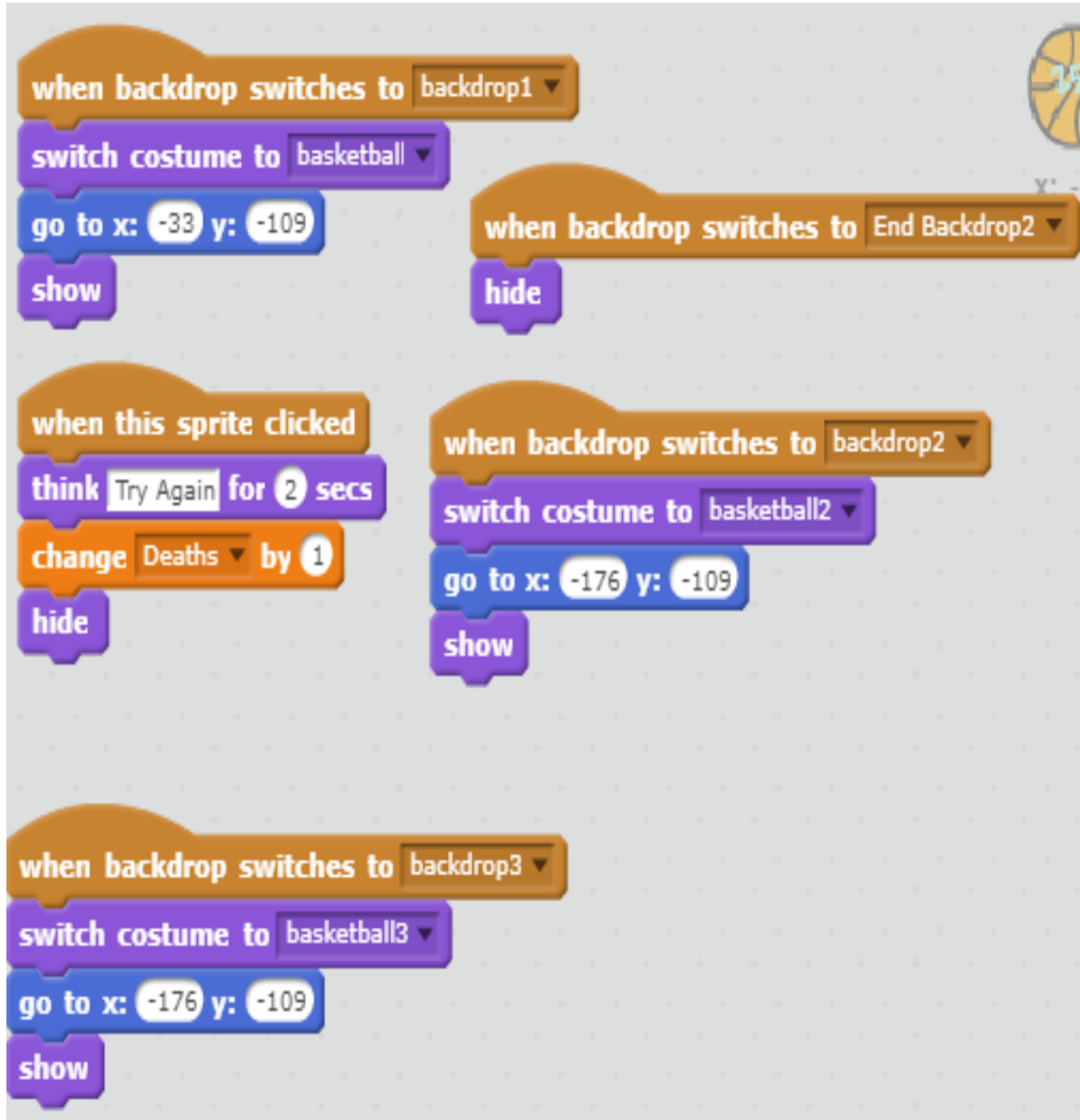
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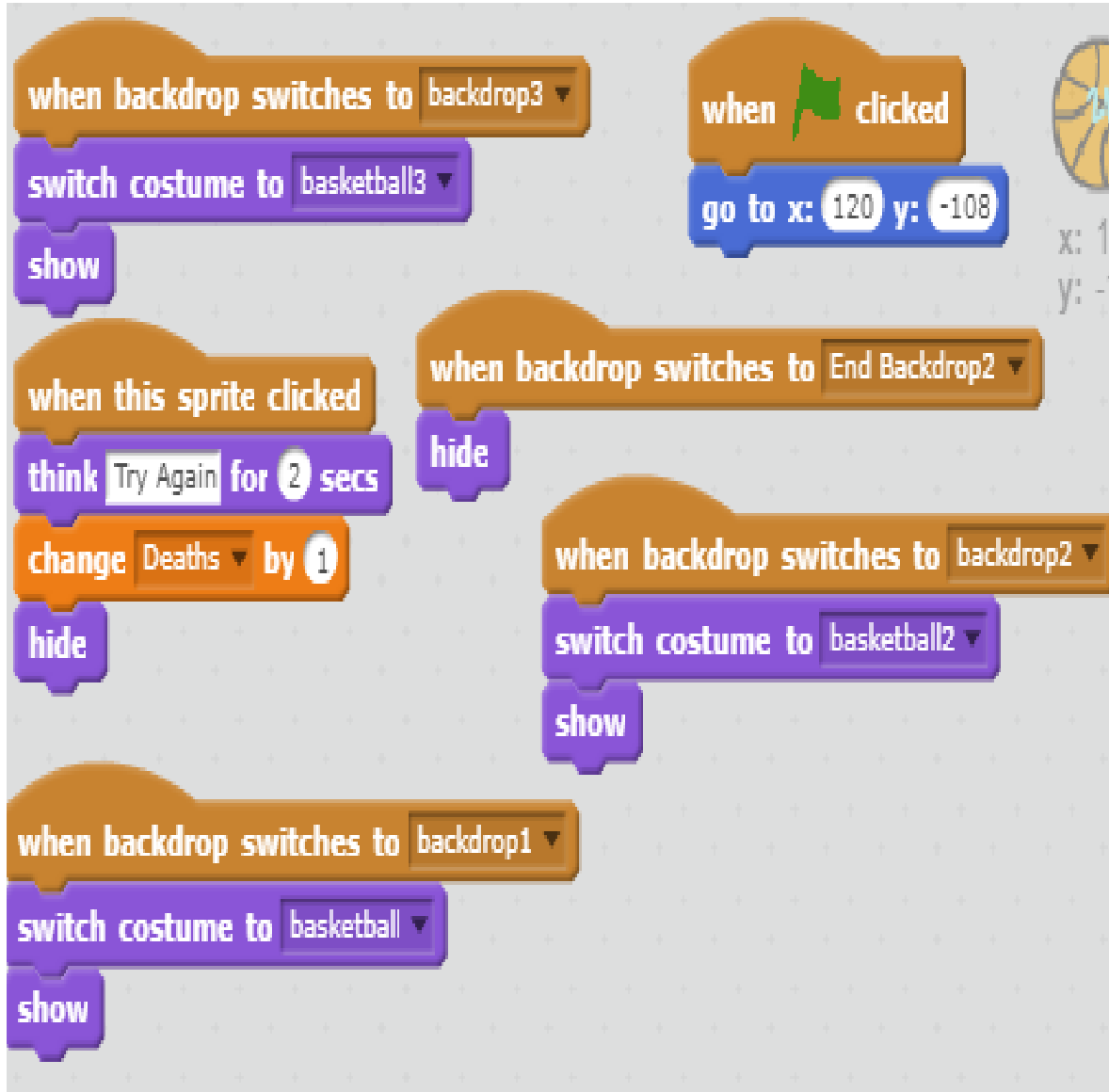
3. Make the following code for basketball 2 with the costumes 23, 206 and six.



4. Make the following code for basketball 2 with the costumes 25, 208 and two.



5. Make the following code for basketball 2 (with the costumes 21, 250 and five over ten.)





Name _____ Date _____

Homework: Basketball Trivia Part II

1. Briefly explain how you made the Basketball Trivia Part II.

2. Explain the concept of the Basketball Trivia game.

Chapter #11: Soccer Game Part I

Key Terms:

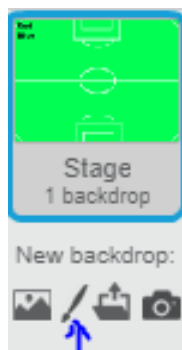
- Blocks: Where commands are stored
- Command: Something that is told to be done
- Sprite: An image that can be controlled through code.
- Background: The scenery of your project.
- Script: Set of instructions to be executed.

Objective:

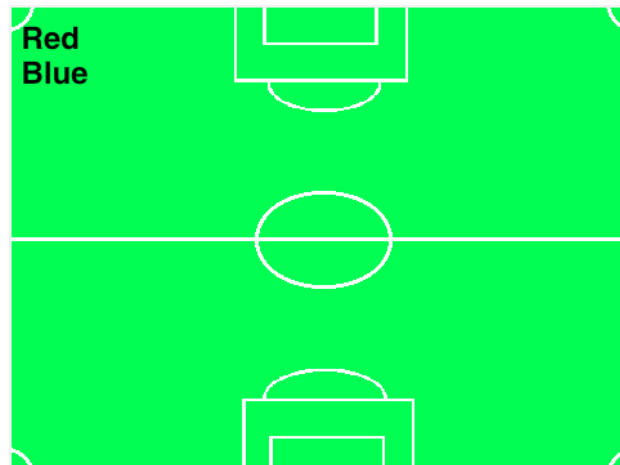
In this chapter, students will learn how to create the first phase of a soccer game. To get started, they should log into their account at scratch.mit.edu and create a new project. They will follow step-by-step procedures given to them by the teacher to help them learn how to systematically recreate the famous sport of soccer in Scratch! Once they are done with their project, they should add it to the CT Stem Studio.

How to make the game:

1. When the students will start the project, the first thing they should add is the soccer field backdrop. To do this, click on the pen near backdrop to draw a backdrop, and then draw a soccer field with it saying Red and Blue at the upper-left corner. If they find it difficult to draw the lines on the field, they could just color the whole backdrop a shade of green that resembles



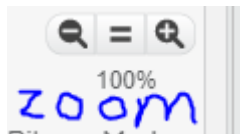
grass.



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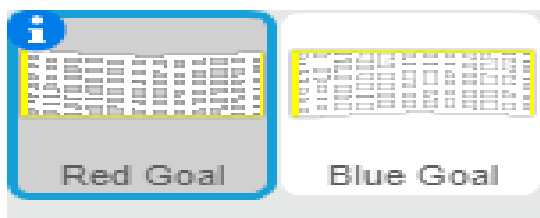
2. The next step in creating your soccer project is to create the goals for each team. To do this create a new custom sprite by clicking the “paint sprite” pen and drawing a goal. The goal can look like anything but it should be small enough that it stays in the goalie box. You can use the zoom button (at the lower-right of the sprite drawing area) to zoom in if it is difficult to draw the goal. In this example it



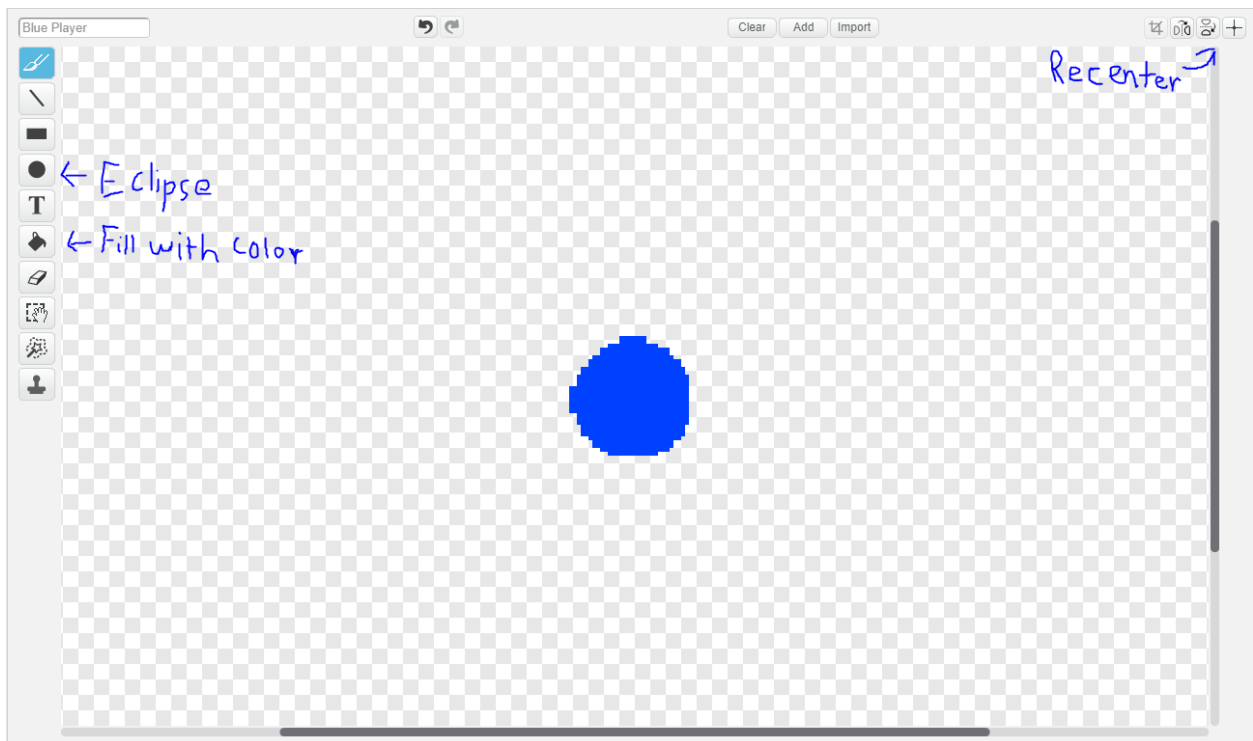
is
drawn
as a
net.



3. Then you want to name this goal “red goal” and then duplicate it (by right clicking on the red goal) and call the other goal the “blue goal”. These will be the corresponding goals for the teams and naming them makes it easy to remember which is which.



4. After that, they should make the players. This game will be a two player or multiplayer game so there are two players needed, each with separate controls. There will be one player from blue team and one from red. To make them, we will have to create two new custom sprites. To do this select the “paint a sprite” pen again and make a small circle using the “eclipse tool”. It should be about $\frac{1}{3}$ of the goals. Then choose the “fill with color” paint bucket and click in the middle with a blue color. This will be the blue team player so they should name it blue player. Once they are finished, they should re-center the image by clicking with the tool in the middle of their sprite.



5. Students should then repeat the last step but color the player red and name it “red player”.

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6. Finally, to finish up all the sprites needed for the game, students should make a soccer ball. To do this create a custom sprite and make a circle like before. The circle should be even smaller than the players at little more than half their size. Next color the circle white and add black spots the best they can to make it resemble a soccer ball.



7. This will end the lesson on this chapter on how to make a soccer game part-I. Next lesson they will be taught how to program the sprites to make them functional in-game.



Name _____ Date _____

Homework: Soccer Game Part I

1. Briefly explain the process of making the first phase of a soccer game program:

2. Connect the keywords with their definition.

Command A word that allows you to execute a command.

Sprite The scenery of your project.

Blocks Set of instructions to be executed.

Background An image that can be controlled through code.

Keyword The scenery of your project.

Script Something that is told to be done.



3. Think about what you will do next to complete the project. What you will code, how you will do it, and why you will do it.



Chapter #12: Soccer Game Part II

Key Terms:

- **Blocks:** Where commands are stored
- **Command:** Something that is told to be done
- **Keyword:** A word that allows you to execute a command.
- **Sprite:** An image that can be controlled through code.
- **Background:** The scenery of your project.
- **Script:** Set of instructions to be executed.

Objective:

In this chapter, students will continue to learn how to finish their soccer game that they started last lesson. To get started, they should log into their account at scratch.mit.edu and go to “my stuff” and open their project. They will follow step-by-step procedures given to them by the teacher to help them learn how to systematically recreate the famous sport of soccer in Scratch! Once they are done with their project, they should add it to the CT Stem Studio.

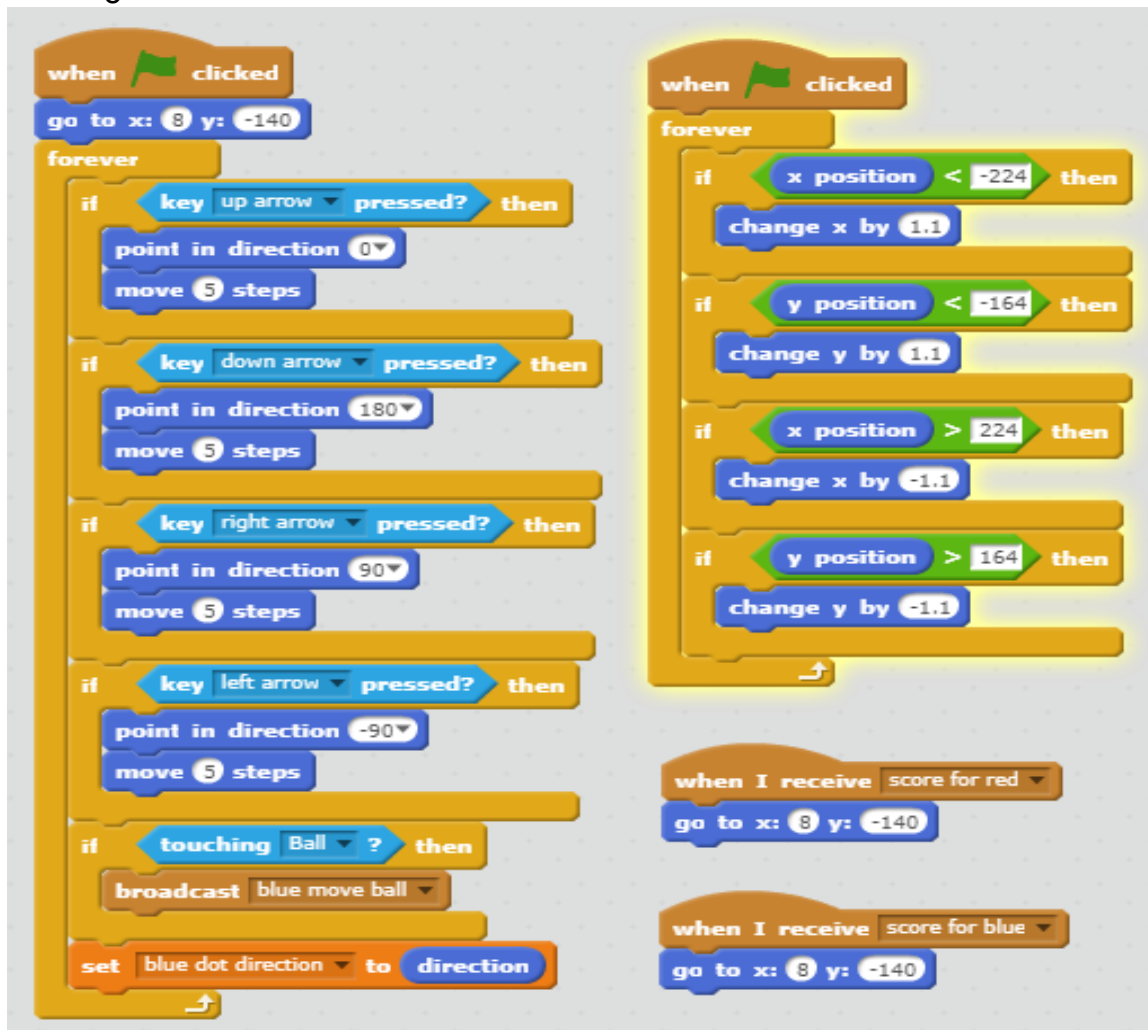
Steps to do it:

1. The first thing they should code is their players to make them move when they hit certain keys and to reset them once the game starts or a goal is scored. Once they finish, they could just copy and paste the code for the red player and change a few things. Here is an example of the code for the blue player:
 - a. The first thing that they should do is make the player move to the starting position when the game starts by putting a “when flag is clicked” block followed by a “go to x:8 y:-140” motion block. Next, what they want to do is make the player move. To do this they put a “forever” block to make it repeat the following instructions as long as the game lasts. The instructions we want it to repeat is to move in a direction when a key is pressed. So they can use the “if _ is pressed then” block with the direction and movement blocks to make it move when a key is pressed. They should also broadcast something like “blue move ball” when the player is touching the ball to signal the ball to move and they should set the “blue dot direction” (a variable) equal to the direction for the ball as well so it moves in the right direction.

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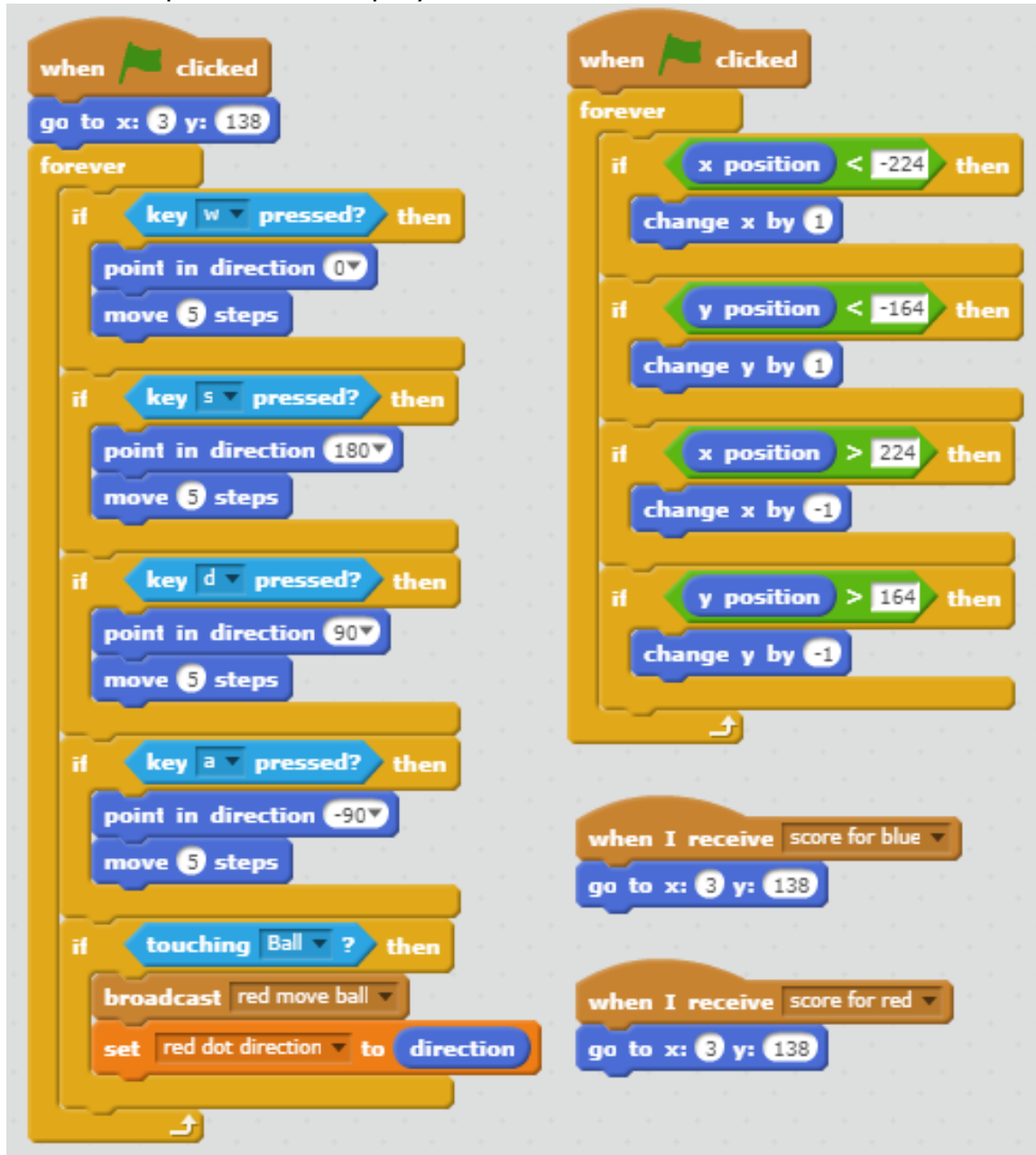
- b. Next they should again have a set of four forever repeating commands when the flag is clicked that makes the player move back when it is near an edge so it doesn't glitch out, get the ball glitched, or get stuck. These commands were discovered to be used in the program through trial and error to fix a bug that was found with the initial version of the program.
- c. Finally, they should have two blocks to reset to their starting position



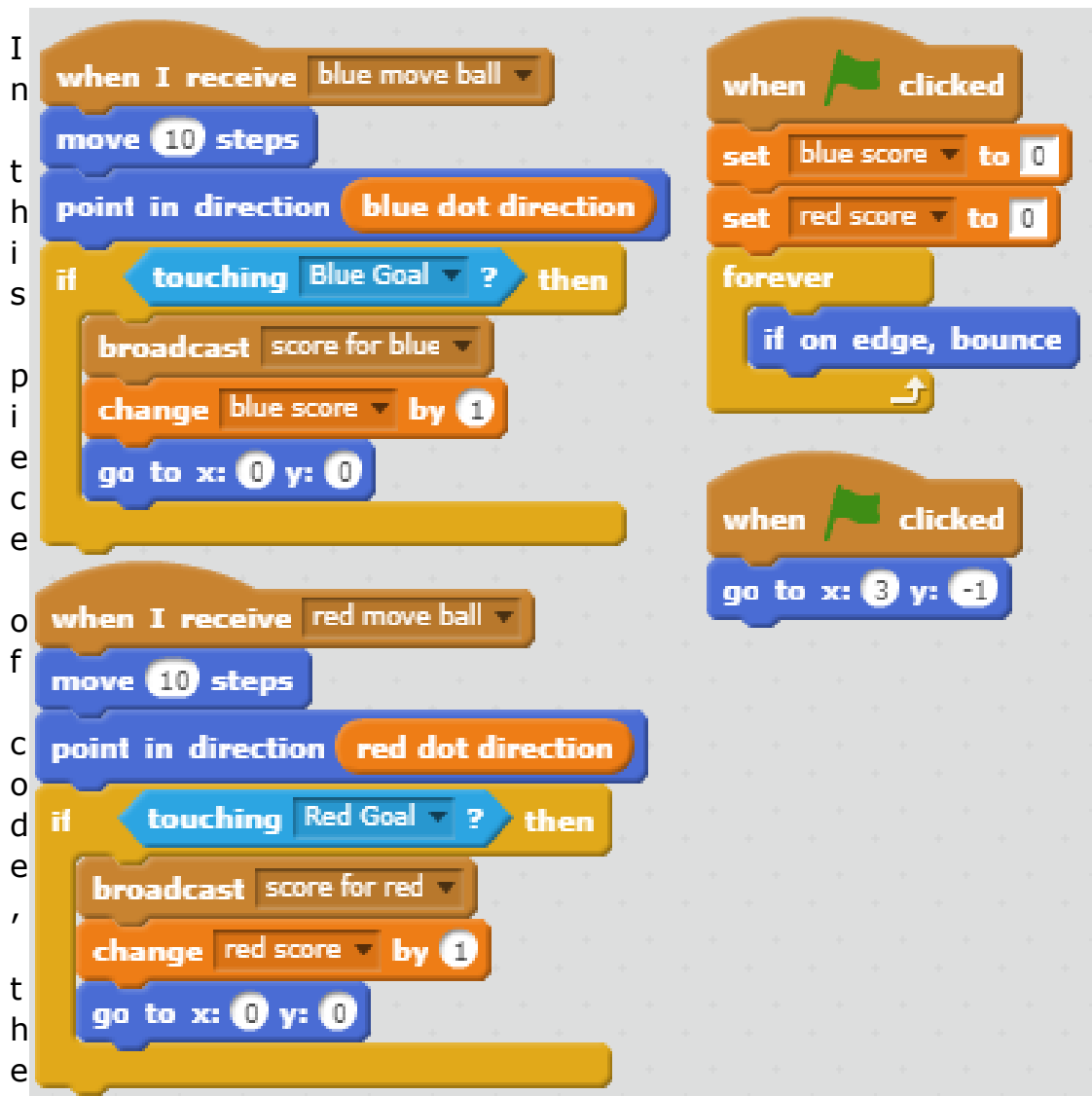
sent from the ball about a goal.



2. Most of this code can be duplicated and put into the red player after changing things like it's initial position coordinates and the keys. Here is an example of the red player's code:



3. After this, what they should do is code for the ball. They want the ball to move when a player is touching it which they already did by broadcasting a message when the player touches it and it also sends it the direction of the player to the ball. So, what we want the ball to do is interpret this information and react accordingly to it. Here is an example of code for the ball:



first thing that is done is to make the ball point in the direction of the player once the ball receives the message that we setup earlier, from the player and to move 10 steps. Then the code tells the computer that if the ball is touching one of the goals, broadcast a message for



the team (to the player which receives it and resets its position), change the team's score by one, and reset the ball to its initial position in the middle of the field. They should also put when flag is clicked, set both scores to 0 so that it resets whenever a match is over and to put a "forever" block with "if on edge, bounce" inside so that the ball can't get stuck outside of the field.

4. The project is now mostly done. They should now add final touches such as putting the variables in the upper-left next to where it says red and blue. They could also add their own creative touches such as putting different keys for movements to give the game a challenge, changing the colors, etc. Once they are done with their project they should add it to the Ct Stem Studio.



Name _____ Date _____

Homework: Soccer Game Part II

1. Briefly explain the process of making the second phase of a soccer game program:

2. Think about what you would like to do in the next session. Please explain.





Chapter #13: Mario Kart Part I

Key Terms:

- **Blocks:** Where commands are stored.
- **Command:** Something that is told to be done
- **Keyword:** A word that allows to execute a command
- **Sprite:** An image that can be controlled by code
- **Backdrop:** The scenery of your project
- **Script:** Set of instructions to be executed

Objective:

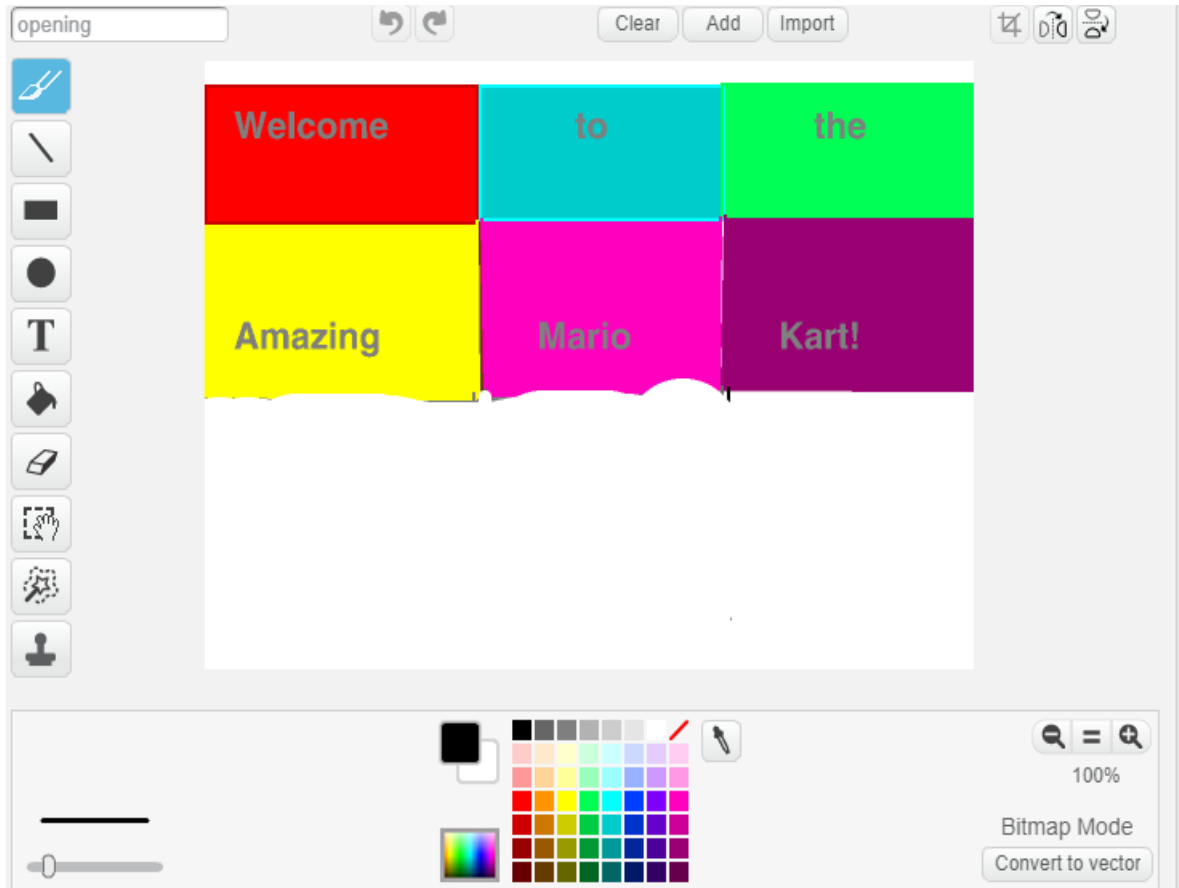
In this project, we will be able to make a Mario kart game. Mario kart is a famous game known for famous characters racing across tracks. To get started, we should log onto your scratch account on scratch.mit.edu and create a new project. Once we are done, share it so that other scratchers can see it.

Our goal is to accomplish a game, where 3 characters are racing to a finish line.

Steps to do the projects:

1. First, delete the cat on the screen to delete, click on the scissors above the screen and click on what you want to delete.

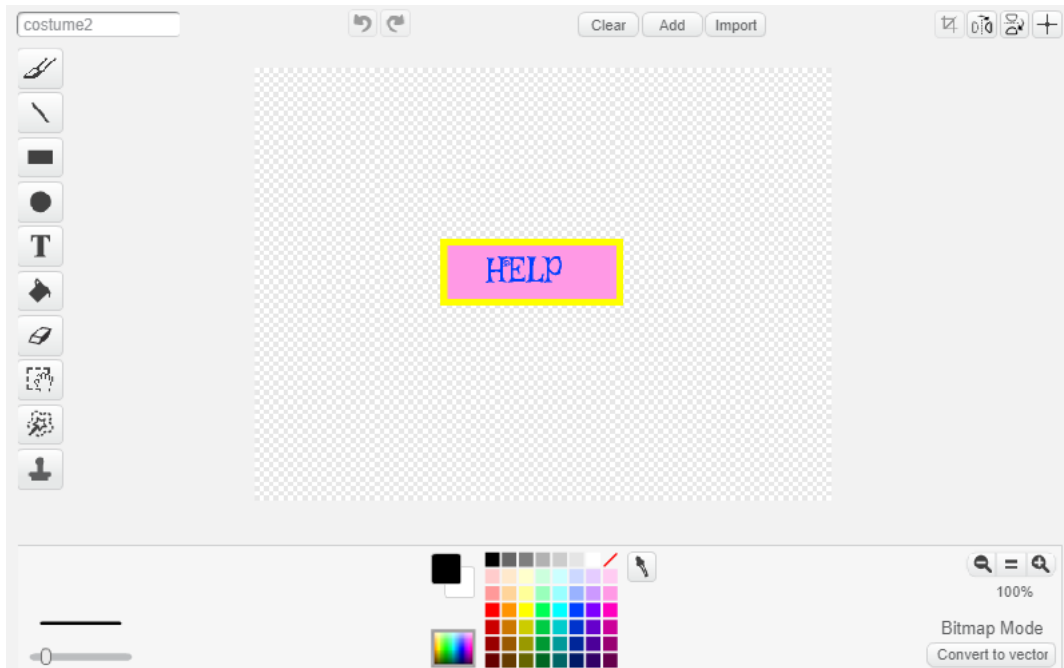
2. Next, we should make the first backdrop. We should make it colorful. This backdrop will be show up when the green flag is clicked. This is what it would kind of look like:



(Make sure to put a piece of code saying when green flag clicked, switch backdrop to Opening

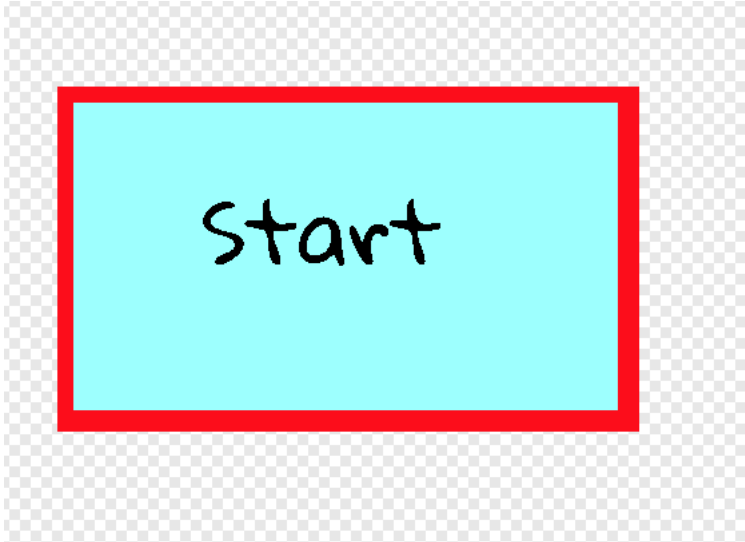


3. Next, we should make the sprite: The first sprite is called HELP and the 2nd sprite is called START. Given below is what the HELP button would kind of look like:

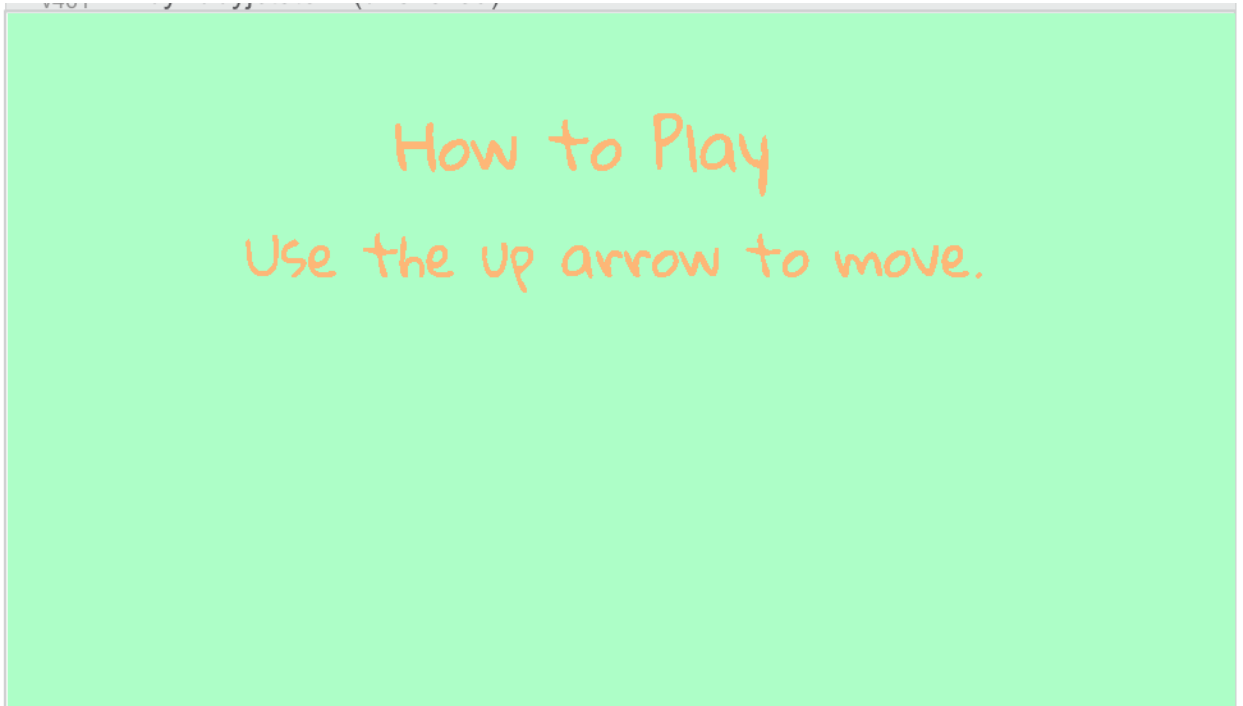




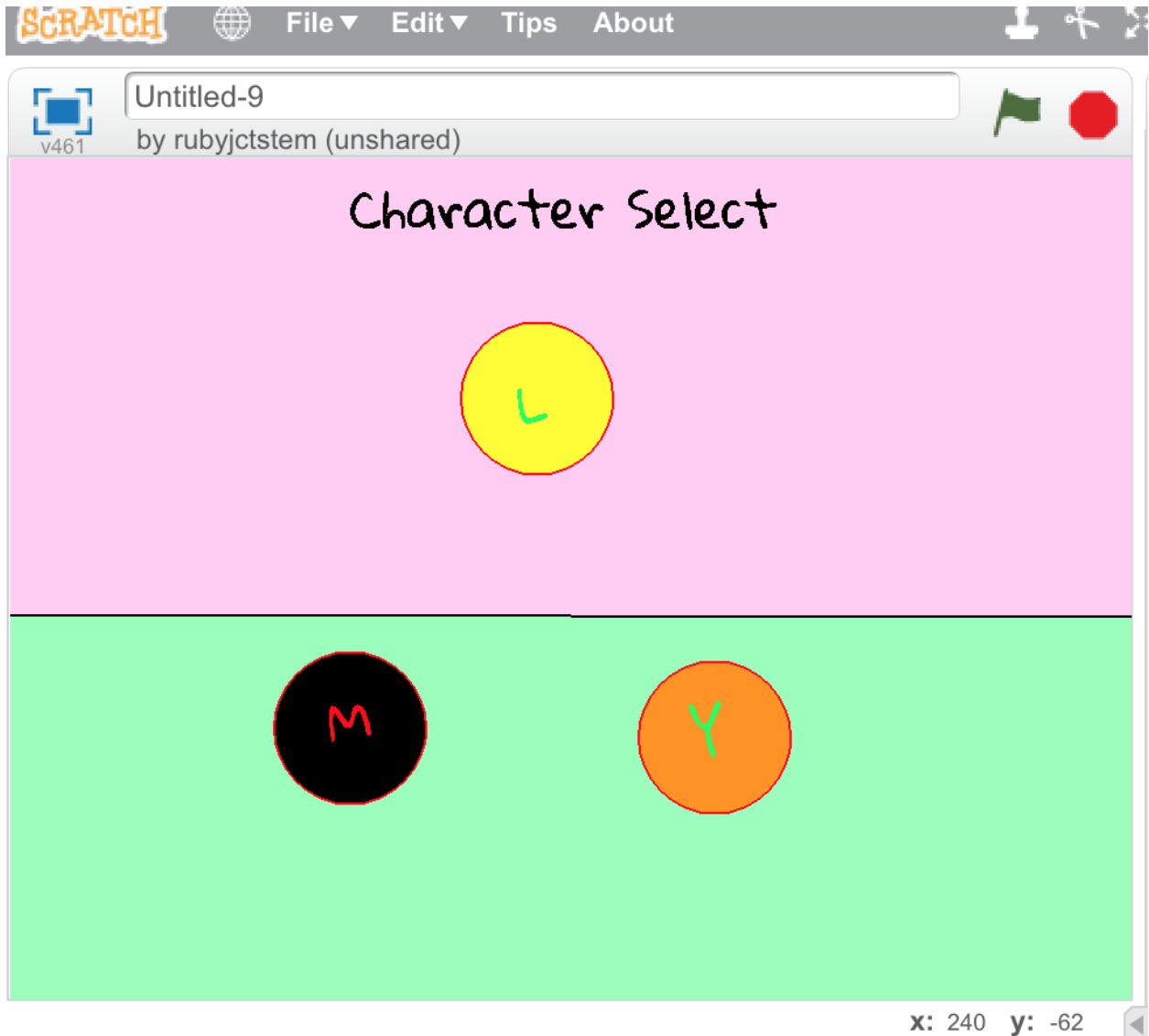
4. Given on the next page is what the START button should look like:



5. We should make a new backdrop so when the “HELP” button is clicked, it should switch to backdrop that tells us how to play the game. Name this backdrop help screen. This is what it would kind of look like:



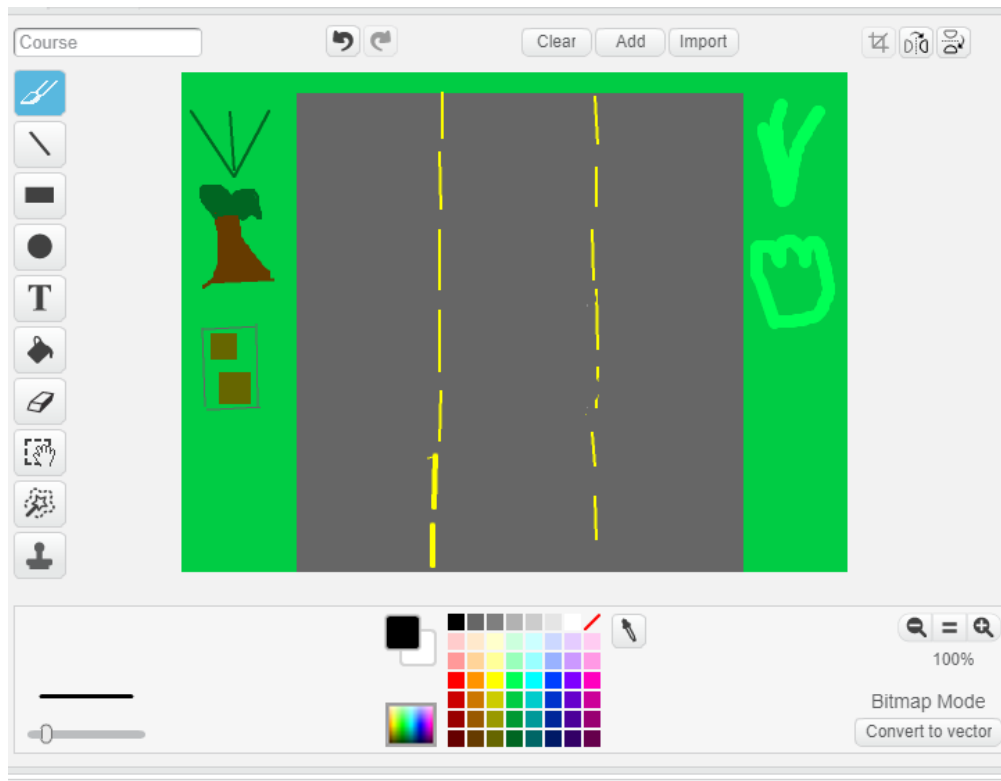
- 6.
7. Make a new backdrop, called character select. Then we should make the characters. Make whatever Mario characters you want. Here is how the character select would look like:



8. To make the characters, you need to make a sprite, draw a circle and type the initial of the character in the circle. For example:



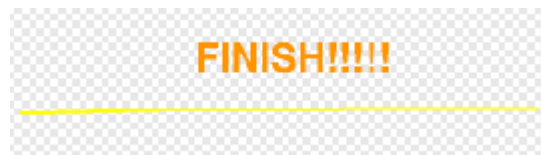
9. Next, we should make a new backdrop in which the characters will drive in. Name it course. Remember to add 2 lines to make 3 lanes for your 3 characters. It should look like this:



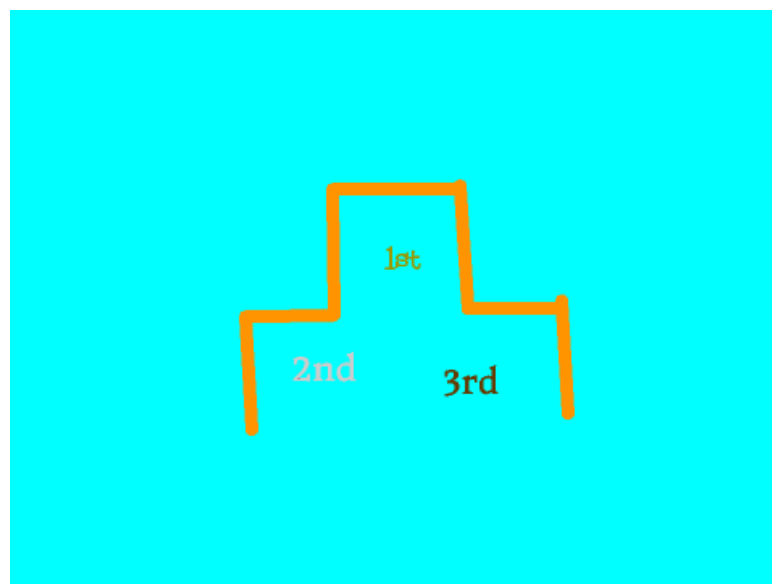
10. Make another sprite that tells you when to start racing. You have to make costumes. The 1st costume is the number 3. Next is number 2. Then it is the number 1. Lastly, it should say **"GO!!!!!!"**. You can use the 1, 2 and 3 from the library but you have to make GO!!!!!! On your own. These are how the costumes would look like:



11. We should make a new sprite that looks like a finish line. It should look like this:



12. Now when were done with that, you have to make a new backdrop and call it "EB" or call it "Credits". It should look like this:





Name _____ Date _____

Homework: Mario Kart Part I

1. Briefly explain how you built the Mario Kart game:

2. Connect the keywords with their respective definition:

Command	A word that allows you to execute a command
Sprite	The scenery of your project
Blocks	Set of instructions to be executed
Background	An image that can be controlled through code
Keyword	Where commands are stored
Script	Something that is told to be done

3. Unscramble these words:

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- a. ENSGNIS: _____
- b. SRTN_EEEGURD: _____
4. What block type does the "say _ for _ sec block come in?
- a. Motion Blocks
 - b. Look Blocks
 - c. Sensing Blocks
 - d. Control Blocks
5. What are event blocks used for?
- a. Trigger Scripts
 - b. Control Sprites
 - c. Play Sounds
 - d. Execute Scripts
6. For extra credit, you need to look up the history of Mario Kart. Who made Mario Kart? What was when the original Mario Kart created?



Chapter #14: Mario Kart Part II

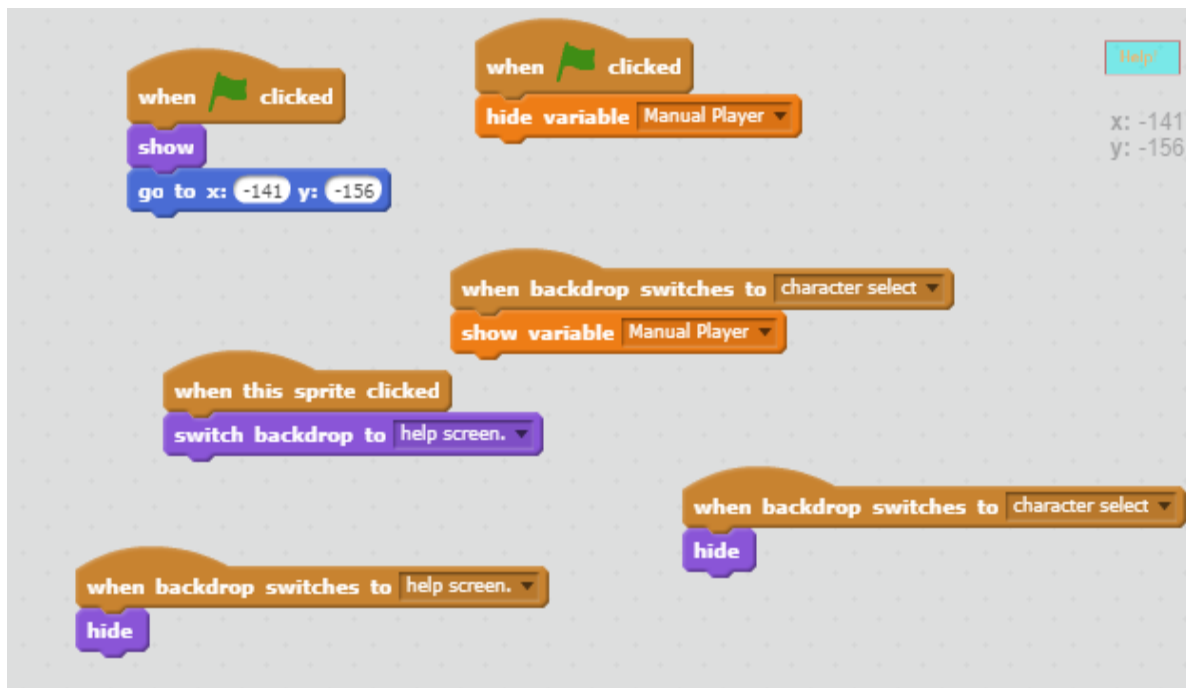
Key Terms:

- **Blocks:** Where commands are stored.
- **Command:** Something that is told to be done
- **Keyword:** A word that allows to execute a command
- **Sprite:** An image that can be controlled by code
- **Backdrop:** The scenery of your project
- **Script:** Set of instructions to be executed

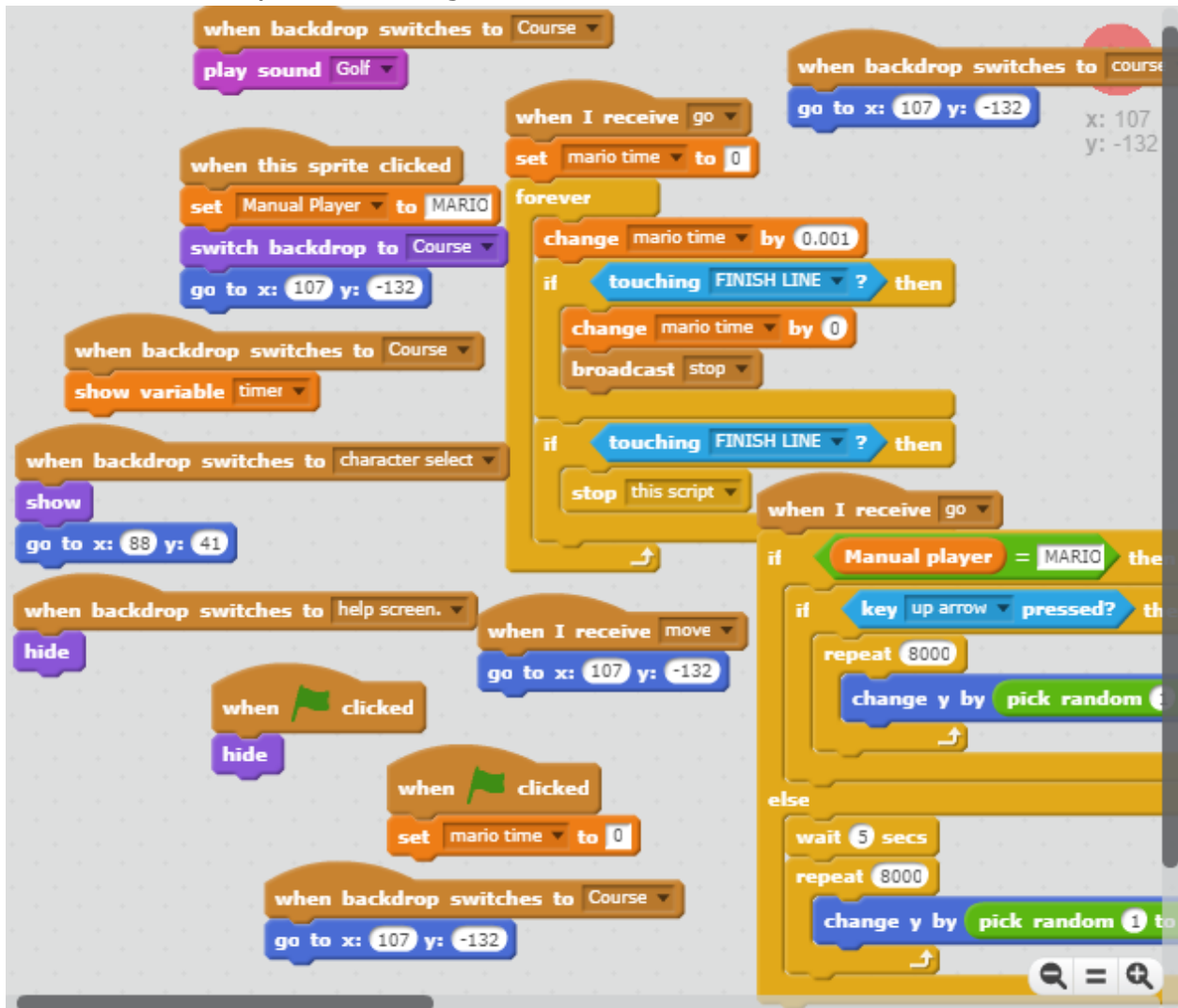
Objective:

In Part II of this project, we will finish the game that we started in Part I.

First, click the help button sprite and make this code. It explains how to play the game. It tells us when it will appear and hide on the screen, what variables to hide and what happens when you click on it:

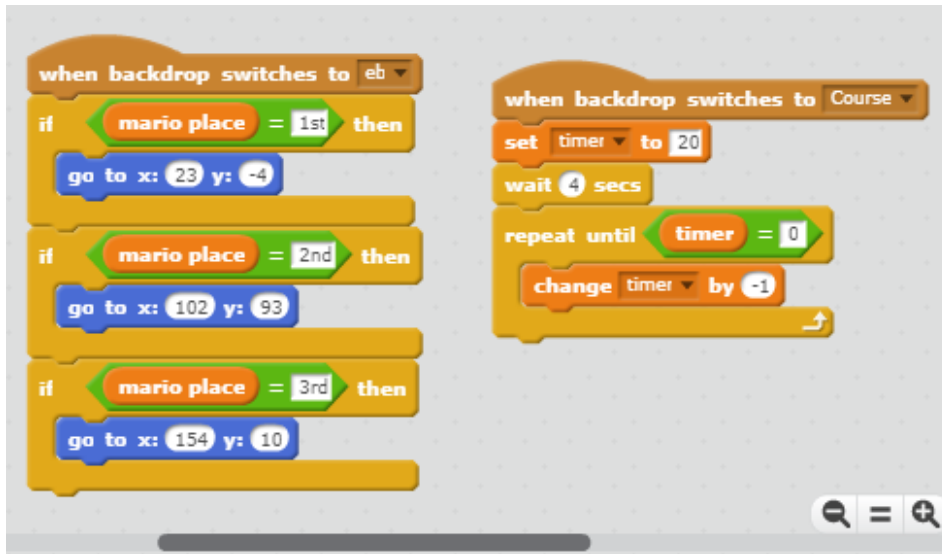


On the next page you will see the simple code for the characters. The simple code explains everything that is basic for the characters for instance, when they'll hide, when they are clicked and what happens when they are at the race. Remember the code will vary depending on which character you are doing the code for. This code is for Character M.

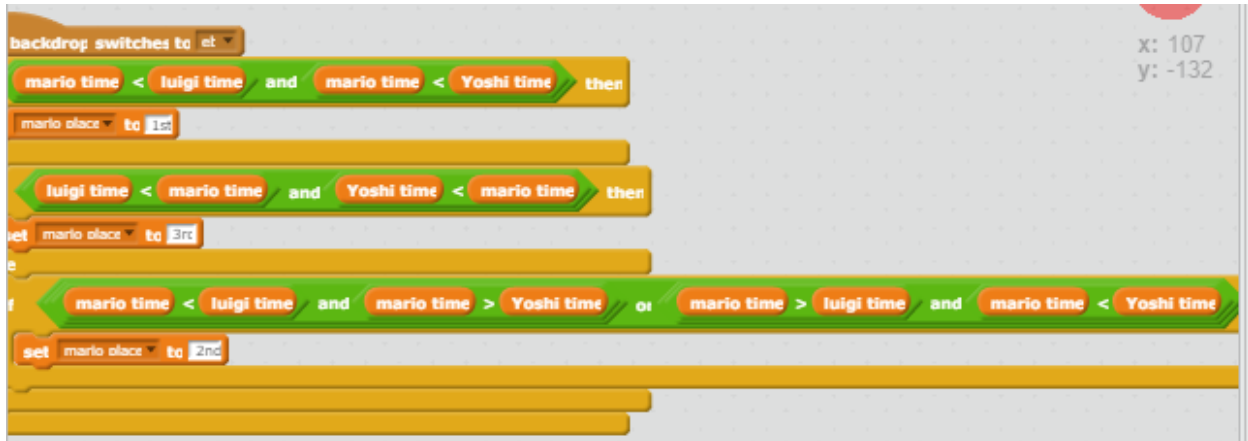


The sound "golf" is the music for the race.

Given on the next page is the advanced code for the characters. It will tell you what happens at the ending and what they will do with timer:



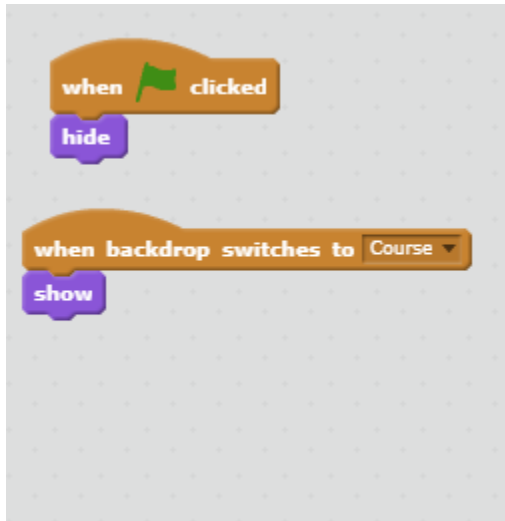
Here is the *HUMONGUS* CODE. It means what happens when Mario's time is less than Luigi's time and Yoshi's time etc.



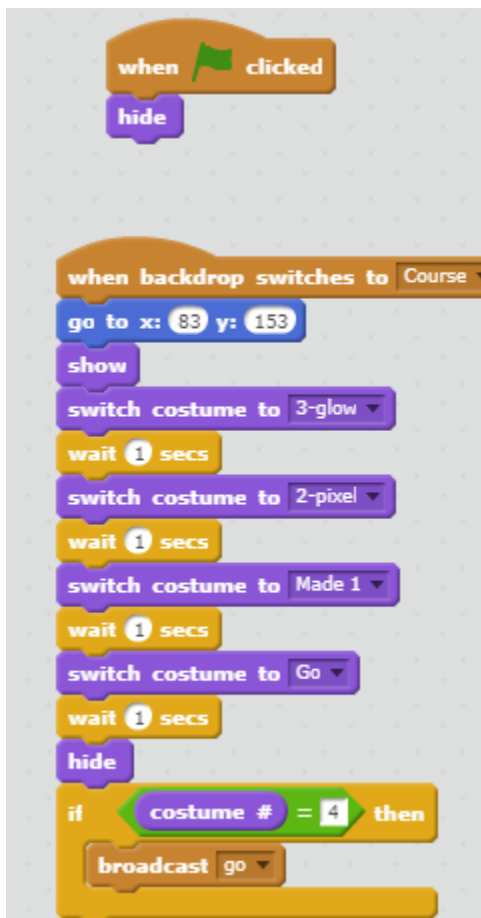
We can copy this code for the other characters instead of repeating the same process for all the characters.



Given below is the code for the finish line, here is the code:



Lastly, go to the countdown sprite and copy the code. It will explain what it will do in the course and when it will hide and show:



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Name_____ Date_____

Homework: Mario Kart Part II

1. Make a game similar like this where 1 player cheats and always gets 1st and add it to the studio.

2. Briefly explain how you made part 2 of this game.

3. Do your best and try and make a 1 player Mario kart game (Hint: try looking at another game).



Chapter #15: Lacrosse Game

Instructions: Today in class you will make a Lacrosse game.

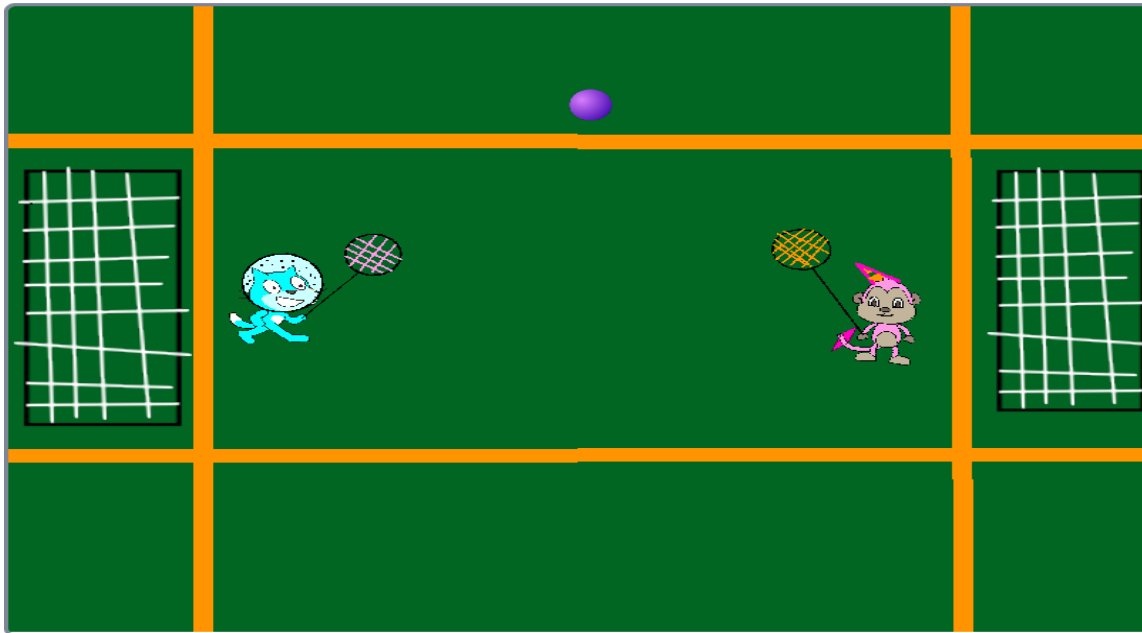
Key words:

- Blocks: Where the commands are stored.
- Command: Something that is told to be done.
- Motion: The art of moving
- Sprite: An image that is controlled through code

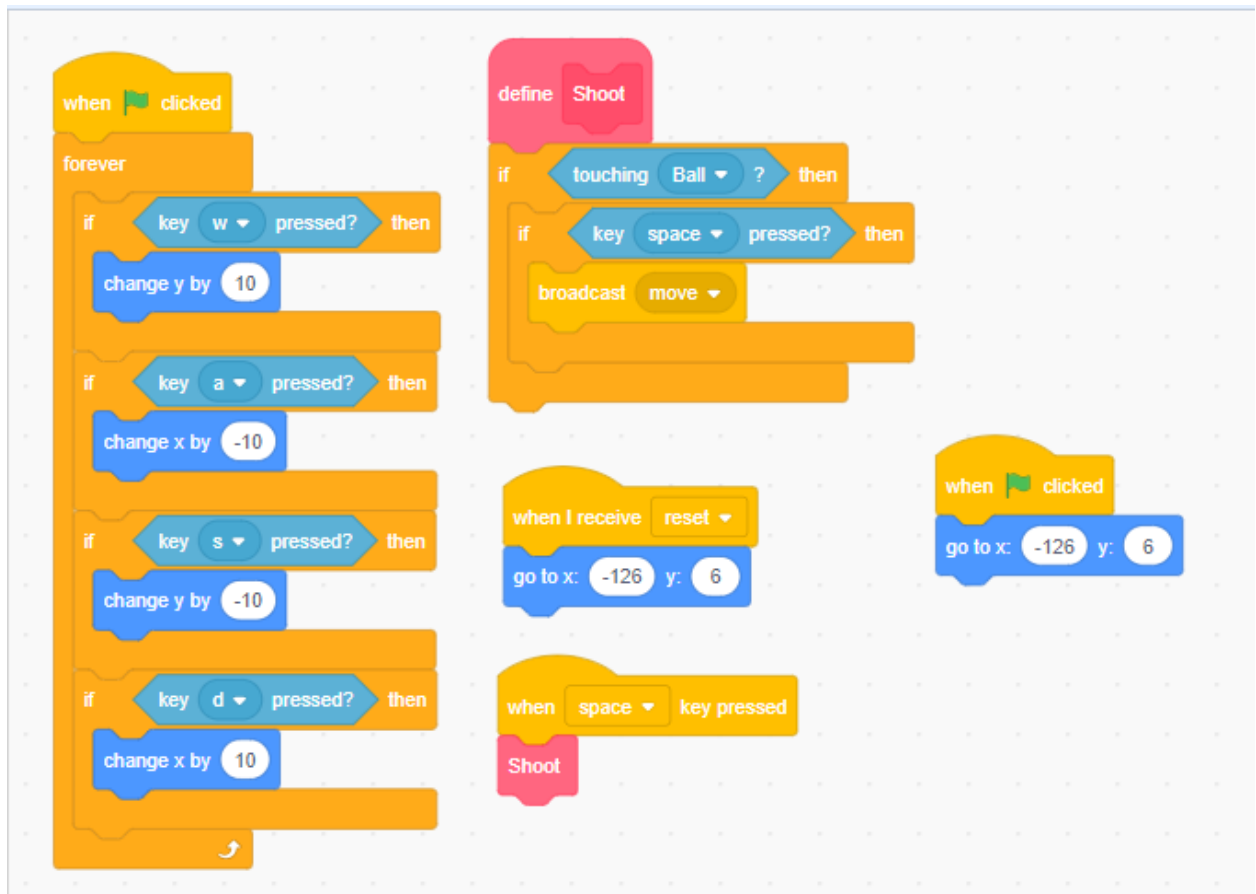
Objective: To make a working Lacrosse game.

How to create the Lacrosse game:

1. First get a sprite from the sprite library. Next, make a backdrop named lacrosse field. Then make two goals and one ball. The goals should also be sprites and not part of the backdrops. It should look like this:



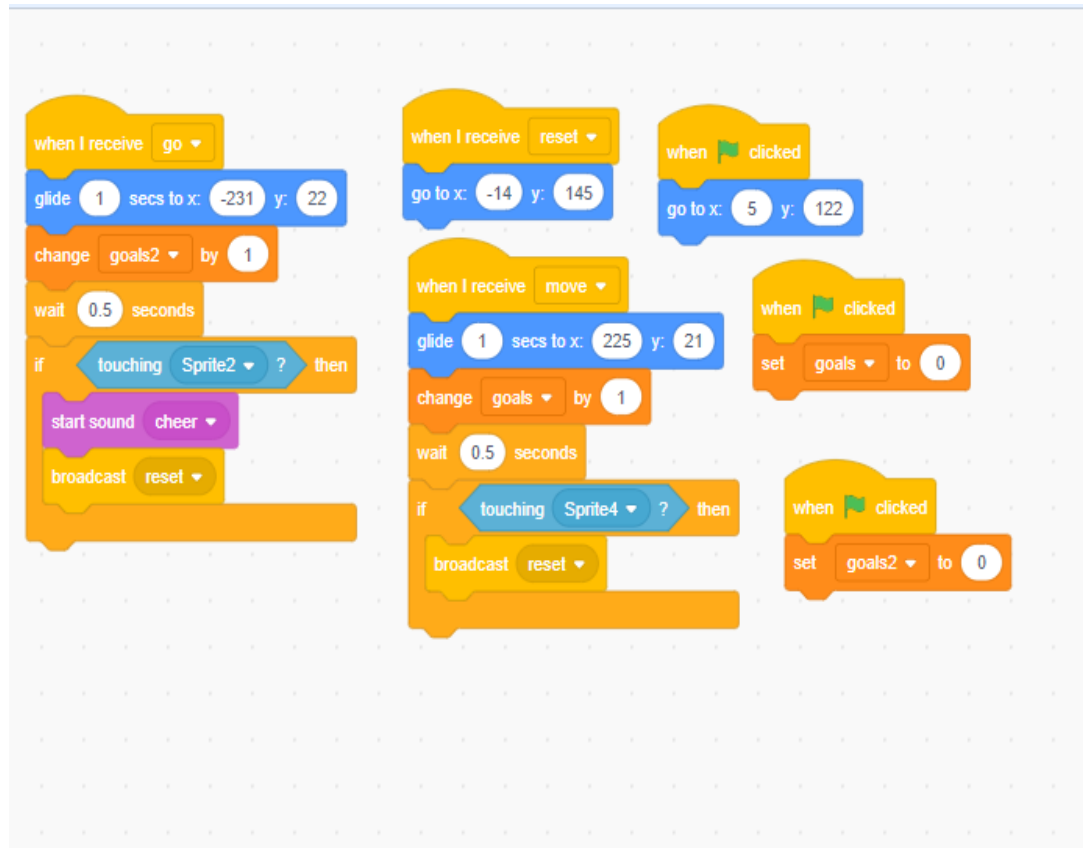
2. After you have done the steps above, you need to add code for the cat. It will explain:
 - Where it will go if you click W, A, S or D like if you click W, it will go up, A means it will go left, S means it will go down, and D means it will go right
 - How it will shoot when you click space, and so basically you click space when you have the ball and it will go to the goal.
 - If you receive reset it will go back to the x and y position it was set to.



3. Next, you need to add code for the cat. The code for the monkey is similar to the cat's code. Just change the key "W", "A", "S", "D" into Up arrow, Down arrow, Right arrow and Left arrow as well as change x and y positions.
4. Then there's the code for the ball. It is a little bit complex. It will explain:
 - If it receives "go", it will increase goals2 by 1, wait .5 of a second. And if it touches the goal then it cheers and broadcast "reset" .
 - If it receives "move" it will change goals by 1, wait .5 of a second and if it's touching "sprite4" then it will broadcast "reset".
 - If it receives "reset" it will go to its starting X and Y coordinates.



- If the green flag is clicked, It would set both goals to 0 and go to its starting X and Y coordinates.



5. That is all the code. Its time o test the game.



Name _____ Date _____

Homework: Lacrosse

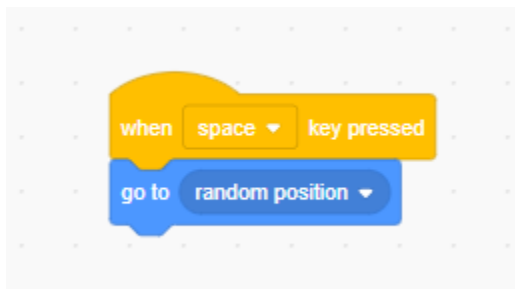
1. What does the following code mean:



- a. Forever turn into a pineapple
- b. Forever turn green
- c. Move 20 steps
- d. Forever move 10 steps

2. What is your favorite Olympic sport and why?

3. What does this code mean:



4. Is the game Lacrosse played worldwide or just in the USA?

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5. Is Lacrosse in the Olympics?



Chapter #16: Mini-Olympic Swimming

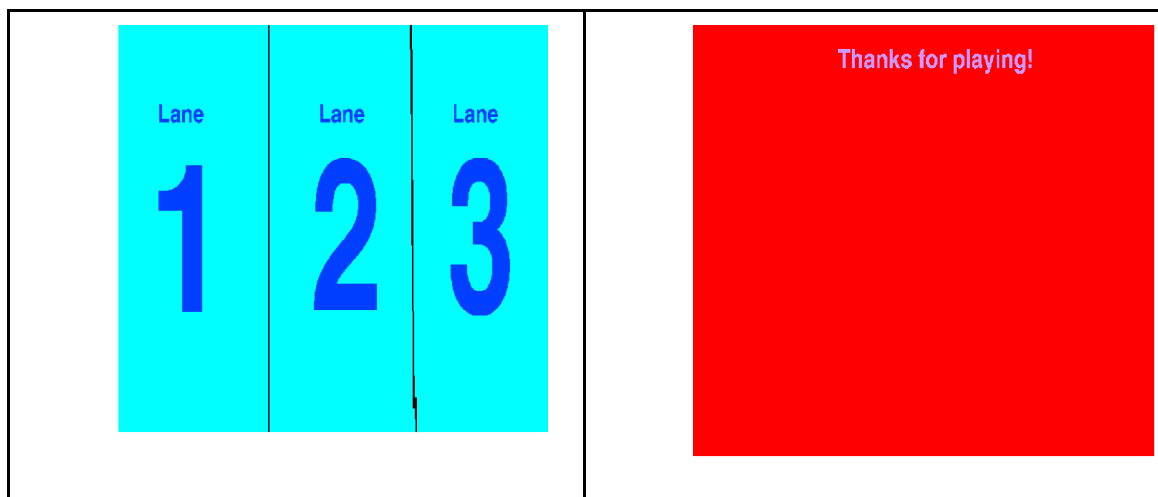
Key words:

- Blocks: Where the commands are stored.
- Command: Something that is told to be done.
- Motion: The art of moving
- Sprite: An image that is controlled through code

Objective: The objective of the game is to make a Swimming game. Please **REMEMBER** that, you are controlling the cat. So please **DON'T** make the cat the CPU. And please add it to the studio when you are done.

How to create the Swimming game:

1. Start by making a "Course" and "EB" (EB means ending backdrop) backdrop. It should resemble something like this:



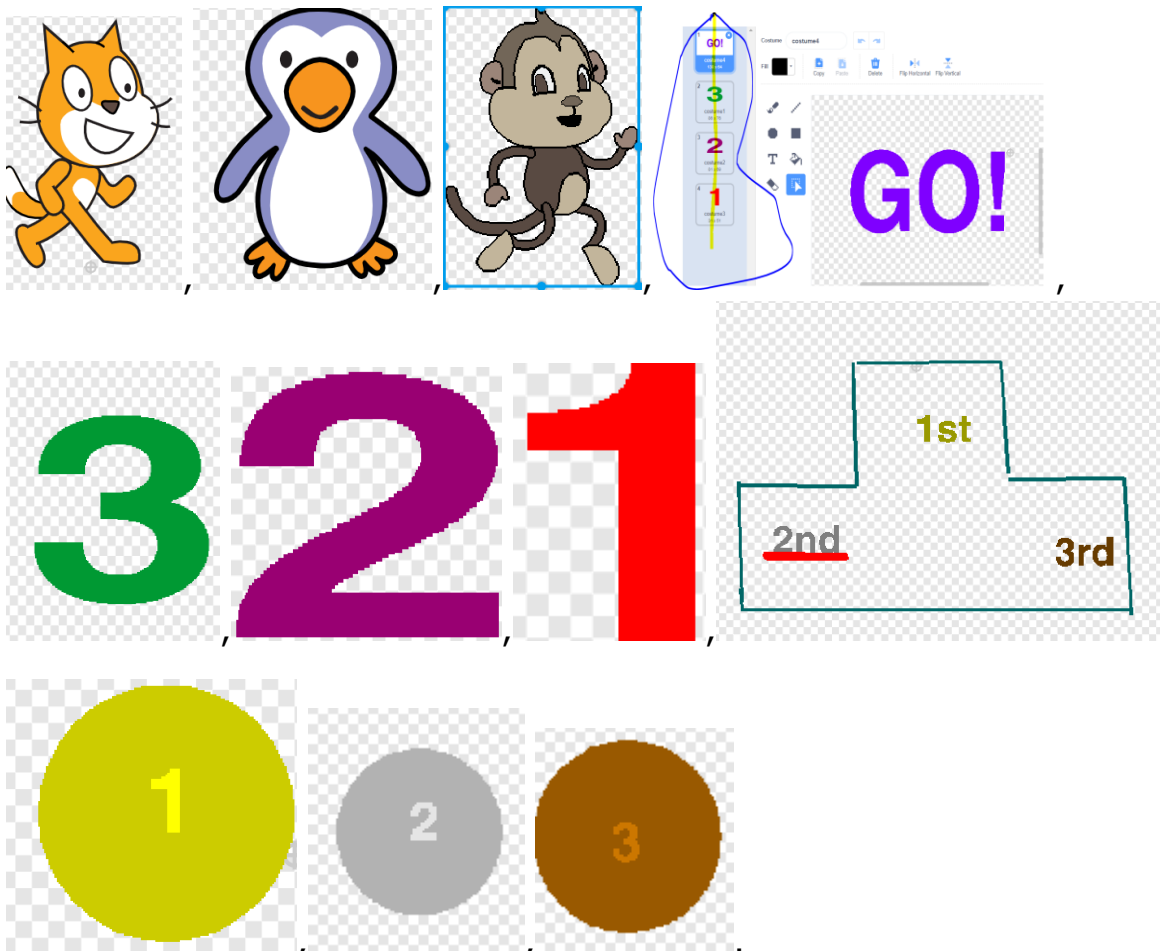
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2. Next, you should please make the following sprites.

- There are 8 sprites and 3 of them you can get from the sprite library (The Cat, Penguin, and the Monkey).
- Name the cat "Diver 1", the Penguin "Diver 2", and the monkey "Diver 3".
- The "3, 2, 1 & Go", "3", "2", and "1" countdown sprites.
- The "1st, 2nd & 3rd" positions sprite.
- The gold medal "Gold", the silver medal "Silver", and the bronze medal "Bronze".
- The countdown, "3, 2, 1 & Go" are 1 sprite in different costumes.

They should all resemble like this:



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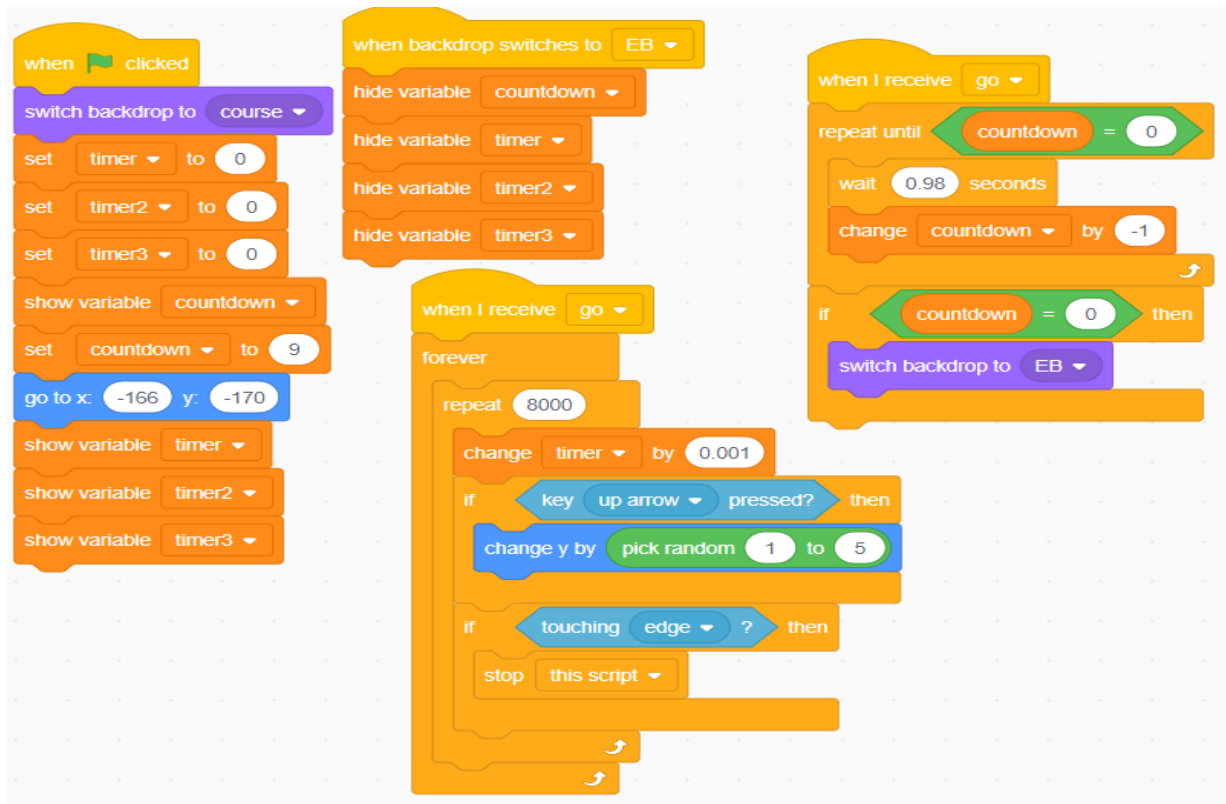
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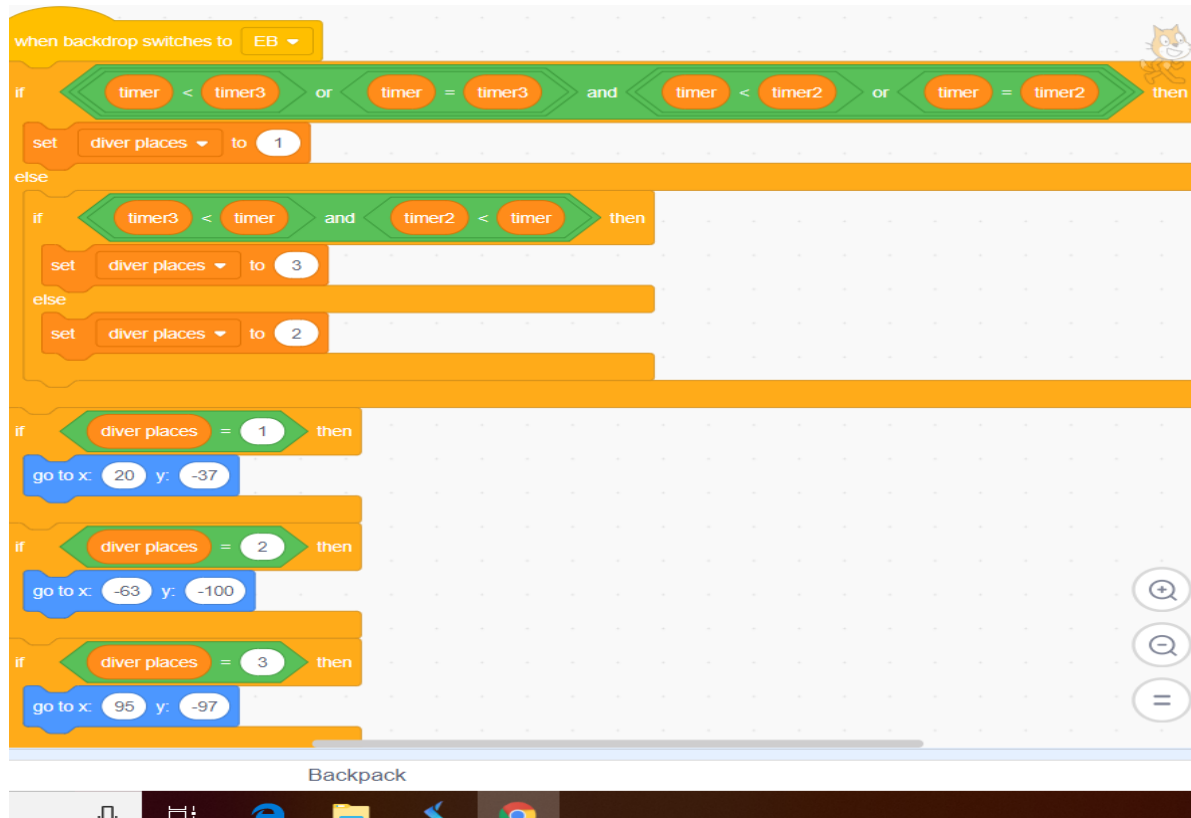
3. We would like you to make the code for the sprite "Diver 1" You will code for:

- What variables to hide and show and at what backdrops.
- The "Countdown" variable tells us the amount of time we have left in the course.
- "Timer 1" is the timer for "Diver1". "Timer2" is the timer for "Diver2". "Timer3" is the timer for "Diver3".
- "Diver1 Places" is how "Diver1" will get to his rankings spot. Similarly, it works for "Diver2" and "Diver3".
- You also need to code that how it will move. E.g. what happens if you click the right arrow? Or what happens if you touch the edge?
- Also, how to control the countdown, meaning - how many seconds do you wait until you change "countdown" By -1?
- Where and when it will go for its rankings like if "Diver1 is 1st, then where will it go?
- Logic of its rankings like if "Timer1">"Timer2" & "Timer1">"Timer3" Then what position will you go to?

Following 2 pictures will be for the cat. It looks like this:

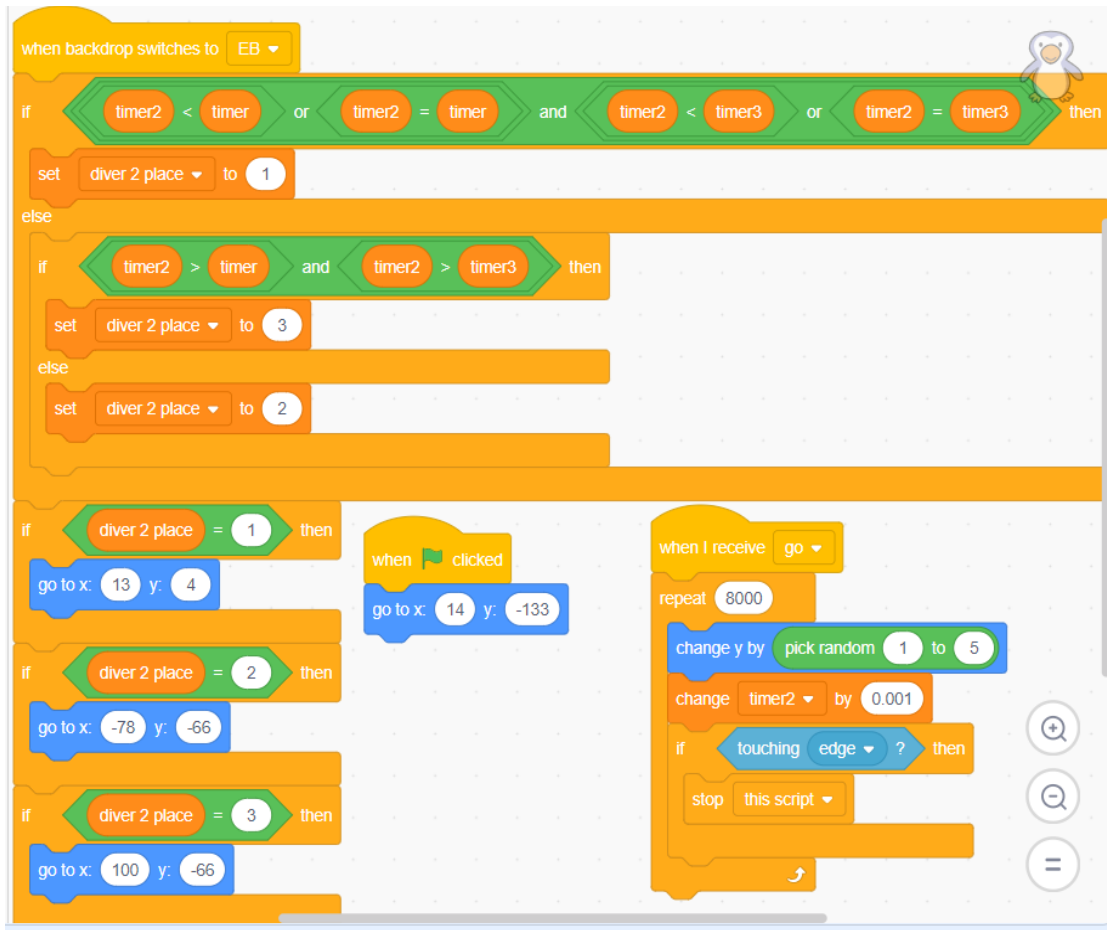


And

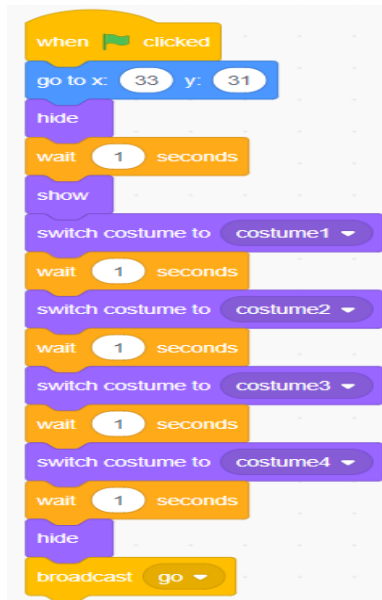


4. Now we are going to make the code for the penguin. Since he is a CPU, he has less code than the code for cat. You are going to code for:
- Where it is going to go for example, if the green flag is clicked, where is he going?
 - How he will move for example, when he receives go, what is he doing?
 - What is going to be his rankings for example, if "Timer2">"Timer1" and "Timer2">"Timer1" then what will he go to?
 - Where will it go depending on his rankings for example, if "Diver 2" is 1st place, where will it go?

The same thing is for the monkey so try to duplicate it and make so it makes sense for the monkey. It is going to resemble like this:

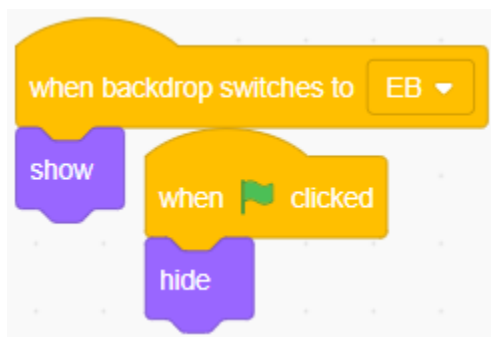


5. Now make the code for the countdown. You will code for:
 - How will it work and when to inform the divers on where to go.
 It looks like this:



6. For the places, the coding is simple. It will explain the following:
- When it is hiding and showing so when backdrop switches to EB it will show or when the green flag is clicked it will hide.

It will look similar to this:

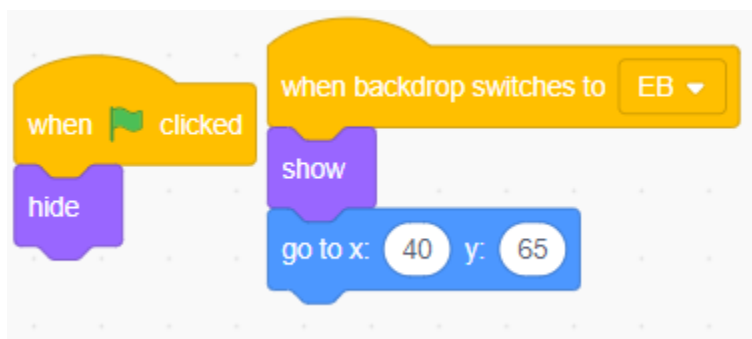




7. For the medals, they all have the following code but different x and y positions. It is going to explain:

- When it is going to show and hide

Repeat this code for all the medals and change their x and y coordinates. It looks like this:





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Homework: Mini-Olympic Swimming

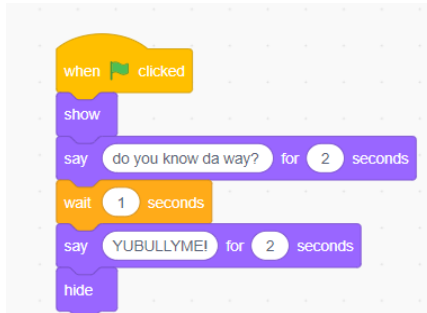
1. Briefly explain how you made the Mini-Olympic Swimming game.

2. When and where was Olympic Swimming introduced into the Olympics
? (What year was it in and where was it located.)

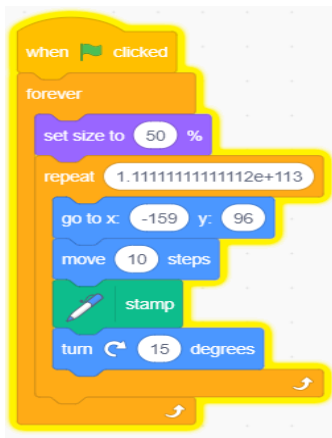
3. Who has the most Olympic gold medals in Olympic-Swimming? What
country is he from? (Put his Name on the top line and his Country on the
bottom).



4. What does the following code mean:



5. What does the following code mean:



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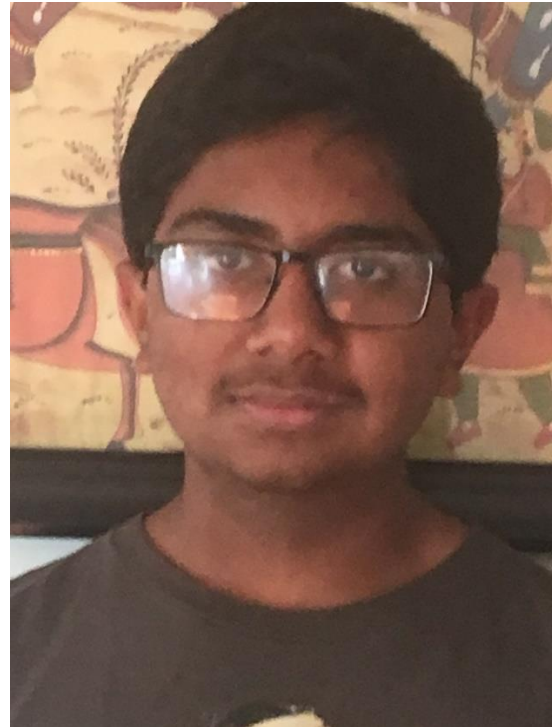
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