Class 1 - Introduction to Coding

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Pre-Class Setup

- Browser 1 - Private tabs
  - Tab 1 - Scratch login page
  - Tab 2 - Dragon Chase program
- Browser 2
  - 3 Scratch Projects

Introduction

Introduce Program Goal

- We are here to introduce a sustainable and understandable code experience.
- We are teaching to encourage creativity and thinking different.
  - Because we want to foster creativity our projects are a guideline not a requirement but we want everybody working on projects during the free time and not playing games.
- We are here to teach to all ages
  - We would like the parents to obtain knowledge as well so that we are growing not just a single new computer scientist but a family of them.
- The first four weeks there will be 3 projects provided, we recommend picking one to focus on though all three projects will be available for review.
- The first hour of the class will have lecture teaching the basics of code, how it behaves and how we can use it!
- During the second hour of class the kids will work on projects
- This changes during the second four weeks where we will learn electrical engineering and coding during the first hour
- During the second hour of the last four weeks we will slowly program a sumo bot to perform different actions.

Introduce Teachers

- Have teachers introduce themselves to the group with topics like:
  - Their name
  - Experience / Specialty
  - Fun facts about themselves / Hobbies / interests

What is coding?

- Coding is a way for humans to tell computers how to behave and respond to user input.
- It is a list of tasks that the computer can understand.
- Its becoming a very important skill to learn, it is used by many occupations such as:
  - Computer Scientists
  - Web Developers
  - Electrical Engineers
  - Scientists (Anthropologists, biologists, chemists)
  - Engineers
  - and many other careers that most don't consider (accountants, civil engineers)

What is a program?

- We take the small instructions that we make with code and we write that code into programs to tell the computer what to do.
- Programs are like a recipe, just like a recipe for baking a cake or making a pizza!
- There has to be a logical order otherwise our program will break.
- We can make a program to bake a cake: (show instructions english and java type program)
  - Preheat the oven to 350 - oven.preheat(350, F)
  - Grease cake pan - pan.grease( );
  - Mix cake mix, eggs, water
  - pour mix into bowl
  - Bake
- If we break the logical sequence, what if we forget to preheat the oven?!
- The computer doesn't know how to handle the instructions we write. These instructions are converted to 1s and 0s so that the computer knows what to do with them

- What do real programs do/control
  - Video games! These are solving lots and lots of math equations, sometimes around 1000 per second
  - Appliances (toasters, dishwasher, ovens)
  - Cars

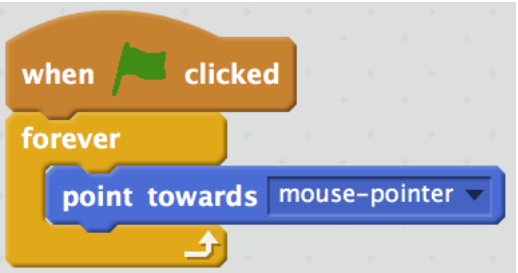
What is Scratch?

- Why are we using scratch?
  - It's Free!
  - Local schools and organizations are teaching scratch and other visual coding languages
  - There are plenty of websites such as code.org that also use visual coding so this is a very transferable skill to play with other systems
  - Everybody can have their own account so they can save their projects and work on them elsewhere.
- How is it effective?
  - Scratch blocks are pre written blocks of code that allow beginners to focus on how a program and logic works and worry less about remembering the syntax of a language.
  - It's easy to see how a program works, it's very easy to read and write.
  - Allows for easy experimentation, if you break your program it is easy to put back together.
  - Once you learn how languages work, its easy to learn new languages.

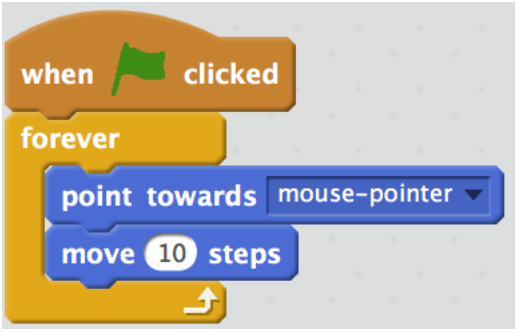
Dragon Chase

Move the Cat - Cat Sprite

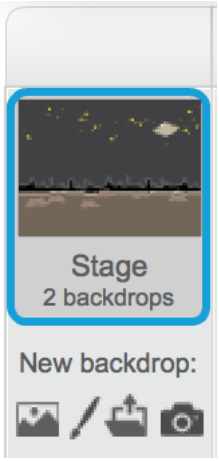
- Lets make the cat face towards the mouse pointer first



- Now we can make the cat move forward towards the mouse

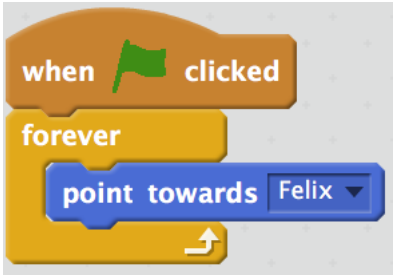


- Add a backdrop to help show that the cat is moving

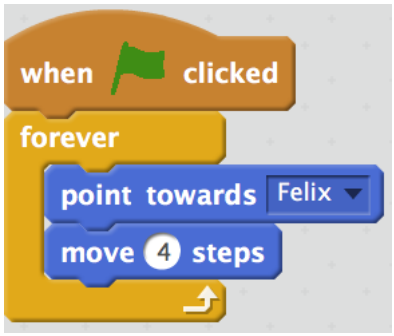


Adding the Dragon - Dragon Sprite

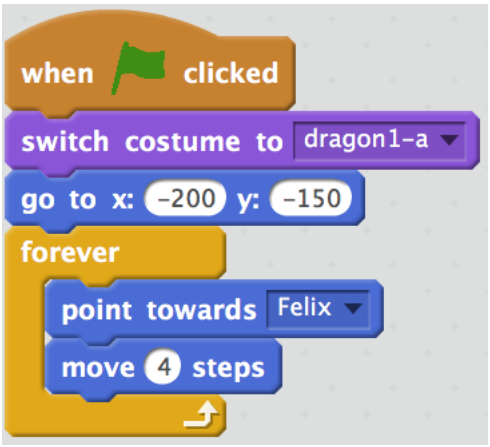
- First lets make the dragon face towards the cat



- To make the dragon chase the cat we add a movement block



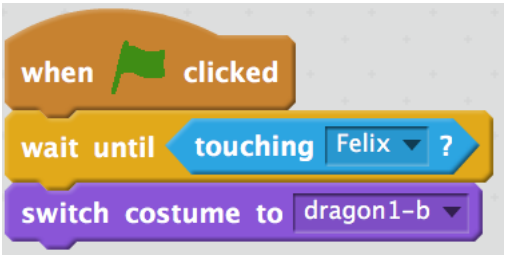
- We want to give the cat a head start so we set the dragons starting point slightly off of the screen. We will also reset the dragons image to default.



Ending the Game - Dragon Sprite

- The dragon will need to end the game when he has caught the cat. We start by adding a control block called wait, we will add a sensing block to target the cat.

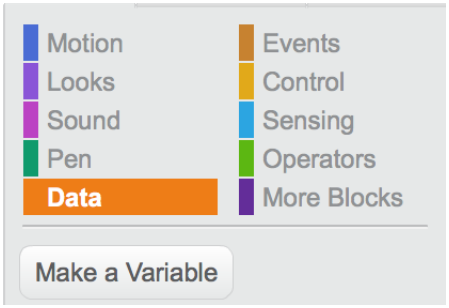
- We have to show that the dragon has caught the cat. The dragon has a second sprite that is him shooting fire. We will use a switch costume block.



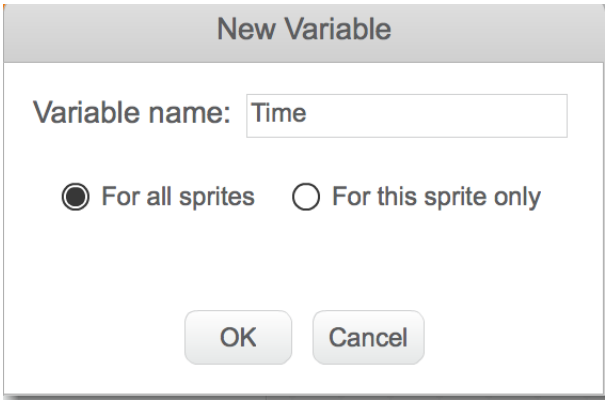
- We need to end the program now. There is a special block for this.

Time Scoring - Dragon or Cat Sprite

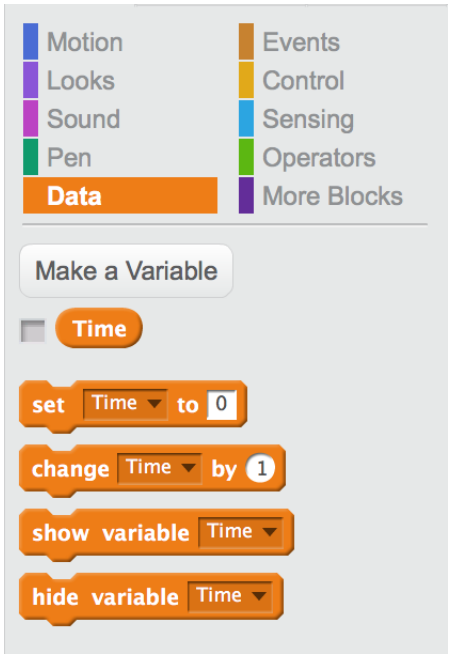
- We are going to score the game based on how long the cat stays away from the dragon. We need to make a new variable called time.



- When we name the variable, we want to make it available to all sprites.

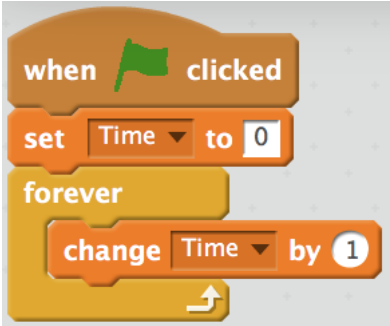


- There will be new blocks in the data section now.



- When the program starts, we need to set the time variable to zero so that our score resets.

- While our program is running we want time to increase continually. We can use a data block to increment time.



- With the last block we see that its counting faster than 1 tick per second. We need to add a delay so that it only increases every second.