Class 1 - Introduction to Coding

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March 19, 2018

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

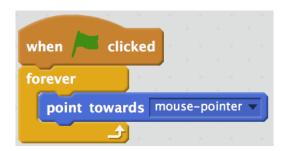
What is Scratch?

- 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.

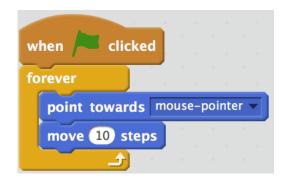
Dragon Chase

Move the Cat - Cat Sprite

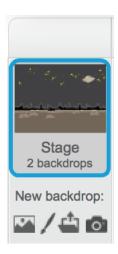
• Lets make the cat face towards the mouse pointer first



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



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

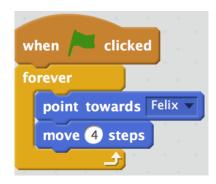


Adding the Dragon - Dragon Sprite

• 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.

```
when clicked

switch costume to dragon1-a v

go to x: -200 y: -150

forever

point towards Felix v

move 4 steps
```

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.

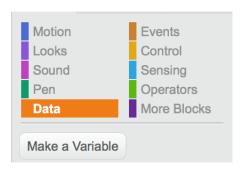


• We need to end the program now. There is a special block for this.

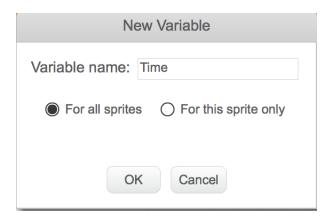


Time Scoring - Dragon or Cat Sprite

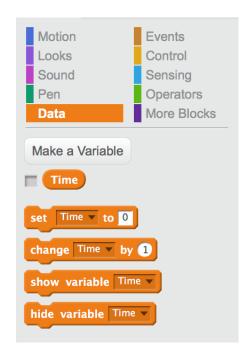
• We are going to score the game based on how long the cat stays away from the dragon. We need to make a new variable called time.



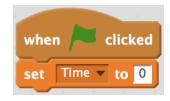
• When we name the variable, we want to make it available to all sprites.



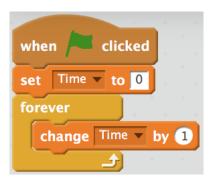
• There will be new blocks in the data section now.



• 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.

