Coding and Game Design
Class Overview

In Lando's Coding with Scratch, students will explore the fundamentals of coding by designing and building games using the Scratch platform. Designed for novice and experienced coders, our unique class system teaches students core coding concepts through creative challenges that are fun and provide opportunities for students to show what they have learned! Students will learn about coding concepts such as loops, sequencing, variables, conditionals, functions and events - allowing them to build creative and fun games for themselves and their friends. The class is self paced, allowing for kids of all skill levels to work through the class! We use group activities such as Kahoot quizzes to introduce new coding concepts and reinforce learning, before students switch to the class specific challenges. Each challenge has multiple versions with varying difficulty levels allowing for all kids to work on the same activities no matter their skill level.

Semester Overview

Class 1: Introduction to Scratch
Concepts Sequencing Events

- Learn to add sprites and backgrounds.
- Learn how Event Blocks work to control sets of code.
- Discover how to make Sprites say things.

Class 2: Introduction to Costumes

Concepts Sequencing Events

- Learn how to change a Sprite's size.
- Learn how to change a Sprite's costume.
- Explore Sensing Blocks that make Sprites react to being touched.

Class 3: Introduction to Sensing Blocks

Concepts Sequencing Events Conditionals

- Use motion blocks to move sprites.
- Use If-Then statements.

Class 4: Introduction to Effects

Concepts Sequencing Loops Functions

- Learn how to make loops using functions that will affect a sprite over and over.
- Use Effect blocks to adjust and modify the appearance of Sprites.

Class 5: Exploration of Movement & Automation

Concepts Conditionals Loops Functions

- Explore multiple ways to program a Sprite to move.
- Learn how to use Conditionals and Loops to automate Sprites' movement.

Class 6: Introduction to Variables

Concepts Variables Conditionals Loops

- Introduce Variable Blocks and assign them to Sprites.
- Create games using Variables to keep score.

Class 7: Exploring Variables & Clones

Concepts Variables Conditionals Sequencing

- Learn how to manipulate and automate Variables.
- Learn how to create clones of Sprites.

Class 8: Creating Worlds in Scratch

Concepts `Functions` `Conditionals` `Sequencing` `Loops`

- Create multiple worlds in a scratch project by having multiple backgrounds.
- Create buttons that trigger a Sprite to move between worlds.

Class 9: Building Games with Conditionals

Concepts `Sequencing` `Functions` `Loops` `Conditionals` `Events` `Variables`

- Learn to create sequences of Conditional Statements to build games.
- Create a Food Chain game where each Sprite is both predator and prey.

Class 10: Create an Ask or Answer Game

Concepts `Sequencing` `Functions` `Loops` `Conditionals` `Events` `Variables`

- Create dynamic interaction games where the Sprite poses questions to the student and its response is dictated by the answer input from the student.

Sample Class

Class Synopsis

During this week's class, students will be introduced to a variety of new coding concepts and asked to combine those previously learned concepts to tackle new challenges. Students will be introduced to coding blocks that can change a Sprite's X and Y coordinates, glide blocks that can automate a Sprite's movement, and sensing blocks that detect other code blocks and react. Students will learn about these new code blocks and concepts through our interactive Kahoot Quiz to start the class, and then take what they learned to their individual, self paced challenges.

Objectives

Students will understand the fundamental coding concepts of conditionals, sequencing, and loops. They will learn to make their programs dynamic with decision-making capabilities, arrange commands for desired outcomes, and automate repetitive tasks efficiently. Through interactive activities and self-paced challenges, they will enhance their problem-solving skills, creativity, and confidence in coding.

New Code Blocks

X & Y Coordinates
- Learn "Change X By", "Change Y By", "Set X & Y To", and "Go To X & Y" coding blocks.
- Gain a fundamental understanding of coordinate planes and how to use them to move a Sprite.

Glide Blocks
- Learn "Glide To" blocks.
- Learn how to automate a Sprite's movement by setting it to glide somewhere random or to a specific location.

Sensing Blocks
- Learn "If Touching" blocks.
- Learn how to use sensing blocks to make a sprite react when it touches another sprite or object.

Class Structure

1. **Kahoot Quiz**
   - Class begins with a group Kahoot quiz to introduce new coding concepts and blocks. This is an opportunity for students to ask questions and learn about the new coding blocks. The Kahoot is designed to introduce a concept, ask questions about it, review as a class, and then ask reinforcing questions to ensure the students are learning.

2. **Scratch Challenges**
   - Once students complete the Kahoot Quiz and take a snack break, the class moves on to individual challenges. These challenges become increasingly complex throughout the class, incorporating the new coding blocks in more intricate ways.

   - Kids are given creative license to design and customize their challenges by using custom sprites and creating games that satisfy the requirements of the challenge.

   - Hints are provided on the challenge sheets to guide the students while encouraging problem solving and critical thinking as they tackle the challenges.

Sample Challenges

Thirsty Bear

Navigate a Bear Sprite along the path to the pond. The Bear Sprite should reset to the beginning of the path when the green flag is clicked.

- In this challenge, students need to use coding blocks to change a sprite's X and Y coordinates to move along the path to get to the pond. Then, to reset the game and send the bear back to the start, students will need to use coding blocks to set the Bear to go to a specific XY coordinate.

Automatic Bear

Program the Sprite to Automatically walk the path to the pond.

- In this challenge, students will need to automate the movement of the Sprite along the path towards the pond. Students will need to use glide blocks to get the Sprite to glide to specific XY coordinates that are along the path to the pond.

Avoid The Octopus

Program a sprite to automatically move back and forth and avoid touching it while getting past.

- In this challenge, students must create a sprite that moves back and forth across the screen automatically. They must then navigate a sprite using the arrow keys and get past the sprite without touching it. If they touch the moving sprite they get reset to the beginning of the game.

So Many Octopuses

Program multiple Octopus sprites to automatically move up and down on the screen. Add a Variable to keep score.

- In this challenge, students must create multiple octopi that move back and forth and try to avoid all of them while moving their sprite across the screen. Students must also use variables to create a score that goes up every time the sprite successfully navigates past the octopuses and goes down if the octopuses touch the sprite.