Lab Activity #0 – Algorithms and Game Creation

As a first activity to introduce you to the world of computer programming, let's begin by NOT programming. It is, after all, only the first week and none of you know any programming yet. Rather let's explore a central idea in Computer Science: Algorithms.

When presented with a computational problem, our first objective is to find a computational solution, or "algorithm," to solve it. An *algorithm* is simply a precise sequence of steps for carrying out a task. Algorithms are commonly compared to food recipes that act on their ingredients (the data). For example, the algorithm for baking chocolate chip cookies might look like this:

1. Combine 2 cups of flour, 1 cup of sugar, and 2 teaspoons of cinnamon in a small bowl.
2. Beat two eggs and 1 stick of butter together in a large bowl.
3. Add the dry ingredients from Step #1 into the eggs and butter mixture from Step #2.
4. Add chocolate chips
5. Spoon a 1-tablespoon size portion of the batter onto a cookie sheet. Repeat this step until there is no batter remaining.
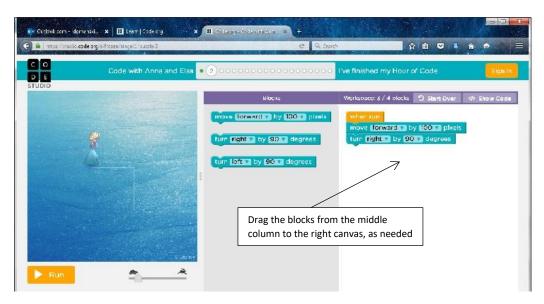6. Place the cookie sheet in a 350 degree oven and bake for 50 minutes.

Assuming we know how to perform basic cooking steps (measuring ingredients, cracking eggs, stirring, licking the spoon, etc.), we could make some admittedly questionable-tasting cookies by following these steps precisely. And that's the idea of an algorithm – defining a sequence of steps that need to be taken in order to solve a problem or achieve an objective.

So let's get to it. Rather than defining the steps needed for baking cookies, you are going to define the steps needed to accomplish specific objectives within a computer game, and ultimately create a game yourself. You don't need to know any programming at all – just drag and drop.

1. Go to https://code.org/hourofcode/overview

2. Click on one of the following games: "Minecraft Hour of Code", "Star Wars: Building a Galaxy with Code", or "Code with Anna and Elsa" (or play around, and choose one that interests you!) Then click the "Start" button for that game.

Click "Start"

3. Follow the instructions in the video (or on the tab for "No Video? Show Notes"). They will describe how to drag and drop blocks of code to the right-side canvas in order to accomplish the objectives mentioned at the start of each puzzle. Note: Make sure the blocks "snap" together in order to guarantee that they all execute in sequence.

Drag the blocks from the middle column to the right canvas, as needed

4. After completing the final puzzle where you have to create your own game, click on the button "Show Code" in the upper right corner to view the source code. Copy and paste that source code into an MS-WORD document and print it out (or upload it) for submission with your name on it.