**Variables Lab**

Variables are one of the most important tools in computer programming. They allow your computer program to remember information.

Think of a variable as a bucket. The bucket has two important pieces. On the outside of the bucket, you put a name. On the inside of the bucket you can keep stuff. The name is how you remember which bucket is which and what might be inside of the bucket. Why is the name important? Imagine you have 1000 buckets. How will you know what is inside of each of them? The name of course!

**A Simple Example!**

In our game we want to keep track of our players score. To do this we use a variable! Here is how we do this in code.

**var** currentScore = 0;

What’s going on here? First off we have the word **var**. This is how we make a new bucket. Then we have the name currentScore. This is the name we have given to the bucket. Last we have = 0. This is how we put information inside of our bucket. That’s it! Now in other parts of the code we can use this variable to do powerful stuff! We keep track of the score, and make it bigger.

(Teachers Note: Every computer programming language is slightly different on how they make variables, above we showed how to do it in Swift, a programming language made by Apple! Other languages do it differently. Many languages have a third important part of a variable, a TYPE. This lets you decide what kinds of things can be put inside of your variable. Some examples of types are: Numbers, Letters/Words, Complex Objects. In Swift the typed is auto-detected by the computer if you don’t specify it.)

**Hands On!**

We have lots of variables in our game. Experiment with changing some of them and seeing what happens when you do. You’ll notice tweaking some of these variables will customize your game, make it harder or make it easier!

Inside of your GameScene.swift file, try finding and changing the following variables. What do each of them do when you change them? Write down what you set the value to, and what you observed it did at that value. When you find a value you like, keep it for your game!

* playerHealth (Line 22) 10 pts \_\_\_\_\_\_\_\_\_

* playerStartX (Line 24) 10 pts \_\_\_\_\_\_\_\_\_
* playerStartY (Line 26) 10 pts \_\_\_\_\_\_\_\_\_
* MAX\_ENEMIES (Line 32) 10 pts \_\_\_\_\_\_\_\_\_
* WIN\_SCORE (Line 35) 10 pts \_\_\_\_\_\_\_\_\_

Once you’ve changed one of these variables, its time to run your program. Hit the play button in the top left corner, and now play your game. How did the changes you make, change the game? Consider repeating the BONUS EXERCISE with these new variables to learn more about how the code works.

Inside of your Enemy.swift file, we have some more variables you can change. Try changing the following. Write down what you set the value to, and what you observed it did at that value. When you find a value you like, keep it for your game!

* enemySpeed (Line 39) 10 pts \_\_\_\_\_\_\_\_\_
* enemyWidth (Line 42) 10 pts \_\_\_\_\_\_\_\_\_
* enemyHeight (Line 45) 10 pts \_\_\_\_\_\_\_\_\_

(Teachers Note: You should notice that it was pretty easy for you to guess what each variable was going to do. Naming variables is an important part of computer programming and really helps-out. It’s like keeping your room clean! Imagine if the names of enemySpeed, enemySize, enemyFireSpeed were instead enemyVar1, enemyVar2, enemyVar3, or worse. ev1bx, ev1by, eb1bz. That would have made it much harder for you to understand what they did without doing allot more digging.)

***BONUS EXCERCISE: (Do this last)***

*Open the GameScene.swift file. Do a search (Cmd + F) on the code in this file and look for references to currentScore. Can you tell what each of these does? If you were to change them, do you have any ideas of what they would do?*

Second Occurrence (Line 156) 5 pts \_\_\_\_\_\_\_\_\_

Third Occurrence (Line 158) 5 pts \_\_\_\_\_\_\_\_\_

Fourth Occurrence (Line 176) 5 pts \_\_\_\_\_\_\_\_\_

Sixth Occurrence (Line 190) 5 pts \_\_\_\_\_\_\_\_\_

Seventh Occurrence (Line 195) 5 pts \_\_\_\_\_\_\_\_\_

All the code we work on today is available at <https://github.com/Unome5548/Digigirlz2020> If you want to keep working on your game, you can download it there. Email me at [mipatte@microsoft.com](mailto:mipatte@microsoft.com) if you have any questions or need help!