Lab 1 - Portfolio Questions

DISCUSSION PORTFOLIO QUESTIONS: Answer the questions here. You will organize the information in your portfolio later on in this unit.

1) **Search online for an Arduino project that interests you. Choose one of the projects and explain the scope of the project in YOUR own words and provide a link and/or video within your portfolio. Clearly explain why this would be a good project to try and why it interests you.**

   - An Arduino project that interests me is a piano project.
   - A piano project can be simply made with an Arduino, buzzer, resistors, and push buttons. To start with, Arduino can produce PWM (Pulse Width Modulation) signals. With the help of PWM we can use the function tone which is also another feature of Arduino which generates different frequency of tones. Furthermore, with the help of these features we can start coding. The first thing would be to declare all the push buttons as the inputs and declare the buzzer as the output. Second assign the pin number to each push button so that the Arduino will be able to read the values of the pushbutton. Lastly, assign each push buttons different frequency (highest to lowest) in the conditional part. Finally, after your done you can relish your sensational piano project.
   - This would be a good project to try as it is extremely easy to understand, even for those who are beginners like myself. Furthermore, it expands a lot of knowledge upon different functions and features that Arduino has as well as it gives a broad understanding on the purpose and uses of different electrical components such as buzzer, resistors, push buttons etc.
   - This project interests me as I am a music producer therefore, I am extremely fascinated and passionate toward a lot of different musical instrument.

2) **Explain what the difference is between a digital and an analog signal. Give a specific example of each. Which pins are used for digital input / output and which are used for analog on the Arduino Uno? What types of values or range of values can you expect for each type of signal?**

   - The difference between a digital signal and an analog signal is that an analog signal is a continuous signal that represents physical measurements and it is denoted in sine waves where as a digital signals are time separated signals which are generated using digital modulation in simple terms analog signals use a range of values to represent signals where as a digital signal uses discrete of 0 and 1 to represent signals
   - An example of digital signal is a thermometer and an example of a digital signal are phones, computers etc.
   - The pins used for digital input/output are pin 0 to 13 and pins used for analog input/output are pin A0 to A5 in Arduino Uno.
   - Analog signals have a range of values such as 2.5V, 3.1V, etc where as a digital signals have 2 values such as 1 and 0.

3) **If you run out of all 14 digital I/O pins (meaning that you are using them for another purpose), which other pins on the Arduino can you use for digital I/O? How would you declare one of those pins using the pinMode function? Be clear and fully explain your answer.**

   You can use the analog pins for digital I/O. You would declare one of those pins by using the pinMode function such as pinMode(pin #,mode) for example pinMode(5,LOW).

4) **Writing to the Console using Serial.println and providing comments throughout your code have no impact on the execution of your running Arduino program. Provide two different reasons why programmers would want to use these techniques.**

Programmers would want to use these techniques:
- To send data from the Arduino to another electronic device such as a computer, so that someone can see the values displayed on the computer monitor.
- To display the user of what the code does (almost like a comment).

5) **Describe what effect this command would have in a sketch: digitalWrite(5, LOW);**

This command would output a voltage of 0 from pin 5.

6) **You had the choice of doing extension #1 or #2. If you chose #1, there were two versions of the built-in tone() function that you could use. What are the arguments for the two different versions of tone (one has two arguments and the other has three)? What is the range of audible frequencies humans can hear?**

- The two argument for the first version of the tone function include pin number and frequency measured in Hertz.
- The three argument of the second version of the tone function includes pin number, frequency (Hertz), and duration (milliseconds).
- The range of audible frequencies humans can hear is 20 Hz to 20 kHz

If you chose #2, how does the RGB LED work? Which pins provide PWM (pulse width modulation) signals and how is a PWM pin different from a regular digital I/O pin?

Link to Extension 1 Tinkercad:
https://www.tinkercad.com/things/l98mmawFWav-lab-1-extension-1/editel?sharecode=PKtWmki0hfkF69l1vqYbXDOk3u8tC7XCvvRk3KAGX5I