ENGI1020 - Lab Logbook Template

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| --- | --- | --- |
| Name | Lab & Date | Input & Output Devices |
| Anton Guaman | Lab 3  October 9, 2020 | Input: Temperature sensor and Button  Output: LCD Screen and LED |

* 0 Preparation
  + - Summary of lab task in your own words
    - Summary of preparation (no need to repeat entirely)

The lab preparation consisted in creating a flow chart with the respective decisions depending on the input and output devices we selected. In my case it was the temperature sensor and the LED. After we made a test plan in test matrix format that would show the expected outcomes depending on the input.

The lab consisted in setting up our lab equipment consisting of our Arduino, the two input devices and the two output devices. After we modified the lab script to read the input from our devices and stored them in variables. We used conditional statements depending on the input received and these will affect how the output is displayed. After we the implementation we used looping. So, our script run an infinite amount of times we could say.

* 1 Implementation
  + 1.1 Converting Design to Implementation
    - Notes about how you took your design and implemented it
    - DO NOT just insert your code (though if it is useful to include lines of code to explain, you can)

We began the implementation by getting the input from our two input devices. We stored those input into variables. The first input that we stored in a variable was the temperature in Celsius and the value of the input would be displayed as an output in the LCD screen. The input was stored in variable name x.

x = temp\_celsius(1)

In the following part we use a formula to manipulate the hue color in the LCD screen that will depend on the input from the temperature sensor. The input was stored in variable name y.

y = -0.07 \* x + 20 \* 0.07

lcd\_hsv(y,1, 255)

The second input we stored in a variable was the button. The input was stored in variable name buttonpress.

buttonpress = digital\_read(8)

In the next part of our code we use conditional statements to decide how output would be shown depending on what input is entered which will affect how the output is displayed. The first proposition was if the input from the temperature sensor is greater than 23 and the input from button pressed was equal to one. The output would be that the LED will turn on and that the LCD screen will display the corresponding color.

if x > 23 and buttonpress == 1:

digital\_write(3,1)

The second proposition we wrote was that if the “if” statement does not evaluate to true the LED will not turn on but the LCD screen will display the corresponding value depending on the temperature.

else:

digital\_write(3,0)

* + 1.2. Errors Encountered While Implementing
    - Notes about errors encountered in Python interpreter or syntax problems
    - Include notes about solution
    - If useful, include names of errors

The errors encountered in the implementation were the same ones that happened in Lab 2. The error name was serial time out. I tried to solve this error with my knowledge from the past lab. I began by restarting my kernel, it did not work. I continued to upload the firm ware to my Arduino, it did not work. I tried switching USB ports were the Arduino was connected, it did not work. I received help from Professor and the teacher assistant. Finally, we deleted the firmware and downloaded it again to my computer. We tried again uploading the firmware to the Arduino and it was successful. I could continue testing my code afterwards.

* + 1.3 Details and Facts from Implementation to Remember
    - Details about concepts that you learned from implementation
    - Technical details about interpreter, Arduino equipment, engi1020 module related to implementation
    - Anything else you think will demonstrate your learning and will be useful to remember for future

I keep learning more about how Arduino works with my computer and the possible ways that I can solve the serial time out errors. I know now more steps that I can do to solve this problem like downloading the firmware to my computer again and after upload it to my Arduino.

* 2 Testing
  + 2.1. Test Plan and Results
    - Should be in table format!!

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test** | **Input Manipulation** | **Output**  **Expected** | **Output**  **Observed** | **Investigation** |
| **Test 1** | **How did you**  **change the**  **input?**  For the first test I did not change the temperature sensor input, but I did press the button. | **What did you**  **expect to**  **observe?**  I expected to observe the LED turn on since I pressed the button and I am at room temperature which is 23 degrees Celsius. The LCD screen will display an LCD color. | **What did you**  **observe?**  The LED turned on and displayed the appropriate color on the LCD screen. | **Did they match?**  **If not, what did**  **you do (can**  **reference**  **Section 2.2)**  Yes, they did match! |
| **Test 2** | For the second test I changed the temperature sensor input by moving it close to an ice pack and I did not press the button. | I expected to observe the LED to not turn since the temperature would be less than 23. Display a different LCD color than from the one of Test 1. | The LED did not turn on and the temperature was less than 23. Displayed the appropriate color on the LCD screen. | Yes, they did match |
| **Test 3** | For the third test I changed the temperature sensor input by moving it close to an ice pack and I did press the button. | Although, I pressed the button I expected to observe the LED to not turn since the temperature would be less than 23. Display a different LCD color than from the one of Test 2. Since the temperature would be lower because the ice pack has been exposed more time to the ice pack. | The LED did not turn on and the temperature was less than 23. It did not turn on since it does not meet the statements of the “if”condition. Displayed the appropriate color on the LCD screen. | Yes, they did match |
| **Test 4** | For the fourth and last test I changed the temperature input by moving away the ice back and letting it stabilize to room temperature. Also, I did not press the button. | I expected the LCD screen color to display a color similar to the one on Test 1 as well as that the LED would not turn on since I did not press the button and it does not meet the “if” condition. | The LCD screen color displayed was similar to the one on Test 1. The LED did not turn on | Yes, they did match! |

* 2.2. Errors Encountered while Testing
  + - Details about semantics or syntax errors discovered through testing
    - Expanding on “Investigation Column” above

There were no semantics or syntax errors. I stored the analog and digital input in variables correctly. I verified it with printing the variable that was assigned to the input. I used the if and else statements correctly with the appropriate comparisons and always finished writing them with a colon.

When using the loope “while” it was running the code at a faster pace. It worked the same as when tested. Just that the output would change it a mater of seconds. The LED would turn on if the temperature input was greater than 23 and it would not turn on if the temperature input was less than 23. The LCD screen changed depending on the temperature. If I keep the button pressed and the temperature is greater than 23 the LED would remain turned on otherwise the LED would be turned off. I pressed the button and hold it and the script did not stop. I had to stop the script manually.

* + 2.3. Details and Facts from Testing to Remember
    - Details about concepts that you learned from testing
    - Technical details about interpreter, Arduino equipment, engi1020 module related to testing
    - Anything else you think will demonstrate your learning and will be useful to remember for future

The key take always are the same ones as from implementation. I am more acquainted on how the Arduino works with my computer and I know more on how to solve serial time outs. Another key take away is that if statements use comparisons and end with a colon, but an else statement does not use comparisons just a colon at the end. Colons are important when using conditional statements!!

* 3. Reflection and Conclusion
  + 3.1. Reflection Question Answers
* Describe another situation where looping (while) may be preferred to branch (if).

Looping may be preferred when the script is required to repeat multiple times and it would help if it was down automatically instead of running the script multiple times manually with branching. Also, loops can break when a condition is satisfied so it does not last forever and you will receive the results desired.

* How easy or challenging did you find it to recall work previously completed in Labs 1 and 2? Were your logbook entries helpful for this? Why or why not?

The knowledge that we have been building through lectures and hands on experience during Labs 1 and 2 have been really helpful for Lab 3 to go smoothly. My logbook entries were helpful since I could reference them when working on the pre-lab, implementation and testing of Lab 3.

* How did your implementation change as you tested? If it did not, why do you think this was?

My implementation went as expected. I followed the instructions on how the script should work. I understood what code we needed to implement and how it will work with different kinds of input and how those inputs would display as outputs. I enjoyed adding a new component like the loop which showed me again the many possibilities that we can implement while coding.

* + 3.2 Additional conclusion Notes