EEE 120

Lab 2 Answer Sheet (Online Class)

Multiplexers, Decoders and the Arithmetic and Logic Unit (ALU)

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Semester/Year/Session (A/B):Spring 2022 A Date:1/30/22

**Task 2-1: Build and Test a 1-Bit 2:1 Multiplexer**

**Include a picture of your Digital circuit here:**![Diagram, schematic

Description automatically generated]()

**Please comment on the single biggest issue you were facing when designing the circuit.**

Had no issues building this circuit

**Task 2-2: Build a 4-Bit 2:1 Multiplexer**

**Include a picture of your Digital circuit here:**![Diagram, schematic

Description automatically generated]()

**Please comment on the single biggest issue you were facing when designing the circuit.**

I had a little trouble getting the two\_bit\_mux to show up under customs.

**Include a picture of your simulation (timing diagram) here:**

**Which tests did you perform and why? The following table is an example of how to describe your test sequence. You need to make sure to perform a sufficient number of tests to check the circuit for eventual faults.**

|  |  |  |
| --- | --- | --- |
| **Test Stimulus** | **Test Motivation** | **Pass/Fail** |
| A+B | To see if it works | Pass |

**Please comment on the single biggest issue you were facing when simulating the circuit.**

Getting the GTK Wave to show up

**Task 2-3: Add 7-Segment Displays to Your Circuit**

Include a picture of your Digital 7-Segment Display here:![Diagram, schematic

Description automatically generated]()

**Please comment on the single biggest issue you were facing when adding the displays.**

Getting the display to show correctly

**Task 2-4: Build the NOT/NEG Circuit**

Include a picture of your Digital circuit here:![Diagram, schematic

Description automatically generated]()

**Please comment on the single biggest issue you were facing when designing the circuit.**

Inputting previous circuits to get the incrementor working.

**Task 2-5: Build the AND/ADD Circuit**

Include a picture of your Digital circuit here: ![Diagram, schematic

Description automatically generated]()![Diagram, schematic

Description automatically generated]()

**Please comment on the single biggest issue you were facing when designing the circuit.**

Had an issue with the merger from the “a” input on merger output 2 to the 2nd AND input.

**Task 2-6: Build and Test the ALU Circuit**

Include a picture of your Digital circuit here:

Please comment on the single biggest issue you were facing when designing the circuit. Could not get the and\_add to be 5 inputs.

Please complete the ALU function definition table shown below:

| arith | invert | pass | Function |
| --- | --- | --- | --- |
| 0 | 0 | 0 |  |
| 0 | 0 | 1 |  |
| 0 | 1 | 0 |  |
| 0 | 1 | 1 |  |
| 1 | 0 | 0 | Arithmetic Sum, A+B |
| 1 | 0 | 1 |  |
| 1 | 1 | 0 |  |
| 1 | 1 | 1 |  |

**Include all pictures of simulations (timing diagrams) for each function here:**

**Did the circuit behave as expected? If no, what was wrong**? No. There was a mistake in the NOT\_NEG circuit.

**Please comment on the single biggest issue you were facing when simulating the circuit.**

My NOT\_NEG circuit did not work causing my AND\_ADD to not work thus my ALU to not work properly.

**Task 2-7: Create a video and submit your report (Optional)**

[This task is useful to get partial credit if your schematic is not working. Take advantage of it to explain to the grader your understanding of the circuit. More importantly, explain where you think the mistake is in and what you would do if you were given more time to fix it.]

Record a short video showing your schematic in Digital and your waveforms in GTKWave. Be sure to show yourself in the video and show your screen. **Upload the video to your Google Drive (personal one or ASU one). Copy and paste the sharing link to that video here. Make sure the link is working and pointing to the correct video. Do NOT upload your video to YouTube.** If your circuit is not working as expected, explain in the video how it is not working and where you expect the mistake to be from.

**Video Link:**

<https://drive.google.com/file/d/1JfXe2AkA10MP5sDl0Uhk64-3k0OUaJ5A/view?usp=sharing>

<https://drive.google.com/file/d/101jlKKISgFtctgbItsNOzvr6Sl6OLmTn/view?usp=sharing>

<https://drive.google.com/file/d/1JD8g63w31IYWyU7Zxg9bkypXBHNhNw4U/view?usp=sharing>

<https://drive.google.com/file/d/1DCMdwSCVMkksX2J25fAL0GZW3zFdgF2N/view?usp=sharing>

<https://drive.google.com/file/d/1ZI9ZaWA2ZRBmnvbgJ-vSxOKShTpS_79U/view?usp=sharing>

**At the beginning of your recording, say your name, the task number and circuit name. Be brief in your recording. Submit the completed template to Canvas.**

**Make sure all your files are in the Lab2 directory. Create a zip file of the Lab2 directory. Remember to turn in the zip file and your completed template on Canvas! Make sure you upload the template before the zip file.**

Lab 2: Lab Report Grade Sheet

|  |  |
| --- | --- |
| **Name:** |  |

## Instructor Assessment

| **Grading Criteria** | **Max Points** | **Points Lost** |
| --- | --- | --- |
| **Description of Assigned Tasks, Work Performed & Outcomes Met** |  |  |
| Task 2-1: Build and Test a 1-bit 2:1 Multiplexer | 10 |  |
| Task 2-2: Build a 4-Bit 2:1 Multiplexer | 10 |  |
| Task 2-3: Add 7-Segment Displays to Your Circuit | 10 |  |
| Task 2-4: Build the NOT/NEG Circuit | 10 |  |
| Task 2-5: Build the AND/ADD Circuit | 15 |  |
| Task 2-6: Build and Test the ALU Circuit | 15 |  |
| Task 2-7: Create a video and submit your report. |  |  |
|  | **Points Lost** |  |
| Lab Score (70 points total) | **Late Lab** |  |
|  | **Lab Score** |  |