**CECS 341 - Lab 3**

**“MIPS Control Unit”**

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I certify that this submission is my original work

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Lab Report: Lab Assignment 3 - “MIPS Control Unit”

1. **Goal:** The goal of this lab is to create the control unit that decodes an instruction and then tells the rest of the processor what to do.
2. **Steps:**
   1. Step 1: Read over the entire lab instruction.
   2. Step 2: Copy the code for the main decoder and the ALU decoder.
   3. Step 3: Copy the code for the ALU that we have used in previous labs.
   4. Step 4: Copy the code for the test bench.
   5. Step 5: Copy the skeleton code for the design file.
   6. Step 6: Understand how the R-type format instructions work and what each signal means.
   7. Step 7: Understand how the main and ALU decoders work with a given instruction.
   8. Step 8: Complete the skeleton code for the design file by filling in the correct inputs and outputs for each module.
   9. Step 9: Check each answer with the solution provided and make sure the program is running correctly.
3. **Results:** The result of the lab starts with outputting the signals for add, subtract, and, or, and set less than. After those signals are outputted, the program will output the load word signal, store word signals, branch equal to signals (when branch is taken and not), the add immediate signals and finally the jump signals. Using the jump instruction as an example, the instruction is meant to jump from one part of the program to another. The only signals that would be affected by that would be the jump signal. The ALU control is then 010 for the jump instruction giving a signal output of 0000001010 (MemToReg, MemWrite, pcsrc, alusrc, regDst, regWrite, jump, and aluControl[2:0]).
4. **Conclusion:** I learned in this lab how the control unit can take an instruction and decode what the instruction is suppose to do and output the signals that are affected from both decoders. The challenging part of the lab was to determine how the decoders worked and what their purposes were.