CECS 341 – LAB 7

MIPS Execute Stage

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I certify that this submission is my original work

Lab Report: Lab Assignment 7 – MIPS Execute Stage

1. Goal: The goal of the MIPS Execute Stage Lab Assignment is to implement the Execute Stage of the MIPS processor in a single cycle.

2. Steps:
    a. Go to edaplayground.com and log in to your account.
    b. Rewrite the outline provided with this lab.
    c. Identify what is to be done to produce specified output.
    d. Create alu.v and fill in the data.
    e. Get the mux2.v file from the previous lab.
    f. Get the adder32.v file from the previous lab.
    g. Check for errors.
    h. Run the code for test cases.

3. Results: In this Lab Assignment we performed the R-Type instructions and output the following outputs.

```
ALU is performing AND
aluoute = 00001010
ALU is performing OR
aluoute = 00003636
ALU is performing ADD
aluoute = 00004646
ALU Operation is invalid
aluoute = xxxxxxxx
ALU is performing SUB
aluoute = ffffddde
ALU is performing SLT
aluoute = 00000001
Done
```

4. Conclusion: In conclusion of this lab, I learned how the implementation of the Execute Stage works in the single cycle MIPS processor. The Execute stage involves the ALU which is used to calculate the result of R-Type instructions. It also performs subtraction to check if both sides of BEQ operands are equal. The challenges in this lab were to figure out how to read the Figure 7.1 and understand the process.

5. Notes: The RegWriteE, MemtoRegE, MemWriteE, and BrancheE signals are passed along but do not control any hardware in the EX stage. The ALUControlE makes the ALU perform a specific operation. When ALUSrcE is equal to 0 the ALU input B receives output of register File, when equal to 1 the ALU input B receives immediate data.