**Introduction**

For this final project, we were required to make a 16 – bit single cycle MIPS processor. We were to take the ALU that we created structurally from project 2 and use it at the center of this new design. In addition, we needed to implement a Register file, RAM, ALU control, and program counter. Once that was all complete combine all the components into a single file and verify the processor works correctly.

**Components**

ALU

**ALU Control**



Register

RAM

**Conclusion**

After preforming a hand analysis of the given program to execute and verifying the output against the simulation we could see the processor works as expected. Figure 1. The supplied code, and the converted values to hexadecimal.

|  |  |
| --- | --- |
| ldi $r0, 10 | 500A |
| ldi $r1, 5 | 5105 |
| ldi $r2, 0 | 5200 |
| ldi $r3, 0 | 5300 |
| ldi $r4, 0 | 5400 |
| ldi $r5, 0 | 5500 |
| ldi $r6, 0 | 5600 |
| ldi $r7, 0 | 5700 |
| add $r2, $r0, $r1 | 0201 |
| mult $r3, $r0, $r1 | 1301 |
| sub $r4, $r0, $r1 | 4401 |
| sh $r3, 0x0B | 630B |
| sh $r4, 0x0A | 640A |
| lh $r6, 0x0A | 760A |
| lh $r7, 0x0B | 770B |

*Figure 1. Shows the code that was given and the hexadecimal conversion*