**Course: Computer Organization – ENCM 369  
Lab #:** Lab 7  
**Instructor Name:** Norm Bartley **Student Name:** Stephen Ravelo **Lab Section:** B03 **Date submitted:** March 13, 2025

# Exercise A

## Part 1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **RegWrite** | **ImmSrc** | **ALUSrc** | **MemWrite** | **ResultSrc** | **PCSrc** | **ALUControl** |
| 1 | 00 | 1 | 0 | 1 | 0 | 000 |

|  |  |  |
| --- | --- | --- |
| **A1** | **A2** | **A3** |
| 01010 | 01000 | 01001 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SrcA** | **SrcB** | **ALUResult** | **Result** | **PCNext** |
| 0x1001\_0030 | 0x0000\_0008 | 0x1001\_0038 | 0x0003\_4567 | 0x0040\_00d0 |

|  |
| --- |
| **WD3** |
| 0x0003\_4567 |

## Part 2

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **RegWrite** | **ImmSrc** | **ALUSrc** | **MemWrite** | **ResultSrc** | **PCSrc** | **ALUControl** |
| 1 | xx | 0 | 0 | 0 | 0 | 010 |

|  |  |  |
| --- | --- | --- |
| **A1** | **A2** | **A3** |
| 01011 | 00101 | 11101 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SrcA** | **SrcB** | **ALUResult** | **Result** | **PCNext** |
| 0x0002\_468a | 0x0000\_03ff | 0x0000\_028a | 0x0000\_028a | 0x0040\_00e0 |

|  |
| --- |
| **WD3** |
| 0x0000\_028a |

# Exercise B

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **RegWrite** | **ImmSrc** | **ALUSrc** | **ALUControl** | **MemWrite** | **ResultSrc** | **PCSrc** |
| 1 | 00 | 1 | 000 | 0 | 0 | 0 |

|  |  |  |
| --- | --- | --- |
| **A1** | **A2** | **A3** |
| 00111 | 00000 | 00111 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SrcA** | **SrcB** | **ALUResult** | **Result** | **PCNext** |
| 0x0000\_00c0 | 0xffff\_ffa0 | 0x0000\_0060 | 0x0000\_0060 | 0x0040\_00a8 |

|  |
| --- |
| **WD3** |
| 0x0000\_0060 |

# Exercise C

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Instruction | Opcode | RegWrite | ImmSrc | ALUSrc | TargetSrc | MemWrite | ResultSrc | Branch | ALUOp | Jump |
| lw | 0000011 | 1 | 00 | 1 | x | 0 | 01 | 0 | 00 | 0 |
| sw | 0100011 | 0 | 01 | 1 | x | 1 | xx | 0 | 00 | 0 |
| R-type | 0110011 | 1 | xx | 0 | x | 0 | 00 | 0 | 10 | 0 |
| beq | 1100011 | 0 | 10 | 0 | 1 | 0 | xx | 1 | 01 | 0 |
| I-type ALU | 0010011 | 1 | 00 | 1 | x | 0 | 00 | 0 | 10 | 0 |
| jal | 1101111 | 1 | 11 | x | 1 | 0 | 10 | x | xx | 1 |
| jalr | 1100111 | 1 | 00 | 1 | 0 | 0 | 10 | x | 10 | 1 |

RegWrite – 1 because we’re writing PCPlus4 to the R-File.

ImmSrc – 00 because it is an I-type instruction.

ALUSrc – 1 because we need to use the result from Extend in ALU.

TargetSrc – 0 because we need to use ALUResult for the PCTarget.

MemWrite – 0 because we don’t want to write anything to D-Mem.

ResultSrc – 10 because we need PCPlus4 to be written to the R-File.

Branch – x because Jump is 1.

ALUOp – 10 because it’s like addi where we add an immediate value to rs1.

Jump – 1 because PCSrc must be 1 to use PCTarget for PCNext.