CENG311

PROGRAMMING ASSIGNMENT 3

REPORT

**Opcodes and their corresponding instructions:(My student number is 280201033 so the starting opcode will be 33 in binary.)**

|  |  |
| --- | --- |
| **opcode** | **instruction** |
| 00100001 | R-type |
| 00100010 | lw |
| 00100011 | sw |
| 00100100 | jump |
| 00100101 | beq |
| 00100110 | bne |
| 00100111 | addi |

**ALU:**

|  |  |
| --- | --- |
| **ALU control lines** | **Function** |
| 000 | AND |
| 001 | OR |
| 010 | add |
| 011 | XOR |
| 100 | NOR |
| 110 | subtract |
| 111 | set on less than |

**ALU Control:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Instruction opcode** | **ALUOp** | **Instruction operation** | **Function field** | **Desired ALU action** | **ALU control input** |
| **LW** | **00** | **load word** | **XXXXXX** | **add** | **010** |
| **SW** | **00** | **store word** | **XXXXXX** | **add** | **010** |
| **Addi** | **00** | **add intermediate** | **XXXXXX** | **add** | **010** |
| **Branch equal** | **01** | **branch equal** | **XXXXXX** | **subtract** | **110** |
| **Branch not equal** | **01** | **branch not equal** | **XXXXXX** | **subtract** | **110** |
| **R-type** | **10** | **AND** | **100100** | **AND** | **000** |
| **R-type** | **10** | **OR** | **100101** | **OR** | **001** |
| **R-type** | **10** | **add** | **100000** | **add** | **010** |
| **R-type** | **10** | **XOR** | **100110** | **XOR** | **011** |
| **R-type** | **10** | **NOR** | **100111** | **NOR** | **100** |
| **R-type** | **10** | **subtract** | **100010** | **subtract** | **110** |
| **R-type** | **10** | **set on less than** | **101010** | **set on less than** | **111** |