|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| fcn | OPcode | ALUsrc | ALUop | Mem  Read | Mem  Write | Reg  Write | Mem  To Reg | Reg Dst | Branch | Jump |
| AND | 0000 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| OR | 0001 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| XOR | 0010 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| NOR | 0011 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Add | 0100 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Sub | 0101 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| less | 0110 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Addi | 1100 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| Subi | 1101 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| sw | 1000 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 |
| lw | 1001 | 1 | 0 | 0 | 1 | 0 | X | X | 0 | 0 |
| Beq | 1110 | 0 | 0 | 0 | 0 | 0 | X | X | 1 | 0 |
| jump | 1111 | x | x | x | 0 | 0 | 0 | X | 0 | 1 |

ALU control Table

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Input Opcode | | | | | | Output Opcode | | | |
|  | ALUop | I1 | I2 | I3 | I4 | O1 | O2 | O3 | Enable |
|  | 0 | x | x | x | x | x | x | x | 0 |
| AND | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| OR | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| XOR | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |
| NOR | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 1 |
| Add | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Sub | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| Less | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| Addi | 1 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 1 |
| Subi | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 1 |
| Lw | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Sw | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| Jump | x | 1 | 1 | 1 | 1 | x | X | x | x |