**ALU CONTROL DESIGN:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **OpCode** | **ALUOp** | **Instruction** | **Function Field** | **ALU**  **action** | **ALU Control Input** | **Shift** |
| **subi** | 11 | Subtraction  immediate | XXXXXX | sub | 0110 | 0 |
| **addi** | 00 | Addition  immediate | XXXXXX | add | 0010 | 0 |
| **LW** | 00 | Load word | XXXXXX | add | 0010 | 0 |
| **SW** | 00 | Store word | XXXXXX | add | 0010 | 0 |
| **BEQ** | 01 | Branch eq. | XXXXXX | sub | 0110 | 0 |
| **BNE** | 01 | Branch not eq. | XXXXXX | sub | 0110 | 0 |
| **R-Type** | 10 | add | 100000 | add | 0010 | 0 |
| **R-Type** | 10 | sub | 100010 | sub | 0110 | 0 |
| **R-Type** | 10 | sll | 000000 | sll | 0000 | 1 |
| **R-Type** | 10 | srl | 000010 | srl | 1001 | 1 |
| **R-Type** | 10 | sra | 000011 | sra | 1000 | 1 |
| **R-Type** | 10 | and | 100100 | and | 0001 | 1 |
| **R-Type** | 10 | or | 100101 | or | 0011 | 1 |
| **R-Type** | 10 | xor | 100110 | xor | 0100 | 1 |
| **R-Type** | 10 | slt | 101010 | slt | 0101 | 1 |
| **R-Type** | 10 | mult | 011000 | mult | 0111 | 1 |