## **Group Members:**

|  |  |
| --- | --- |
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## **Project Task 1 :**

# **Operands:**

3 operands (For example: x = y+z)

# **Types of operands (register-based??memory-based??mixed):**

Register and Memory based .

# **Operations:**

We implement 8 Operations. We used 3 bits for opcode . That’s why

the number of operations will be 2^3 = 8.

# **Types of operations*:***

We used 3 types of Operations.

- 4 Arithmetic, 1 logical and 3 Data Transfer.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Operation Type** | **Instruction** | **Opcode** | **Instruction**  **Type** | **Funcationality** |
| Arithmetic | ADD | 000 | R – Type | Add two operands |
| Arithmetic | SUB | 001 | R – Type | Sub two operands |
| Arithmetic | MUL | 010 | R – Type | Mul two operands |
| Arithmetic | DIV | 011 | R – Type | Div two operands |
| Logical | ADDi | 100 | I-Type | Addi$s1,$s2,offset |
| Data Transfer | LW | 101 | I-Type | Lw$s1, offset($s2) |
| Data Transfer | SW | 110 | I-Type | Sw $s2,offset($s1) |
| Data Transfer | Output | 111 | I-Type | Out $s1 |

# **Formats:**

We choose R-format and I-format for our project.

## **R-Type Format:**

* Each Register field is 2 bits in length.
* Op field is 4 bits in length.
* RS and RT are the first and second source registers.
* RD is the designation register.

*Example:* ADD $s1, $s2, $s3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 000 | 10 | 11 | 01 | 0 |
| OP | RS | RT | RD | Shmt |
| 3 bits | 2 bits | 2 bits | 2 bits | 1 bit |

## **I-Type Format:**

* Each Register field is 2 bits in length.
* Immediate field is 2 bits in length.
* Op field is 4 bits in length.
* Load word, Store word, Logical ADDi and Output are I-Type.
* RS is a source register and address for loads and stores.
* RT is a source register for Output.

*Example:* lw$3, 7($2)

|  |  |  |  |
| --- | --- | --- | --- |
| OP | RS | RT | Immediate |
| 101 | 10 | 11 | 111 |
| 3 bits | 2 bits | 2 bits | 3 bits |

# **List of register:**

|  |  |  |
| --- | --- | --- |
| **Name of the Registers** | **Register Number** | **Value (2 Bits)** |
| $t0 | 0 | 00 |
| $s0 | 1 | 01 |
| $s1 | 2 | 10 |
| $s2 | 3 | 11 |