

Instruction Set Format Design

Instruction type (00):

Arithmetic Operations : (OpCode - 0000)

| Instruction Type | OpCode | RS | RT | RD | Function | Don't care |
|------------------|---------|---------|---------|---------|----------|------------|
| 31 - 30 | 29 - 26 | 26 - 22 | 21 - 17 | 16 - 12 | 11 - 8 | 7 - 0 |

Corresponding Function values:

| Function | Operation |
|----------|-----------|
| 0000 | ADD |
| 0001 | SUB |
| 0010 | NOT |
| 0011 | AND |
| 0100 | OR |
| 0101 | XOR |
| 0110 | SLA |
| 0111 | SRA |
| 1000 | SRL |

Stack Operations:

| Instruction Type | OpCode | RS | Zeros |
|------------------|---------|---------|--------|
| 31 - 30 | 29 - 26 | 25 - 21 | 20 - 0 |

| OpCode | Operation |
|--------|-----------|
| 0001 | Push |
| 0010 | Pop |

Move Operations:

| Instruction Type | OpCode | RS | RD | Zeros |
|------------------|---------|---------|---------|--------|
| 31 - 30 | 29 - 26 | 25 - 21 | 20 - 16 | 15 - 0 |

Instruction type (01):

Arithmetic Operations (Immediate):

| Instruction Type | OpCode | RD | RS | Immediate |
|------------------|---------|---------|---------|-----------|
| 31 - 30 | 29 - 26 | 25 - 21 | 20 - 16 | 15 - 0 |

| OpCode | Operation |
|--------|-----------|
| 0000 | ADDI |
| 0001 | SUBI |
| 0010 | SLAI |
| 0011 | SRAI |
| 0100 | SRLI |

Instruction type (10):

Branch Operations:

| | | | |
|-----------------------------|-------------------|---------------|------------------|
| Instruction Type 31 - 30 | OpCode 29 - 26 | RD 25 - 21 | Offset 20 - 0 |
|-----------------------------|-------------------|---------------|------------------|

| OpCode | Operation |
|--------|-----------|
| 0000 | BR |
| 0001 | BMI |
| 0010 | BPL |
| 0011 | BZ |

Instruction type (11):

Load, Store Operations:

| | | | | |
|-----------------------------|-------------------|---------------|---------------|------------------|
| Instruction Type 31 - 30 | OpCode 29 - 26 | RD 25 - 21 | RS 20 - 16 | Offset 15 - 0 |
|-----------------------------|-------------------|---------------|---------------|------------------|

| OpCode | Operation |
|--------|-----------|
| 0000 | LD |
| 0001 | ST |
| 0010 | LDSP |
| 0011 | STSP |