

Loads:

| | | | | | |
|-----------|-----|-----|----|---------|----------------|
| imm[11:0] | rs1 | 000 | rd | 0000011 | LB rd,rs1,imm |
| imm[11:0] | rs1 | 001 | rd | 0000011 | LH rd,rs1,imm |
| imm[11:0] | rs1 | 010 | rd | 0000011 | LW rd,rs1,imm |
| imm[11:0] | rs1 | 100 | rd | 0000011 | LBU rd,rs1,imm |
| imm[11:0] | rs1 | 101 | rd | 0000011 | LHU rd,rs1,imm |

Stores:

| | | | | | | |
|-----------|-----|-----|-----|----------|---------|----------------|
| imm[11:5] | rs2 | rs1 | 000 | imm[4:0] | 0100011 | SB rs1,rs2,imm |
| imm[11:5] | rs2 | rs1 | 001 | imm[4:0] | 0100011 | SH rs1,rs2,imm |
| imm[11:5] | rs2 | rs1 | 010 | imm[4:0] | 0100011 | SW rs1,rs2,imm |

Arithmetic:

| | | | | | | |
|-----------|------------|-----|-----|----|---------|-----------------|
| 0000000 | rs2 | rs1 | 000 | rd | 0110011 | ADD rd,rs1,rs2 |
| imm[11:0] | | rs1 | 000 | rd | 0010011 | ADDI rd,rs1,imm |
| 0100000 | rs2 | rs1 | 000 | rd | 0110011 | SUB rd,rs1,rs2 |
| | imm[31:12] | | | rd | 0110111 | LUI rd,imm |
| | imm[31:12] | | | rd | 0010111 | AUIPC rd,imm |

Logical:

| | | | | | | |
|-----------|-----|-----|-----|----|---------|-----------------|
| 0000000 | rs2 | rs1 | 100 | rd | 0110011 | XOR rd,rs1,rs2 |
| 0000000 | rs2 | rs1 | 110 | rd | 0110011 | OR rd,rs1,rs2 |
| 0000000 | rs2 | rs1 | 111 | rd | 0110011 | AND rd,rs1,rs2 |
| imm[11:0] | | rs1 | 100 | rd | 0010011 | XORI rd,rs1,imm |
| imm[11:0] | | rs1 | 110 | rd | 0010011 | ORI rd,rs1,imm |
| imm[11:0] | | rs1 | 111 | rd | 0010011 | ANDI rd,rs1,imm |

Shifts:

| | | | | | | |
|---------|-------|-----|-----|----|---------|-------------------|
| 0000000 | rs2 | rs1 | 001 | rd | 0110011 | SLL rd,rs1,rs2 |
| 0000000 | shamt | rs1 | 001 | rd | 0010011 | SLLI rd,rs1,shamt |
| 0000000 | rs2 | rs1 | 101 | rd | 0110011 | SRL rd,rs1,rs2 |
| 0000000 | shamt | rs1 | 101 | rd | 0010011 | SRLI rd,rs1,shamt |
| 0100000 | rs2 | rs1 | 101 | rd | 0110011 | SRA rd,rs1,rs2 |
| 0100000 | shamt | rs1 | 101 | rd | 0010011 | SRAI rd,rs1,shamt |

Compare:

| | | | | | | |
|-----------|-----|-----|-----|----|---------|------------------|
| 0000000 | rs2 | rs1 | 010 | rd | 0110011 | SLT rd,rs1,rs2 |
| 0000000 | rs2 | rs1 | 011 | rd | 0110011 | SLTU rd,rs1,rs2 |
| imm[11:0] | | rs1 | 010 | rd | 0010011 | SLTI rd,rs1,imm |
| imm[11:0] | | rs1 | 011 | rd | 0010011 | SLTIU rd,rs1,imm |

Branches:

| | | | | | | |
|--------------|-----|-----|-----|-------------|---------|------------------|
| imm[12 10:5] | rs2 | rs1 | 000 | imm[4:1 11] | 1100011 | BEQ rs1,rs2,imm |
| imm[12 10:5] | rs2 | rs1 | 001 | imm[4:1 11] | 1100011 | BNE rs1,rs2,imm |
| imm[12 10:5] | rs2 | rs1 | 100 | imm[4:1 11] | 1100011 | BLT rs1,rs2,imm |
| imm[12 10:5] | rs2 | rs1 | 101 | imm[4:1 11] | 1100011 | BGE rs1,rs2,imm |
| imm[12 10:5] | rs2 | rs1 | 110 | imm[4:1 11] | 1100011 | BLTU rs1,rs2,imm |
| imm[12 10:5] | rs2 | rs1 | 111 | imm[4:1 11] | 1100011 | BGEU rs1,rs2,imm |

Jump&Link:

| | | | | | |
|-----------------------|-----|-----|----|---------|-----------------|
| imm[20 10:1 11 19:12] | | | rd | 1101111 | JAL rd,imm |
| imm[11:0] | rs1 | 000 | rd | 1100111 | JALR rd,rs1,imm |

System:

| | | | | | |
|---------------|-------|-----|-------|---------|-------|
| 0000000000000 | 00000 | 000 | 00000 | 1110011 | SCALL |
|---------------|-------|-----|-------|---------|-------|

64 bits:

Arithmetic&Logical:

| | | | | | | |
|-----------|-------|-----|-----|----|---------|--------------------|
| imm[11:0] | | rs1 | 000 | rd | 0011011 | ADDIW rd,rs1,imm |
| 0000000 | shamt | rs1 | 001 | rd | 0011011 | SLLIW rd,rs1,shamt |
| 0000000 | shamt | rs1 | 101 | rd | 0011011 | SRLIW rd,rs1,shamt |
| 0100000 | shamt | rs1 | 101 | rd | 0011011 | SRAIW rd,rs1,shamt |
| 0000000 | rs2 | rs1 | 000 | rd | 0111011 | ADDW rd,rs1,rs2 |
| 0100000 | rs2 | rs1 | 000 | rd | 0111011 | SUBW rd,rs1,rs2 |
| 0000000 | rs2 | rs1 | 001 | rd | 0111011 | SLLW rd,rs1,rs2 |
| 0000000 | rs2 | rs1 | 101 | rd | 0111011 | SRLW rd,rs1,rs2 |
| 0100000 | rs2 | rs1 | 101 | rd | 0111011 | SRAW rd,rs1,rs2 |

Loads&Stores:

| | | | | | | |
|-----------|-----|-----|-----|----------|---------|----------------|
| imm[11:0] | | rs1 | 110 | rd | 0000011 | LWU rd,rs1,imm |
| imm[11:0] | | rs1 | 011 | rd | 0000011 | LD rd,rs1,imm |
| imm[11:5] | rs2 | rs1 | 011 | imm[4:0] | 0100011 | SD rs1,rs2,imm |

Shifts:

| | | | | | | |
|---------|-------|-----|-----|----|---------|--------------------|
| 0000000 | shamt | rs1 | 001 | rd | 0011011 | SLLIW rd,rs1,shamt |
| 0000000 | shamt | rs1 | 101 | rd | 0011011 | SRLIW rd,rs1,shamt |
| 0100000 | shamt | rs1 | 101 | rd | 0011011 | SRAIW rd,rs1,shamt |