**R , I , J Instructions (Register, Immediate, Jump)**

**MIPS Instruction Type Summary**

**(SHOWS HOW MANY BITS PER SEGMENT)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Instruction Type** | **Example** | **Instruction Coding** | |
| **ALU Usage** | | |
| Non-Jump R-Type | add rd, rs, rt | R | |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **31** | **26** | **25** | **21** | **20** | **16** | **15** | **11** | **10** | **6** | **5** | **0** | | op | | rs | | rt | | rd | | sa | | fn | | |
| The ALU performs the operation indicated by the mnemonic, which is coded into the fn field. | | |
| Immediate | addi rt, rs, imm | I | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **31** | **26** | **25** | **21** | **20** | **16** | **15** | **0** | | op | | rs | | rt | | imm | | |
| The ALU performs the operation indicated by the mnemonic, which is coded into the op field. | | |
| Branch | beq $rs, $rt, imm | I | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **31** | **26** | **25** | **21** | **20** | **16** | **15** | **0** | | op | | rs | | rt | | imm | | |
| The ALU subtracts rt from rs for comparison. | | |
| Load | lw rt, imm(rs) | I | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **31** | **26** | **25** | **21** | **20** | **16** | **15** | **0** | | op | | rs | | rt | | imm | | |
| The ALU adds rs and imm to get the address. | | |
| Store | sw rt, imm(rs) | I | |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **31** | **26** | **25** | **21** | **20** | **16** | **15** | **0** | | op | | rs | | rt | | imm | | |
| The ALU adds rs and imm to get the address. | | |
| Non-Register Jump | jal target | J | |  |  |  |  | | --- | --- | --- | --- | | **31** | **26** | **25** | **0** | | op | | target | | |
| The ALU is not used. | | |
| Jump Register | jalr rd, rs | R | |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **31** | **26** | **25** | **21** | **20** | **16** | **15** | **11** | **10** | **6** | **5** | **0** | | op | | rs | | rt | | rd | | sa | | fn | | |
| The ALU is not used. | | |