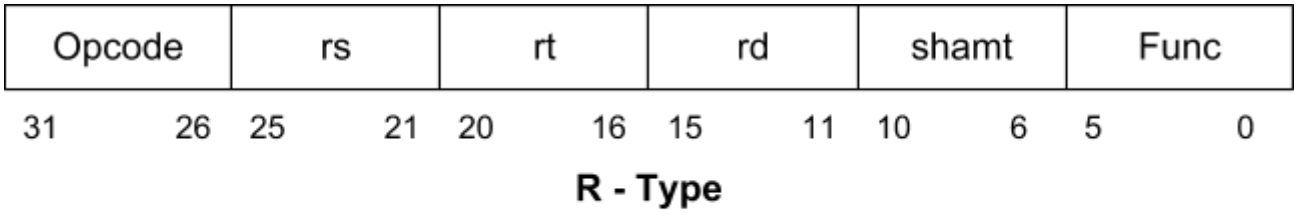
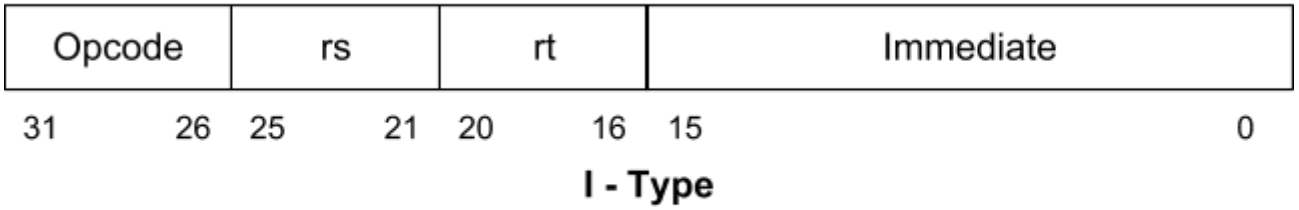
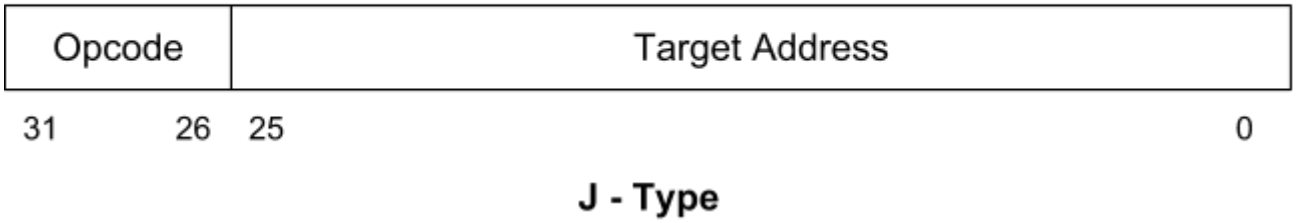
Instruction Formats



R - Type



I - Type



J - Type

Instruction Set

1. **R-Type**
   Opcode = 000000

Function	Description	Function Code
add rd, rs, rt	rd = rs + rt	100000
sub rd, rs, rt	rd = rs - rt	100010
mul rd, rs, rt	rd = rs * rt	011000
div rd, rs, rt	rd = rs / rt (integer division)	011010
and rd, rs, rt	rd = rs & rt (bitwise AND)	100100
or rd, rs, rt	rd = rs | rt (bitwise OR)	100101
nor rd, rs, rt	rd = ~(rs | rt) (bitwise NOR)	100111
xor rd, rs, rt	rd = rs ^ rt (bitwise XOR)	100110
srl rd, rs, rt	rd = rs >> rt (shift right logic)	000010

sll rd, rs, rt	rd = rs << rt (shift left logic)	000000
slt rd, rs, rt	rd is set if (rs < rt)	101010
syscall		0001100

2. **I-Type**

Function	Description	Opcode
addi rt, rs, imm	rt = rs + imm	001000
subi rt, rs, imm	rt = rs - imm	001100
beq rt, rs, target	Branch to target if (rs == rt)	000100
bgt rt, rs, target	Branch to target if (rs > rt)	000111
lw rt, [rs, #imm]	rt = DataMemory[rs + imm]	100011
sw rt, [rs, #imm]	DataMemory[rs + imm] = rt	101011

3. **J-Type**

Function	Description	Opcode
j target	Jump to target	000010
jal target	Link and jump to target	000011
jr target_register	Jump to address in target register	010000

Register Set

Register Number	Usage
r0	Hard-wired to 0
r1	Reserved for pseudo-instructions
r2-r3	Return values from functions
r4-r7	Arguments to functions - not preserved by subprograms
r8-r15	Temporary data, not preserved by subprograms
r16-r23	Saved registers, preserved by subprograms
r24-r25	More temporary registers, not preserved by subprograms

r26-r27	Reserved for kernel. Do not use.
r28	Global Area Pointer (base of global data segment)
r29	Stack Pointer
r30	Frame Pointer
r31	Return Address