

MIPS Instruction Reference

Arithmetic and Logical Instructions

Instruction	Opcode/Function	Syntax	Operation
add	100000	f \$d, \$s, \$t	\$d = \$s + \$t
addu	100001	f \$d, \$s, \$t	\$d = \$s + \$t
addi	001000	f \$d, \$s, i	\$d = \$s + SE(i)
addiu	001001	f \$d, \$s, i	\$d = \$s + SE(i)
and	100100	f \$d, \$s, \$t	\$d = \$s & \$t
andi	001100	f \$d, \$s, i	\$t = \$s & ZE(i)
div	011010	f \$s, \$t	lo = \$s / \$t; hi = \$s % \$t
divu	011011	f \$s, \$t	lo = \$s / \$t; hi = \$s % \$t
mult	011000	f \$s, \$t	hi:lo = \$s * \$t
multu	011001	f \$s, \$t	hi:lo = \$s * \$t
nor	100111	f \$d, \$s, \$t	\$d = ~(\$s \$t)
or	100101	f \$d, \$s, \$t	\$d = \$s \$t
ori	001101	f \$d, \$s, i	\$t = \$s ZE(i)
sll	000000	f \$d, \$t, a	\$d = \$t << a
sllv	000100	f \$d, \$t, \$s	\$d = \$t << \$s
sra	000011	f \$d, \$t, a	\$d = \$t >> a
srav	000111	f \$d, \$t, \$s	\$d = \$t >> \$s
srl	000010	f \$d, \$t, a	\$d = \$t >>> a
srlv	000110	f \$d, \$t, \$s	\$d = \$t >>> \$s
sub	100010	f \$d, \$s, \$t	\$d = \$s - \$t
subu	100011	f \$d, \$s, \$t	\$d = \$s - \$t
xor	100110	f \$d, \$s, \$t	\$d = \$s ^ \$t
xori	001110	f \$d, \$s, i	\$d = \$s ^ ZE(i)

Constant-Manipulating Instructions

Instruction	Opcode/Function	Syntax	Operation
lhi	011001	o \$t, immed32	HH (\$t) = i
llo	011000	o \$t, immed32	LH (\$t) = i

Comparison Instructions

Instruction	Opcode/Function	Syntax	Operation
slt	101010	f \$d, \$s, \$t	\$d = (\$s < \$t)
sltu	101001	f \$d, \$s, \$t	\$d = (\$s < \$t)

slti	001010	f \$d, \$s, i	\$t = (\$s < SE(i))
sltiu	001001	f \$d, \$s, i	\$t = (\$s < SE(i))

Branch Instructions

Instruction	Opcode/Function	Syntax	Operation
beq	000100	o \$s, \$t, label	if (\$s == \$t) pc += i << 2
bgtz	000111	o \$s, label	if (\$s > 0) pc += i << 2
blez	000110	o \$s, label	if (\$s <= 0) pc += i << 2
bne	000101	o \$s, \$t, label	if (\$s != \$t) pc += i << 2

Jump Instructions

Instruction	Opcode/Function	Syntax	Operation
j	000010	o label	pc += i << 2
jal	000011	o label	\$31 = pc; pc += i << 2
jalr	001001	o labelR	\$31 = pc; pc = \$s
jr	001000	o labelR	pc = \$s

Load Instructions

Instruction	Opcode/Function	Syntax	Operation
lb	100000	o \$t, i (\$s)	\$t = SE (MEM [\$s + i]:1)
lbu	100100	o \$t, i (\$s)	\$t = ZE (MEM [\$s + i]:1)
lh	100001	o \$t, i (\$s)	\$t = SE (MEM [\$s + i]:2)
lhu	100101	o \$t, i (\$s)	\$t = ZE (MEM [\$s + i]:2)
lw	100011	o \$t, i (\$s)	\$t = MEM [\$s + i]:4

Store Instructions

Instruction	Opcode/Function	Syntax	Operation
sb	101000	o \$t, i (\$s)	MEM [\$s + i]:1 = LB (\$t)
sh	101001	o \$t, i (\$s)	MEM [\$s + i]:2 = LH (\$t)
sw	101011	o \$t, i (\$s)	MEM [\$s + i]:4 = \$t

Data Movement Instructions

Instruction	Opcode/Function	Syntax	Operation
mfhi	010000	f \$d	\$d = hi
mflo	010010	f \$d	\$d = lo
mthi	010001	f \$s	hi = \$s
mtlo	010011	f \$s	lo = \$s

Exception and Interrupt Instructions

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Instruction	Opcode/Function	Syntax	Operation
trap	011010	o i	Dependent on OS; different values for immed26 specify different operations.