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

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