

# MIPS Reference Sheet

## Basic Instruction Formats

Register	0000 00ss ssst tttt dddd d000 00ff ffff	R	s, t, d are interpreted as unsigned
Immediate	oooo ooss ssst tttt iiii iiii iiii iiii	I	i is interpreted as two's complement

## Instructions

Word	.word i	iiii iiii iiii iiii iiii iiii iiii iiii		
Add	add \$d, \$s, \$t	0000 00ss ssst tttt dddd d000 0010 0000	R	\$d = \$s + \$t
Subtract	sub \$d, \$s, \$t	0000 00ss ssst tttt dddd d000 0010 0010	R	\$d = \$s - \$t
Multiply	mult \$s, \$t	0000 00ss ssst tttt 0000 0000 0001 1000	R	hi:lo = \$s * \$t
Multiply Unsigned	multu \$s, \$t	0000 00ss ssst tttt 0000 0000 0001 1001	R	hi:lo = \$s * \$t
Divide	div \$s, \$t	0000 00ss ssst tttt 0000 0000 0001 1010	R	lo = \$s / \$t; hi = \$s % \$t
Divide Unsigned	divu \$s, \$t	0000 00ss ssst tttt 0000 0000 0001 1011	R	lo = \$s / \$t; hi = \$s % \$t
Move From High/Remainder	mfhi \$d	0000 0000 0000 0000 dddd d000 0001 0000	R	\$d = hi
Move From Low/Quotient	mflo \$d	0000 0000 0000 0000 dddd d000 0001 0010	R	\$d = lo
Load Immediate And Skip	lis \$d	0000 0000 0000 0000 dddd d000 0001 0100	R	\$d = MEM[pc]; pc = pc + 4
Load Word	lw \$t, i(\$s)	1000 11ss ssst tttt iiii iiii iiii iiii	I	\$t = MEM [\$s + i]
Store Word	sw \$t, i(\$s)	1010 11ss ssst tttt iiii iiii iiii iiii	I	MEM [\$s + i] = \$t
Set Less Than	slt \$d, \$s, \$t	0000 00ss ssst tttt dddd d000 0010 1010	R	\$d = 1 if \$s < \$t; 0 otherwise
Set Less Than Unsigned	sltu \$d, \$s, \$t	0000 00ss ssst tttt dddd d000 0010 1011	R	\$d = 1 if \$s < \$t; 0 otherwise
Branch On Equal	beq \$s, \$t, i	0001 00ss ssst tttt iiii iiii iiii iiii	I	if (\$s == \$t) pc += i * 4
Branch On Not Equal	bne \$s, \$t, i	0001 01ss ssst tttt iiii iiii iiii iiii	I	if (\$s != \$t) pc += i * 4
Jump Register	jr \$s	0000 00ss sss0 0000 0000 0000 0000 1000	R	pc = \$s
Jump And Link Register	jalr \$s	0000 00ss sss0 0000 0000 0000 0000 1001	R	temp = \$s; \$31 = pc; pc = temp

When a word is stored to memory location `0xffff000c`, the least-significant byte (eight bits) of the word are sent to the standard output.

Loading a word from memory location `0xffff0004` places the next byte from standard input into the least-significant byte of the destination register.