

MAL Data Movement Instructions

Instruction		Operation
lw	R_d, addr	load integer (word)
sw	R_s, addr	store integer (word)
move	R_d, R_s	move integer
la	R_d, label	load address
li	R_d, const	load immediate

MAL Data Transformation Instructions

Instruction		Operation
add	$R_d, R_{s1}, R_{c_{s2}}$	add int
div	$R_d, R_{s1}, R_{c_{s2}}$	divide int
mul	$R_d, R_{s1}, R_{c_{s2}}$	multiply int
neg	R_d, R_s	negate int
rem	$R_d, R_{s1}, R_{c_{s2}}$	divide int ($R_d = \text{remainder}$)
sub	$R_d, R_{s1}, R_{c_{s2}}$	subtract int

MAL Integer Comparison Instructions

Instruction		Operation
b	label	branch to label unconditionally
beq	$R_{s1}, R_{c_{s2}}, \text{label}$	branch to label if $R_{s1} == R_{c_{s2}}$
ble	$R_{s1}, R_{c_{s2}}, \text{label}$	branch to label if $R_{s1} \leq R_{c_{s2}}$
blt	$R_{s1}, R_{c_{s2}}, \text{label}$	branch to label if $R_{s1} < R_{c_{s2}}$
bge	$R_{s1}, R_{c_{s2}}, \text{label}$	branch to label if $R_{s1} \geq R_{c_{s2}}$
bgt	$R_{s1}, R_{c_{s2}}, \text{label}$	branch to label if $R_{s1} > R_{c_{s2}}$
bne	$R_{s1}, R_{c_{s2}}, \text{label}$	branch to label if $R_{s1} \neq R_{c_{s2}}$
beqz	R_s, label	branch to label if $R_s == 0$
blez	R_s, label	branch to label if $R_s \leq 0$
bltz	R_s, label	branch to label if $R_s < 0$
bgez	R_s, label	branch to label if $R_s \geq 0$
bgtz	R_s, label	branch to label if $R_s > 0$
bnez	R_s, label	branch to label if $R_s \neq 0$

MAL Jump Instructions

Instruction		Operation
j	addr	unconditional jump
jr	R_{targ}	unconditional jump
jal	addr	subprogram call
jalr	$R_{\text{save}}, R_{\text{targ}}$	subprogram call

MAL System Access Instructions

Instruction	Operation
syscall	call on operating system services

Mars System Call Codes

Service	Code	Parameters	Return Values
print_int	1	integer (\$a0)	
print_string	4	string address (\$a0)	
read_int	5		integer (\$v0)
read_string	8	buffer address (\$a0), length (\$a1)	
sbrk	9	number of bytes (\$a0)	address of block (\$v0)
exit	10		