CSE340
Chapter-2 (Continued)

17 Oct 2023

Bitwise AND → and, andi

Bitwise OR → or, ori

Bitwise NOT → nor

R type, I-type.

nor → r format

একটা register অন্য আরেকটা int এর সমান হয়

and $to, $t1, $t2
rd rs rt

| | |
|---|---|
| $t1 = | 1110 |
| $t2 = | 0101 |
| ∴ $to = | 0100 |

andi $to, $t1, 2

| | |
|---|---|
| $t1 = | 1011 |
| $t2 = | 0010 |
| ∴ $to = | 0010 |

or $to, $t1, $t2

| | |
|---|---|
| $t1 = | 1110 |
| $t2 = | 0100 |
| ∴ $to = | 1110 |

ori $to, $t1, 2

| | |
|---|---|
| $t1 = | 1011 |
| $t2 = | 0010 |
| $to = | 1011 |

a nor b = Not (a or b)

আগে a or b এর মান or operation হবে then তার complement নে- হবে.

মুশকিল Not করার জন্য

nor $t1, $t2, $zero.

$t2 = 1011

$zero = 0000

∴ $ or operation এর ফল = 1011

এখন এটার not নিতে হবে.

∴ $t1 = 0100

nor $t1, $t2, $t3

$t2 = 0100

$t3 = 1000

or operation এর ফল = 1100

Not এর ফল, $t1 = 0011

# Loops

## while loop:

C - code:

```
while (save[i] == k) {
    a = a + 2;
    i += 1;
}
```

i, k, a are stored in $s3, $s5 and $s4 respectively and base address of save is $s6.

MIPs Code:

```
Loop:
    sll  $t0, $s3, 2
    add  $t0, $t0, $s6  # Memory address of save[i]
    lw   $t1, 0($t0)
    bne  $t1, $s5, Exit
    addi $s4, $s4, 2
    addi $s3, $s3, 1
    j loop              # loop iterate
Exit:
```

For loop:

```
for (int i=0 ; save[i] > k ; i++){
    a = a+2
}
```

i, k, a are stored in $s3, $s5 and $s4. respectively. Base address of save is in $s6.

MIPS Code:

```
add   $s3,   $zero, $zero   # i = 0  assign করা হচ্ছে initially

loop:
    sll   $t0,  $s3, 2
    add   $t0,  $t0,  $s6
    lw    $t1,  0($t0)
    slt   $t2,  $t1 , $s5     # যতক্ষণ, main code এ
                              > then ∠ এর সাথে
                              compare করব, less than
                              হলে $t2 তে 1 store
                              হবে।
    bne   $t2, $zero, Exit
    addi  $s4, $s4, 2
    addi  $s3, $s3, 1
    j     loop

Exit:
```