

## Chapter 4

### 4.7

#### 4.7.1

700ps

#### 4.7.2

950ps

#### 4.7.3

905ps

#### 4.7.4

705ps

#### 4.7.5

700ps

#### 4.7.6

950ps

### 4.16

#### 4.16.1

350 ps. and 1250 ps.

#### 4.16.2

1750 ps. and 1250 ps.

#### 4.16.3

ID and 300 ps.

#### 4.16.4

35%

#### 4.16.5

65%

### 4.22

#### 4.22.1

<b>sw</b> \$s5, 12(\$s3)	IF ID EX ME WB
<b>lw</b> \$s5, 8(\$s3)	IF ID EX ME WB
sub \$s4, \$s2, \$s1	IF ID EX ME WB
<b>bez</b> \$s4, label	** ** IF ID EX ME WB
add \$s2, \$s0, \$s1	IF ID EX ME WB
sub \$s2, \$s6, \$s1	IF ID EX ME WB

#### 4.27

##### 4.27.1

```
add $s3, $s1, $s0
nop
nop
lw $s2, 4($s3)
lw $s1, 0($s4)
nop
or $s2, $s3, $s2
nop
nop
sw $s2, 0($s3)
```

#### 4.28

##### 4.28.1

The CPI increases from 1 to 1.4125.

##### 4.28.2

The CPI increases from 1 to 1.3375.

##### 4.28.3

The CPI increases from 1 to 1.1125.

##### 4.28.4

The speedup is approximately 1.019.

##### 4.28.5

The "speedup" is 0.91.

##### 4.28.6

The predictor is 25% accurate on the remaining branches.

#### 4.29

##### 4.29.1

Always Taken=60%

Always not-taken=40%

##### 4.29.2

25%

##### 4.29.3

60%