Yeachan Okh

Homework #2

2.1 f=g+(h-5);

```
Add i f, h, -5
Add f,f,g
```

2.2 f=g+i+h

2.3 B[8]=A[i-j];

```
Sub $t0,$s3,$s4
Add $t0,$s6,$t0
Lw $t1,l6,*=($t0)
Sw $t1,32($s7)
```

2.4

```
sll  $t0, $s0, 2     # $t0 = f * 4
add  $t0, $s6, $t0   # $t0 = &A[f]
sll  $t1, $s1, 2     # $t1 = g * 4
add  $t1, $s7, $t1   # $t1 = &B[g]
lw   $s0, 0($t0)     # f = A[f]
addi $t2, $t0, 4
lw   $t0, 0($t2)
add  $t0, $t0, $s0
sw   $t0, 0($t1)
```

B[g]=A[f]+a{1+f};

2.5

```
add $t0, $s6, $s0
Add $t1, $s7, $s1
Lw $s0, 0($t0)
Lw $t0, 4($t0)
Add $t0, $t0, $s0
Sw $t0, 0($t1)
```

2.6

Address	Data
24	2
38	4
32	3
36	6
40	1

2.6.1

```
temp = Array[0];
```

Temp2 = Array[1];
Array[0] = Array[4];
Array[1] = temp;
Array[4] = Array[3];
Array[3] = temp2;
2.6.2
sll $t0, $s1, 2
Add $t0, $t0, $s7
Lw $t0, 0($t0)
Addi $t0, $t0, 1 Sl
l $t0, $t0, 2
Lw $s0, 0($t0)
2.7
Little Endian – 12 EF CD AB
Big Endian – AB CD EF 12
2.9
B[8] = A[i] + A[j];

sll $t0, $s1, 2
Add $t0, $t0, $s7
Lw $t0, 0($t0)
Addi $t0, $t0, 1
Sll $t0, $t0, 2
Lw $s0, 0($t0)
2.10

```
addi $t0, $s6, 4
add  $t1, $s6, $0
sw   $t1, 0($t0)
lw   $t0, 0($t0)
add  $s0, $t1, $t0
```

Answer: f=2*(&A)
2.12.1

```
add $t0, $s0, $s1
```

50000000
2.12.2 overflow
2.12.3
sub $t0, $s0, $s1
B0000000
2.12.4 no over flow
2.12.5
add $t0, $s0, $s1
add $t0, $t0, $s0

Answer: D0000000
2.12.6 overflow
2.18.1
Opcode: 8bits, rs, rt, rd: 7bits
2.18.2
Opcode 8 bits, rs and rt: 7 bits
2.18.3
More registers= more bits=increased code size
More registers= less register spill= less instructions
More instructions = more better instruction= decrease code size
More instruction= larger opcodes=larger code size
2.21

```
not $t1, $t2      // bit-wise invert
```

Nor $t1, $t2, $t2
2.22

2.22 [5] <§2.6> For the following C statement, write a minimal sequence of MIPS assembly instructions that does the identical operation. Assume `$t1 = A`, `$t2 = B`, and `$s1` is the base address of C.

```
A = C[0] << 4;
```

Lw $t3, 0($s1)
Sll $t1, $t3, 4
2.26.1
20
2.26.2
i=10;
Do{
	B+=2;
	i=i-1;
}
while(i>0)
2.26.3
5*n
2.29
addi $t1, $0, $0
LOOP: lw $s1, 0($s0)
 add $s2, $s2, $s1
addi $s0, $s0, 4
addi $t1, $t1, 1
slti $t2, $t1, 100
bne $t2, $s0, LOOP

Answer:

```
For (i=0; i<100; i++){
        Result += MemArray[s0];
        s0=s0+4;
}
```

2.38

```
lbu $t0, 0($t1)
sw  $t0, 0($t2)
```

0x00000011

2.47.1

Arithmetic 2 cycles, load store 6 cycles, branch3 cycles find average cpi

2.6

2.47.2

25% improvement

.88

2.47.3

50% improvement

.53 repeating