Module 3)

2.3) B[8] = A[i-j] →

A is in $s6

B is in $s7

```
sub $t0, $s3, $s4     #i-j
add $t0, $t0, $s6     #add the base to $t0
lw  $t0, 0($t0)       #load A[8] into $t0
sw  $t0, 32($s7)      #load $t0 into B[8]
```

2.4)

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

and $s6 has the bas register

Shift left $s1 by 2 which = a multiplication by 4

$s7 the base of B

m B[g] = A[f] + A[f+1]

sw $t0, 0($t1) store $t0 in $t1 where $t1 is the memory address of B[g]

2.9) i is in $s3 so lets find the address of A[i] first

```
sll $t0, $s3, 2       # $t0 = i * 4
add $t0, $t0, $s6     # add the base addr of A
lw  $t0, 0($t0)       # load value of A[i] into $t0
sll $t1, $s4, 2       # Same for j. j is in $s4
add $t1, $t1, $s6     # add base of A
lw  $t1, 0($t1)       # load A[j] into $t1
add $t2, $t0, $t1     # add both values and store into $t2
sw  $t2, 32($s7)      store $t2 into B[8]
```

2.11) 0000 0010 0001 0000 1000 0000 0010 0000

op=0 2 1 0 8 0 2 0

000000	10000	10000	10000	00000	100000
op=0	rs=16	rs=16	rs=16	shamt=0	funct=0x20 (add)

$\boxed{\text{add \$s0, \$s0, \$s0 \quad R-type}}$

2.15 sw $t1, 32($t2)

43 10 9 32
101011 01010 01001 0000 0000 0010 0000
opcode
sw
43

I-type 0xAD490020

2.16 op=0 rs=3 rt=2 rd=3 shamt=0 funct=34

sub because of the 0 and 34

rs=3 : $v1
pg. 105 rt=2 : $v0
rd=3 : $v1

R-type

$\boxed{\text{sub \$v1, \$v1, \$v0}}$

2.17 op=0x23, rs=1, rt=2, const=0x4 I-type

hex=35 $at $v0 lw $v0, 4($at)

100011|00001|00010|0000000000000100

35 1 2 4
0x23

2.19 $t0 = 0x AAAAAAAA $t1 = 0x12345678

2.19.1 $t0 in bytes = 1010 1010 1010 1010 1010 1010
$t1 in bytes = 0001 0010 0011 0100 0101 0110 0111 1000
sll result = 0x AAAAAAA0
$t2 = 1010 1010 1010 1010 1010 1010 1010 0000
$t1 or $t2 = 10101011 1110 1111 1110 1111 1000
1011

$\boxed{\text{0x B A B E F E F 8}}$

2.19.2) \$t2 1010 1010 1010 1010 1010 1010 1010 0000

so \$t2 = 0xAAAA AAA0

andi \$t2, \$t2, -1

-1 = 1111 1111 1111 1111 1111 1111 1111 1111

\$t2 after andi = 1010 1010 1010 1010 1010 1010 1010 0000

$\boxed{= 0x\ AAAA\ AAA0}$

2.19.3) srl \$t2, \$t0, 3

\$t2 0001 0101 0101 0101 0101 0101 0101 0101

0x15555555

andi \$t2, \$t2, 0xFFEF

~~0xFFEF~~ =

0xFFEF = 0000 0000 0000 0000 1111 1111 1110 1111

0101 0101 0100 0101

andi \$t2, \$t2, 0xFFEF = 0000 0000 0000 0000

= $\boxed{0X\ 0000\ 5545}$

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3.20) 0x0C000000 = 0000 1100 0000 0000 0000 0000 0000 0000

Sign = 0

00011000 = exponent = 24

000 0000 0000 0000 0000 0000 = mantissa

two's = $2^{26} + 2^{27}$ = 201326592

unsigned is the same

3.21) $\boxed{\text{jal } 0x00000000}$

opcode = 000011 = 3 hex which is jal on the greensheet

3.22) 1.0×2^{-103}

$-1 \times (1+0) \times 2^{(24-127)} = 2^{-103} = 1.0 \times 2^{-103}$

3.24) $2.6125 \times 10^1 + 4.150390625 \times 10^{-1}$

$0.125 = \frac{1}{8} = \frac{1}{2^3} = 1. \times 2^{-3}$

$.1 \times 2^{-2}$

$.01 \times 2^{-1}$

$.001 \times 2^0$

$2.6125 \times 10^1 = 26.125 = 11010.001$

$= 1.1010001 \times 2^4$

$4.150390625 \times 10^{-1} = 0.4150390625 = .011010100111 = 1.101010011 \times 2^{-2}$

Shift. 1.1010100111 6 to the right 0.0000011010100111

GR S=1

$$
\begin{array}{r}
1.1010001000\overset{G}{1}\overset{R}{0} \\
\underline{0.000001101010011\,1} \\
1.1010100010
\end{array}
$$

G=1, R=0, S=1 because there are non zero digits to the right of the found, so round up

$1.1010100011 \times 2^4 = 11010.100011 \times 2^0 = 26.546875$

$= 2.6546875 \times 10^1$