Chapter 2

1. Write the MIPS code for the following C code:

```
Y = A[6] - G[15] - 5
X[9] = B[3] - Z[0] + Y
```

   Assume Base addresses of X, G, A, B, Z are in registers $s0, $s1, $s2 and $s3. Also, Y is in register $s4.

   Please note that you have to make optimum utilization of the temporary and saved registers.

2. Write the MIPS code for the following C code:

```
X[5] = B[6] - G[16]
Y = A[3] - Z[1] + X[5]
```

   Assume Base addresses of X, G, A, B, Z are in registers $s0, $s1, $s2, $s3, $s5. Also, Y is in register $s4.

   Please note that you have to make optimum utilization of the temporary and saved registers.

3. Suppose, the variables P, Q, R, S are stored in the registers $1, $5, $6, and $11. Additionally, the base address of array X is stored in the $12 register. **Now read the following MIPS code and write down the equivalent C code. You don't need to import any library or declare variables.** ***Hint: Think of this question as the reverse process of what you learned in the lectures.***

```
ADDI $1, $1, 5
ADDI $5, $1, -2
LW  $6, 48($12)
ADDI $6, $6, -5
SUB $11, $5, $6
SW $11, 12($12)
```

Solution:

```
P = P + 5
Q = P - 2
R = X[12]
R = R - 5
S = Q-R
X[3] = S
```

4. Suppose you have an array called Marks = [14, 9, 7, 8, 3, 4, 10, 11].The base address of Marks is stored in `$s0`.Now read the given code carefully and answer the questions:

```
ADDI $s1, $0, 6 # store 6 in $s1
LOOP:
SLTI $t3, $s1, 0
BNE $t3, $zero, EXIT
SLL $t4, $s1, 2
ADD $t5, $s0, $t4
LW $s2, 0($t5)
SLTI $t3, $s2, 5
BNE $t3, $zero, ELSE
LW $s3, 4($t5)
ADDI $s3, $s3 , 2
SW $s3, 4($t5)
J ITERATOR_DECREMENT
ELSE:
LW $s3, 4($t5)
ADDI $s3, $s3 , -2
SW $s3, 4($t5)
ITERATOR_DECREMENT: ADDI $s1, $s1, -1
J LOOP
EXIT:
```

	Answer
What will the value of Marks[0] after the code completes execution?	14
What will the value of Marks[2] after the code completes execution?	9

What will the value of Marks[4] after the code completes execution?	5
What will the value of Marks[6] after the code completes execution?	8

5. Study branch address calculation maths from the videos
6. Study machine codes of R, I and J type instructions
7. Convert the following code snippets into MIPS (In all cases, the registers will be given. For practice, you can use whatever register you like)

```
j= 10
For(i=0;i<n;i++)
{
        if (arr[i] == arr[j])
                arr[i] = arr[i] + 1;
       j = j - 1;
}
```

Chapter 3

Study the assignment questions and maths from the video. As well as MIPS coding

Chapter 4

Study the diagrams. Try to understand how each instruction gets executed and which control signals gets executed when.