Course Title: Computer Architecture	Course Code: CSE 3313	Credit Hours: 3.0
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CT-02

Total Marks: 20

Time: 30 min

Consider the following C function that accepts three arguments, **an integer array** and the **length of the array n, a check value c**. This function calculates the prefix sum array of the given array and returns 0 if value of the last index is greater than c or returns 1 otherwise. The starting MIPS assembly instruction address is 1000 and the variable **i** corresponds to **$s2**.

```c
int prefix_sum_checker (int a [ ], int n, int c)
{
    int i = 1;
    while (i < n)
    {
        a[i] += a[i-1];
        i++;
    }
    if(a[n-1]>c)
        return 0;
    else
        return 1;
}
```

A. Convert the code to the corresponding MIPS assembly instructions. [10]

B. Convert the first 8 lines of your assembly instructions to the corresponding machine code. No need to convert it to binary. [6]

C. Consider an array A, whose base address is in $s3. If we develop a new Instruction Set Architecture such that the memory can contain triple words. What will be the corresponding MIPS assembly code for accessing the **address** of the 4th element of the array, i.e A [4]. [4]

MIPS Machine Codes

Instruction	Opcode	Function Code
add	0	32
sub	0	34
lw	35	
sw	43	
and	0	36
or	0	37
nor	0	39
andi	12	
ori	13	
sll	0	0
srl	0	2
beq	4	
bne	5	
slt	0	42
j	2	
jr	0	8
jal	3	
addi	8	

MIPS Registers

Name	Register Number
$zero	0
$at	1
$v0-$v1	2-3
$a0-$a3	4-7
$t0-$t7.	8-15
$s0-$s7	16-23
$t8-$t9	24-25
$k0-$k1	26-27
$gp	28
$sp	29
$fp	30
$ra	31