HW#3 (CSC390)

Due: 02/12/2016 by 5:00PM

#Q1.

Write a MIPS assembly language program that will perform the following C code operations:

```
for (i = 0; i < 8; i ++) {
C[i] = A[i + 1] - A[i] * B[i + 2]
}
```

Consider the arrays A and B are initialized with the following two arrays, respectively

[10, 12, 14, 16, 18, 11, 13, 15, 17, 19] and [11, 12, 13, 14, 15, 16, 18, 20, 22, 24].

Store the results in an array of consecutive memory locations C.

#Q2.

Write a MIPS assembly language program that calls a procedure, Add_Sub_Mul, which accept four parameters (g,h,i,j) and returns,

f = (g+h) if i >j; f= (g-h) if i < j; and f = g*h if i == j; the equivalent C function is shown below:

```
    int Add_Sum_Mul (int g, int h, int i, int j) {
      int f;
     if  (i > j) {
                f=(g+h);}
      else if (i < j) {
                f=(g-h);}
    else { f=0;}
}
```

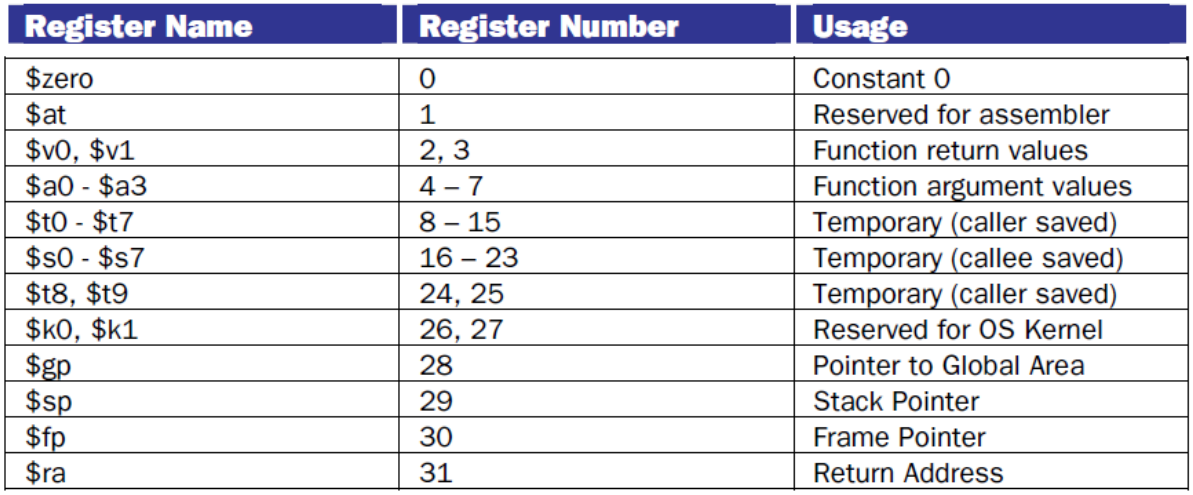
Consider the variables g, h, i, j and f are initialized with some initial values in the data segment. Use $s0 as f in the function and also use $s0 to store the base address of f in the memory location. Clearly comment on the every instruction you use in your program. Specially, clearly show and describe the stack operation. Remember, resisters ($a0-$a2) are used for passing arguments in to the function and $v resisters are used to store the results in the function.

#Q3.

Convert the C function below to MIPS assembly language. Also write a MIPS assembly code to call the function with some initial value of n and store the result in a suitable memory location, labeled as result. Make sure that your assembly language code could be called from a standard C program (that is to say, make sure you follow the MIPS calling conventions).

```
unsigned int sum(unsigned int n)
{
if (n == 0) return 0;
else return n + sum(n-1);
}
```

This machine has no delay slots. The stack grows downward (toward lower memory addresses). The following registers are used in the calling convention:



Register Name	Register Number	Usage
$zero	0	Constant 0
$at	1	Reserved for assembler
$v0, $v1	2, 3	Function return values
$a0 - $a3	4 – 7	Function argument values
$t0 - $t7	8 – 15	Temporary (caller saved)
$s0 - $s7	16 – 23	Temporary (callee saved)
$t8, $t9	24, 25	Temporary (caller saved)
$k0, $k1	26, 27	Reserved for OS Kernel
$gp	28	Pointer to Global Area
$sp	29	Stack Pointer
$fp	30	Frame Pointer
$ra	31	Return Address