1. For the MIPS assembly instructions above, what is the corresponding C statements? Assume that variables f, g, h, i, and j are assigned to registers $s0, $s1, $s2, $s3, and $s4, respectively. Assume that the base address of the arrays A and B are in registers $s6 and $s7, respectively.

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)	

2. Assume that registers $s0 and $s1 hold the values 0x8000000000000000 and 0xD000000000000000, respectively.

(a) what is the value of $t0 for the following assembly code?

    add $t0, $s0, $s1

(b) Is the result in $t0 the desired result, or has there been overflow?

(c) For the contents of registers $s0, $s1 as specified above, what is the value of $t0 for the following assembly code?

    sub $t0, $s0, $s1

(d) Is the result in $t0 the desired result, or has there been overflow?

3. Provide the type and assembly language instruction for the following binary value :
0000 0010 0001 0000 1000 0000 0010 0000$_{two}$. (Hint : Figure 1 may be helpful)

Name	Fields						Comments
Field size	6 bits	5 bits	5 bits	5 bits	5 bits	6 bits	All MIPS instructions 32 bits
R-format	op	rs	rt	rd	shamt	funct	Arithmetic instruction format
I-format	op	rs	rt	address/immediate			Transfer, branch, imm. format
J-format	op	target address					Jump instruction format

(figure 1)

4. Provide the type, assembly language instruction, and binary representation of instruction described by the following MIPS fields :

```
op= 0,  rs = 3 ,  rt = 2,  rd = 3,  shamt = 0,  funct = 34
```

5. Consider the following MIPS loop :

```
Loop : slt   $t2, $0, $t1
        beq   $t2, $0, DONE
        subi  $t1, $t1, 1
        addi  $s2, $s2, 2
        j     LOOP
DONE :
```

(a) Assume that the register $t1 is initialized to the value 10. What is the value in register $s0 assuming the $s0 is initially zero?

(b) For each of the loops above, write the equivalent C code routine, Assume that the registers $s1, $s2, $t1, and $t2 are integers A, B, I, and temp, respectively.

(c) For the loops written in MIPS assembly above, assume that the register $t1 is initialized to the value N. How many MIPS instructions are executed?

6. Implement the following C code in MIPS assembly. Hint : Remember that the stack pointer must remain aligned on a multiple of 16.

```
int fib(int n) {
    if (n == 0)
        return 0;
    else if (n == 1)
        return 1;
    else
        return fib(n − 1) + fib(n − 2);
}
```