ECE 0142 Computer Organization
Homework 8
Assigned: 3/4/16 Due: 3/15/2016 (TA: Chang Song, 1109 Benedum)

1. Implement the following C code in MIPS assembly.

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

Fill in the blanks of the partial answer. Each blank is one instruction only.

```
fib:    addi $sp, $sp, -12              #make room to save 3 values on stack

        _____________________           # push $ra on stack

        _____________________           # push $s0 on stack

        sw      $a0, 0($sp)             # push $a0 on stack

#the following instructions are for the if-else-else statement

        _____________________________   # if n!=0, jump to testnis1

        _____________________________   # else fib(0) = 0

        j rtn                           # return
testnis1:       addi    $t0, $0, 1      # set $t0 to 1

        _____________________________   # if n!=1, jump to gen
        add     $v0, $0, $t0            # else  fib(1) = 1
        j rtn

gen:    subi    _____________________   # calculate n-1
        jal     fib                     #call fib(n-1)
        add     $s0, $v0, $0            #copy fib(n-1) to $s0
```

```
        subi    _____________________   # calculate n-2
        jal     fib                     #call fib(n-2)

        _____________________           # calculate fib(n-1)+fib(n-2)
#the following instructions restores registers and prepare to return
rtn:    lw      $a0, 0($sp)             # pop $a0

        _____________________           # pop $s0

        _____________________           # pop $ra
        addi    $sp, $sp, 12            # restore $sp (top of stack)
        jr      $ra
```