CS232: Lecture 4 (Functions in MIPS)

In this lecture, we'll consider two functions:

```c
int main() {
    ...
    t1 = fact(8);
    t2 = fact(3);
    t3 = t1 + t2;
    ...
    return 0;
}
```

```c
int fact(int n) {
    int i, f = 1;
    for (i = n; i > 1; i--)
        f = f * i;
    return f;
}
```

```mips
main: sub $sp, $sp, 8
sw $ra, 0($sp) # save $ra
li $a0, 8
jal fact
move $t1, $a0
sub $t2, $t1, 4($sp) # save $t1
lw $a0, 8($sp) # save $a0
jal fact
move $t2, $a0
lw $t3, $t1, $t2
add $t3, $t1, $t2
lw $ra, 0($sp) # restore $ra
li $a0, 8 # restore $a0
jr $ra
```

```mips
fact:
    li $t0, 1 # f = 1
move $t1, $a0 # i = n
loop:
    ble $t1, $a0, ret # i > 1
mul $t0, $t0, $t1 # f = f * i
sub $t1, $t1, 1 # i--
    j loop
ret:
    move $t0, $a0
jr $ra
```