

# Computer Organization and Structure

Homework #2

Due: 2014/10/27, 11:59PM

Please write the following four programs in MIPS assembly language.

## 1. Area of a Triangle (30%)

We will give you three 2D points  $(x_1, y_1, x_2, y_2, x_3, y_3)$ , and your job is to calculate the area between these three points. Your output should look like this.

Your output should look like this. The filename is **Area.s**.

```
----- Triangle Area -----
```

Please type 6 integers,  $x_1, y_1, x_2, y_2, x_3, y_3$ , and each with the

Enter key:

$x_1$

$y_1$

$x_2$

$y_2$

$x_3$

$y_3$

The area is :[the area]

## 2. Tower of Hanoi (35%)

Your task is to complete a recursive implementation of the Tower of Hanoi problem in order to get familiar with assembly programming. We will give you an integer  $n$  ( $1 \leq n \leq 5$ ) which means Tower of Hanoi with  $n$  disks. Your job is to move all disks from A to C and print out the moving process.

Your output should look like this. The filename is **Hanoi.s**.

```
----- Tower of Hanoi -----
```

Input :

$n = 3$

Output :

move a -> c

move a -> b

move c -> b

move a -> c

move b -> a

**move b -> c**  
**move a -> c**

### 3. Bubble Sorting (35%)

We will give you five positive integers. Your job is to sort 5 numbers in ascending order. You can choose a sorting algorithm you want. (Such as Quick sort, Merge sort, Bubble sort ...)

Your output should look like this. The filename is **Sorting.s**

---- Bubble Sort ----

**Input :**

**Insert the first integer: 3**

**Insert the second integer: 4**

**Insert the third integer: 2**

**Insert the fourth integer: 5**

**Insert the fifth integer: 1**

**Output :**

**1, 2, 3, 4, 5**

### 4. Bonus: Variation of Fibonacci (Optional)

We make some variations on the original Fibonacci numbers with the new definition as following.

$$F(0) = 0$$

$$F(1) = 1$$

$$F(2) = 2$$

$$F(n) = F(n-1) + F(n-3), \text{ if } n > 2$$

In order to let you students get more understanding of how to use assembly language to

implement recursive call, you are asked to write a program which computes the modified

Fibonacci numbers as definition above.

Your output should look like this. The filename is **Fibonacci.s**

----Variation of Fibonacci ----

**Please type 1 integer, and then press Enter keys.**

**n = 13**

**The result of F(13) is 101**