Lab 7 - Fibonacci Number

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CS311 - Computer Architecture 1

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The last laboratory exercise requires you to code the Fibonacci Number routine using the stack.

Please create a file named `Fibonacci.asm` in ebe (or in any text editor of your choice).

Question 1 - `Fibonacci Number`.

Write an assembly language program to that does the following:

- Reads in a number from terminal using `scanf`
- Computes the largest Fibonacci number that is **less** than the input number
- Display this number in terminal using `printf`

The Fibonacci sequence of numbers is defined as in Equation 1:

$$\begin{aligned} &\text{fib}\,(1) = 1, \\ &\text{fib}\,(2) = 1, \\ &\text{fib}\,(n) = \text{fib}\,(n-1) + \text{fib}\,(n-2) \quad \text{for} \;\; n > 2 \end{aligned} \tag{1}$$

In other words, the first two numbers in the Fibonacci sequence are 1. The subsequent numbers are obtained by adding the previous two numbers in the sequence. Thus,

$$1, 1, 2, 3, 5, 8, 13, 21, 34, ...,$$

is the Fibonacci sequence of numbers.

In this exercise, write a function to compute the largest Fibonacci number that is less than or equal to a given input number. The main procedure requests this number and passes it on to the fibonacci function. You must use the **stack** to store the numbers.

The outline can be given as:

```
        segment .data
   x    dq   0           ; the number for comparison
   scanf_format   db    ``\%ld",0
   printf_format  db    ``The number less than fact(\%ld) is = \%ld",0x0a,0

        segment .text
        global  main                ; let the linker know about main
        global  fibonacci           ; declaration of fibonacci function
        extern  scanf               ; resolve write and exit from libc
        extern  printf
main:
```

Submission

The files must be submitted through Canvas by 5pm December 2, 2016. There is no late submission!. The grading rubric is given in Table 1.

Table 1: Grading rubric

File	Aspects	Points
`Fibonacci.asm`	Correct result	20
	Correct use of stack	25
	Correct use of Fibonacci function	25
	Correct use of `scanf` and `printf`	20
	Documentation	10