# Lab 5 - 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 that does the following:

- Reads in a number from terminal using `scanf`
- Computes the **closest** Fibonacci number to the input number. In the case of equal distance, it should output the higher 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,

$$1, 1, 2, 3, 5, 8, 13, 21, 34, \ldots,$$

is the Fibonacci sequence of numbers.

In this exercise, write a function to compute the closest Fibonacci number to a given input number. In the case of a tie, use the higher number. The main procedure should request this input 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 closest to the fib(%ld) is = %ld",0x0a,0

        segment .text
        global  main
        global  fibonacci
        extern  scanf
        extern  printf
main:
```

# Submission

The files must be submitted through Canvas by 5pm May 27, 2019. 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 |