THE UNIVERSITY OF KANSAS

SCHOOL OF ENGINEERING

DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

EECS 645 – Computer Architecture

Fall 2016

Homework 07 (MARS)

Student Name: Student ID:

Homework 07

In this homework you are required to write a routine that generates the Fibonacci sequence *fib(0), fib(1), fib(2), ... , fib(n)*. When given the argument *n* in register *$a0*, your routine should generate the Fibonacci sequence and store it into the data segment starting at address *0x10010000*.

Implement your routine as follows:

a) **Non-recursively** as described by the following pseudo code

```
fib(int n, &fib){
        fib[0] = 0; fib[1] =1;
        for i = 2 to n
                fib[i] = fib[i-1] + fib[i-2];}
```

b) **Recursively** using the following pseudo code from *Problem 2.31* (in chapter 2 of the second textbook) from *HW06*

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

Hint: You could use the solution of *Problem 2.31* from *HW06* to implement the *recursive* version of your code.

Note: The function in *Problem 2.31* returns one Fibonacci number *fib(n)*, while here you are required to generate a sequence of Fibonacci numbers, i.e. *fib(0), fib(1), fib(2), ... , fib(n)*.

Steps:

1) Download the file "HW07_MARS.zip" from blackboard and extract its contents.
2) Launch MARS, "Mars4_5.jar".
3) Open and edit the template source files:
   "\HW07_MARS\fibonacci_sequence_non-recursive.asm", and
   "\HW07_MARS\fibonacci_sequence_recursive.asm"
4) Verify the correctness of your code by checking the content of the data segment starting from address *0x10010000*.