# CS2640 Project 2
# Total points: 100

**Project Specifications:**

Write a program in assembly language using the MIPS instruction set to calculate the $n^{th}$ Fibonacci number. **This must be done in an iterative loop.**

The Fibonacci function that returns the nth fibonacci number is defined as:

$$F_n = \begin{cases} 0 & \text{if } n = 0; \\ 1 & \text{if } n = 1; \\ F_{n-1} + F_{n-2} & \text{if } n > 1. \end{cases}$$

For example, the first 8 numbers in the sequence is: {0, 1, 1, 2, 3, 5, 8, 13}.
**Pseudocode for the the Fibonacci calculator:**

```
fib(n):
    a = 0
    b = 1
    for i from 0 to n - 1:
        array [i] = a
        temp = b
        b += a
        a = temp
```

Your program will read from input the value of n. Be sure to validate user input and report errors when necessary. n must be a positive number that can not be too large that the value of f(n) cannot be expressed with a 32-bit unsigned integer and can be output to the console. Note: You may need to use a different syscall code to print an unsigned integer value to the console.

While iterating through this loop, store the value of f(k) (for k = 0, 1, 1, 2, 3,…, N) in an array. This array should be large enough to contain N values (where N is the largest permissible value of n). In other words, store each number of the fibonacci sequence up to, and including, the $n^{th}$ number in the array.

Your program should then output the $n^{th}$ Fibonacci number, then, on a separate line, output the entire portion of the sequence stored in the array with each value separated by a space. Use appropriate prompts to describe the output.
**Execute the program for n = 10 and n = 20. Save a copy of the output.**
**Submission Instruction:** You must run the assembly program using the SPIM simulator. Please zip the following files:

- The assembly program(s) (using file extension .asm) and output of the console for the two inputs stated above..
- **include a report** (**with a cover page** and less than 4 pages) explaining our approach to solving the problem, what the input limit is and why.
- Copy your files to a folder named, “your_name_p2” where “your_name” is your first and last name separated by an underscore. Compress that folder into a single Zip archive which should be named, “your_name_p2.zip”

**Submit your zip file via Blackboard**
**NO LATE SUBMISSIONS WILL BE ACCEPTED**