San Francisco Bay University

EE488 - Computer Architecture
Homework Assignment #5
Due day:
4/4/2025

Instruction:

1. Implement a subprogram that prompt the user for *3* numbers, finds the median (middle value) of the *3*, and returns that value to the calling program.
   ⇨ The answer:
   https://github.com/YunishaBasnet/computer-architecture/blob/main/5-1.asm

2. Implement a recursive program that takes in a number and finds the square of that number through addition. For example if the number *3* is entered, you would add *3+3+3=9*. If *4* is entered, you would add *4+4+4+4=16*. This program must be implemented using recursion to add the numbers together.
   ⇨ https://github.com/YunishaBasnet/computer-architecture/blob/main/5-2.asm

3. Write a recursive program to calculate factorial numbers. Use the definition of factorial as *F(n) = n * F(n-1)*
   ⇨ https://github.com/YunishaBasnet/computer-architecture/blob/main/5-3.asm

4. The following pseudo code converts an input value of a single decimal number from $1 \leq n \geq 15$ into a single hexadecimal digit. Translate this pseudo code into MIPS assembly.

```
main{
   String a[16]
   a[0] = "0x0"
   a[1] = "0x1"
   a[2] = "0x2"
   a[3] = "0x3"
   a[4] = "0x4"
   a[5] = "0x5"
   a[6] = "0x6"
   a[7] = "0x7"
   a[8] = "0x8"
   a[9] = "0x9"
   a[10] = "0xa"
   a[11] = "0xb"
   a[12] = "0xc"
   a[13] = "0xd"
   a[14] = "0xe"
   a[15] = "0xf"

   int i = prompt("Enter a number
from 0 to 15 ")
   print("your number is " + a[i])
}
```

⇨ https://github.com/YunishaBasnet/computer-architecture/blob/main/5-4.asm

5. The following pseudo code program calculates the Fibonacci numbers from *1...n*, and stores them in an

array. Translate this pseudo code into MIPS assembly, and use the PrintIntArray subprogram to print the results.

```
main{
   int size = PromptInt("Enter a max F
ibonacci number to calc: ")
   int Fibonacci[size]

   Fibonacci[0] = 0
   Fibonacci[1] = 1

   for (int i = 2; i < size; i++){
     Fibonacci[i] = Fibonacci[i-
1] + Fibonacci[i-2]
   }
   PrintIntArray(Fibonacci, size)
}
```

⇨ https://github.com/YunishaBasnet/computer-architecture/blob/main/5-5.asm