Computer Architecture   Course: IT089IU
International University – VNU HCM   Date: March 2019
Dr. Le Hai Duong   Time: 4 hours

Laboratory Session 5

Procedure

1. **Exercise 1: Int2Hex Converter. (50pts)**
   Write a program that
   1.1 Read in **ONE** unsigned integer in the range 0 to 15. Print out that number in hexadecimal. For example, given the input 13, print out `0xD`. (**lab5_1_1.s**)
   1.2 Modify the previous assembly, create a procedure `printHex(int num)`. This procedure takes in a number and print it out in hexadecimal. (**lab5_1_2.s**)
   1.3 Modify the previous assembly so that it can print out hexadecimal of any 32-bit integer input. For example, read in number 546263, print out `0x855D7`. (**lab5_1_3.s**)

2. **Exercise 2: Fibonacci number (50 pts)**
   The Fibonacci series is defined as:
   1, 1, 2, 3, 5, 8, 13, 21, 34, 55, ...
   Each term in the series is the sum of the preceeding two terms. So, for example, the term 13 is the sum of the terms 5 and 8.

   2.1 Write the program as a counting loop that terminates when the first 100 terms of the series have been computed. Use a register for the current term and a register for the previous term. Each execution of the loop computes a new current term and then copies the old current term to the previous term register. Print out the series. (Use no function) (**lab5_2_1.s**)

   2.2 Rewrite the program using function
   ```
       void  fibonacci(int  numOfTerms);  //  this  is  C
   prototype
   ```

   This function print out the Fibonacci series with one input is the number of terms numOfTerms.

   2.3 Rewrite the program using recursion. The `fib` function should compute the nth term as such:
   ```
   int fib (int N) {
      return return fib(N – 1) + fib(N – 2);
   }
   ```

Reference:

1. https://en.wikibooks.org/wiki/MIPS_Assembly/Pseudoinstructions
2. https://courses.missouristate.edu/KenVollmar/MARS/Help/SyscallHelp.html
3. https://www.assemblylanguagetuts.com/mips-assembly-programming-tutorials/#MIPS_Data_Types
4. https://en.wikibooks.org/wiki/MIPS_Assembly/Arithmetic_Instructions
5. https://gab.wallawalla.edu/~curt.nelson/cptr280/lecture/mips%20arithmetic%20instructions.pdf