

Computer Organization Summer2021

HW1: MIPS Programming

Due Date: 2021/07/20 23:55

1.Goal:

In hw1, students will learn how to write MIPS code, and know the difference between assembly and high-level languages. In order to test the correctness of program, students should use a MIPS simulator –MARS to simulate the programs.

2.Download and Using MARS:

A. Download and installation:

1. Download MARS from the page:
<http://courses.missouristate.edu/KenVollmar/MARS/>
2. Download the version chosen by yourself, and install it

B. Steps for running a MIPS code on MARS:

1. File ->New
2. Write MIPS code
3. Run -> Assemble (F3)
4. Run -> Go (F5)

3.HW Description:

A. Factorial

The attached files factorial.c and factorial.s are modified from the example given in textbook for computing $n!$. In this part, please execute factorial.s on MIPS simulator MARS for practice.

B. Prime number (30%)

Read a number from standard input, and judge if it's a prime number or not. If it is a prime number, then print "It's a prime" on standard output. Otherwise, print "It's not a prime".

C. Permutation (30%)

Read two integers from standard input, named n and k ($n \geq k$ and $k > 0$). Calculate $\text{permutation}(n, k)$ and print the result on standard output.

(Hint: $\text{permutation}(n, k) = n! / (n - k)!$)

D. Greatest common divisor (GCD) (40%)

Read two integers from standard input (The first one will be larger than second one), calculate the greatest common divisor of them and print the result on standard output.

In this question, you have to use recursive function to finish the task. Otherwise, only half of the score will be given.

4. Notes

A. For every task, the corresponding implement in C is provided.

B. There's no strict regulation of input and output format string, but try to be as clear as you can. You can follow the format in reference .c files.

C. Late submission will have 20% penalty per day. The submission will no longer be accepted three days after deadline.

D. Here's the [document \(https://bit.ly/3ysaRax\)](https://bit.ly/3ysaRax) for MIPS instruction set. You can check this question on stackoverflow for some [information\(https://bit.ly/3hETQmL\)](https://bit.ly/3hETQmL) regarding division and multiplication.

E. For all the tasks, test cases and results will not overflow 32-bit register.

F. Any assignment by fraud will get a 0 point.

G. The files you should hand in include:

1. prime.s
2. permutation.s
3. gcd.s

Please compress these files into one zip file, and name your zip file as HW1_studentID.zip (For example, HW1_309551092.zip).

The wrong format or wrong filename will give you 10% penalty.