Advanced MARS Programming
Due: October 3, 2022

INSTRUCTIONS

This assignment explores functions in MIPS. Submit your answers in a single ASM text file called **mini3.asm**. The teaching assistants will hold office hours the week of the 26th.

You are expected to do all your work on your own. Plagiarism and cheating are a serious offence. You may ask classmates, the Tas, and the professor clarification questions.

QUESTION

You must write and execute the code for this question in the MARS MIPS Emulator provided to you on our myCourses webpage under Content/Resources. Your TA will only grade your work from the provided emulator.

Write the following program using MARS:

1. In the MIPS `main()` code area, prompt the user to input an integer number greater than or equal to zero. Say to the user: "Please input an integer value greater than or equal to 0: ".
2. If the user inputs a value less than zero, then terminate the program with the message: "The value you entered is less than zero. This program only works with values greater than or equal to zero."
3. If the user inputs a value greater than or equal to zero, then call a function called **factorial** with the following C signature to calculate the factorial, recursively:

   ```
   int factorial(int);
   ```

4. After the function **factorial** returns the answer to the **main** code area, from the **main** code area, print the following messages:
   a. "You input:" and the value they entered from the keyboard. New line.
   b. "The factorial is:" and the value returned by the function factorial. New line.
5. Now, prompt the user to see if they would like to do this again. Tell the user to input a single character 'Y' (capital letter Y) to do it again, all other characters will terminate the program. If the user inputs 'Y' then go to step 1.

WHAT TO HAND IN

A single ASM text file named **mini3.asm** with the answers to the above question. Submit this to the assignment box "mini 3" on myCourses.

HOW IT WILL BE GRADED

This assignment is worth 20 points.

Point Deductions:

- For not following submission instructions: -3 points
- Your program must execute to be graded (part marks will be given)

Points Awarded:

- Step 1 is 2 points
- Step 2 is 3 points
- Step 3 is 10 points (5 points following C convention, 5 points for recursion)
- Step 4 is 2 points
- Step 5 is 3 points

TA GRADING INSTRUCTIONS

- **Grade the student's program only with the MARS emulator provided from myCourses**.
- 20% off per day late, max 3 late days.
- If the student submits a waiver, mark the assignment as 0 on myCourses but record the waiver event on the grading spreadsheet to average the students grades out of 5 assignments. If this student has used the waiver multiple times, then the grade is 0 for the assignment and do not record the waiver event.
- Remember to award grades proportionally to the students, this means if the student got a question half correct then they receive half of the points.
- Award the score to the student by comparing their work with the solution sheet.