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COE0147 Midterm project

Spring 2016

For this project, you will come up with a solution to a problem using a high-level language and then translate your program into MIPS assembly language. In doing this project, you will learn In this project you will experience the challenge of translating a significant program into assembly and learn how the decisions you make at the algorithmic level impact the assembly-level implementation and overall efficiency.

Problem:

The problem you are being asked to solve is taken from Project Euler [1]. Project Euler is a collection of problems that require the use of mathematics and programming knowledge in order to solve them efficiently. The particular problem you will solve is #150, "Searching a triangular array for a sub-triangle having minimum-sum". The problem description (and a sample problem) can be found at this address:

<https://projecteuler.net/problem=150>

Submission and Grading:

In order to complete this assignment, you will have to complete two tasks:

- 1) Write a program to solve this problem in a high-level language (preferably C or C++). You may use any high-level language that you are comfortable with. The algorithm you come up with will guide you in creating the assembly-level solution. Brute force is a naïve approach to solving this problem, you should optimize your code.
- 2) Convert your high-level code into MIPS assembly code that can be simulated and efficiently calculates the correct solution.

You will be required to submit all files used in drafting your high-level language solution and assembly-level solution. Posted along with this assignment is a MIPS file code harness (main.asm) and one sample test case (Test1.asm) you can use to verify your assembly-level solution. You will be graded using different cases, so make sure you test your solution thoroughly

This project is nominally due **Friday March 4th**. The project can be submitted without penalty up until **Wednesday March 9th**. After March 9th, there will be a 25% penalty. Assignments will not be accepted after **Sunday March 14th**.

You will be grading as follows:

High-level solution (10%). This solution must compile. If you solve this problem in an efficient manner, the problem should take a relatively small amount of time to solve (< 5 seconds).

Assembly-level solution (60%). You will be evaluated on your ability to translate your solution into a working assembly program and create a working solution.

Individual Test cases (30%). You will be given a series of test cases similar in form to the sample provided and your results will be assessed and evaluated.

Please contact us if you have any questions or issues (boy12@pitt.edu, shs173@pitt.edu, dickerson@pitt.edu). You may work with one partner on this project. You will not have a lab the week of the exam (2/26) or the following week (3/4). Those recitations will be dedicated to providing you with any help that you might need with this project, it is strongly recommended that you attend. However, its recommended that you do not until the last minute to get started, you can start now by drafting your high-level solution and then moving on to the assembly-level solution..

References

<https://projecteuler.net/about>