ICS 233 – Fall 2009

Computer Architecture and Assembly Language

Programming Assignment 2

Write and test a MIPS assembly language program to count the letters in a text file and sort them according to their frequency. The program should do the following:

- Open a text file and read all characters into an array. The maximum number of characters to be read should be limited to the size of the array, which should be 100,000 characters. MARS provides the system calls for opening a file, reading from a file, etc.
- Traverse the array character by character. Count only the letters. You should have an array of 26 counters, one for each letter. Each entry in the array should store a letter and its corresponding counter value. Do not distinguish between a capital or lowercase letter. It should be counted as the same letter. Other characters (spaces, commas, periods, parentheses, digits, etc.) should not be counted.
- Sort the letters according to their counter value. For example if letter E has the highest counter value then it should appear on top of the sorted array.
- Display the sorted array, starting with the letter that appeared most frequently in the text file and its counter value.

Your program should be well divided into procedures. A sample run is shown below:

```
Enter input text filename: input.txt

Letter appearance in the input text file:
E               151
A               120
S               69
.
.
.
X               0
```

Submission Guidelines:

All submissions will be done through WebCT.

Submit the source code of the program. Make sure that your program is well documented.

Grading Policy:

The grade will be divided according to the following components:

- Correctness of code: program works properly and produces correct results
- Design and Coding: program is well designed and divided into procedures
- Documentation of code: program is well documented

Late Policy:

The programming assignment should be submitted on the due date by midnight. Late submissions are accepted, but will be penalized for a maximum of 3 late days. Assignments submitted after 3 late days will not be accepted.