**Honors Introduction to C**

**Test #2**

**10/19/2011**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

You are working for a company that charges its advertisers based on volume – on the number of clicks their website gets. Unfortunately, some groups artificially inflate these numbers by writing automatic programs that click on a website many, many times. The companies to whom this happens are unhappy, because they are getting charged for clicks that aren’t from genuine customers. On this exam, your job will be to write an application that calculates the total click data for websites, AFTER throwing out the invalid users. In addition, you will print out a ranked list of each company from top to bottom, based on number of valid clicks. (Note: no clicks of invalid users count at all, not even their clicks for a site that are less than or equal to 2000.)

A user will be defined as invalid if they click on a single website more than 2000 times.

You will be taken through the process of coding this program step by step. You will be provided with the input file format below, and the framework for the code on the following page. Each question you will have to answer will be denoted as a comment in the framework, so you can see where your answer will fit into the greater program.

You will read your input from the file, **“addata.txt”.**

File Format of addata.txt

The first line of the input file contains a two positive integers, *n*, representing the number of customers for which we have click data, and, *m*, representing the number of websites for which we are tracking the click data. It is guaranteed that *n* ≤ 100 and *m* ≤ 50. Each of the next *n* lines will contain grades for one customer. Each line will have *m* integers separated with spaces representing the number of clicks that customer made for each website, 0 through *m*-1, in order. (So, the first number if how many times that customer clicked on site 0, the next number is how many times they clicked on site 1, etc.)

Thus, a sample file may look like this:

3 4

10 20 15 5

5 100000 6 9

25 50 10 8

In this file, customer 0 clicked on site 0, 10 times, site 1, 20 times, site 2, 15 times and stie 3 5 times. Customer 1 clicked on site 0, 5 times, site 1, 100000 times, site 2, 6 times, and site 3 9 times. Customer 2 clicked on site 0, 25 times, site 1, 50 times, site 2 10 times, and site 3, 8 times.

#include <stdio.h>

const int MAX\_CUSTOMERS = 100;

const int MAX\_WEBSITES = 50;

const int MAX\_CLICKS = 2000;

const int DEBUG = 1;

int main() {

 /\* Question 1 \*/

 int num\_customers, num\_websites;

 int click\_data[MAX\_CUSTOMERS][MAX\_WEBSITES];

 int i, j;

 /\* Question 2 \*/

 /\* Question 3 \*/

 int cheaters[MAX\_CUSTOMERS];

 i = 0;

 int cheat\_num = 0;

 for (i=0; i<num\_customers; i++) {

 int cheat\_flag = 0;

 /\* Question 4 \*/

 /\* Question 5 \*/

 }

 if (cheat\_num > 0) {

 printf("Here is/are the cheaters: ");

 /\* Question 6 \*/

 }

 printf("\n");

 /\* Question 7 \*/

 int total\_clicks[MAX\_WEBSITES];

 /\* Question 8 \*/

 int rank[MAX\_WEBSITES];

 for (i=0; i<num\_websites; i++) {

 int num\_bigger = 0;

 /\* Question 9 \*/

 rank[i] = num\_bigger + 1;

 }

 for (i=1; i<=num\_websites; i++)

 /\* Question 10 \*/

 fclose(ifp);

 return 0;

}

1) Write a single statement to replace /\* Question1 \*/ to open the input file addata.txt, to read from.

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2) Write a single statement to replace /\* Question2 \*/ to read in the first two integers in addata.txt into the variables num\_customers and num\_websites, respectively.

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3) Read in all the information from the file into the array, click\_data. This code replaces /\* Question 3 \*/.

4) In this question, you want to see if this particular customer (i) cheated on any website. Replace /\* Question 4 \*/ with code such that, if they did click on any link more than 2000 times, the variable cheat\_flag is set to 1. Otherwise, leave this variable untouched.

5) Replace /\* Question 5 \*/ with code such that if customer i is found to be a cheater, his/her customer number (0-based) is added to the array cheaters and the index into that array, cheat\_num, is incremented.

6) Replace /\* Question 6 \*/ with code to print out the number of each cheater, as they are stored in the array cheaters.

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7) Replace /\* Question 7 \*/ with code to change each value in click\_data to 0 that belongs to a cheater.

8) Replace /\* Question 8 \*/ with code to calculate the total number of clicks for each website and store this information into the array total\_clicks. (Note: total\_clicks[0] will store the total number of clicks received by website 0, etc.)

9) Replace /\* Question 9 \*/ with code to determine how many websites have more click than website i. Store this value in num\_bigger.

10) Replace /\* Question 10 \*/ so that it loops through each website. If the site’s rank is i, then it should print out its rank, company number and total number of clicks.

11) Dennis Ritchie, one of the inventers of the C Programming Language passed away this past weekend. After what letter in the alphabet did he and Ken Thompson name the programming language they created together?

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**Please place any of your answers that don’t fit on the previous page here. Clearly label any work that you would like graded below.**

**Scratch Page – Please clearly mark any work on this page you would like graded.**