

CS 1431 Assignment 2

Due on Wed., Feb. 7, 2001

Each student is required to do this assignment **individually**. Print or write down all of your source files, computer outputs and your inputs. Each page of your answer sheets should contain the following information clearly:

Name, Student Number, Assignment Number, Course Number (CS 1431)

All the answer sheets of your assignment should be stapled together.

Hand in the following:

- Paper work: Source files of Problem 1 and 2, and the inputs and outputs of these problems. Also indicate the compile you used.
- A disk containing the files of problems: The source files and **executable** files which solve the problems.

Place these items in a 9" × 11" envelope, with the following information clearly marked on the outside of the envelope:

Name, Student Number, Course Number (CS 1431) and your email address.

Assignments which do not meet above rules will not be marked.

Deposit (submit) your assignment in Classroom on due date. The grade of the assignment will depend on:

Specification and documentation: 15 %

Format and readability: 15 %

Correctness: 70 %

Problem 1.

Write a C program which outputs a zig-zag matrix. When the program is run, the user is first asked to input the numbers of rows and columns. Then the computer will print a zig-zag matrix on screen. The user is then asked to input the numbers of rows and columns again. To terminate the program, the user simply input 0,0. The following is an example of the input and output:

```
Enter the numbers of rows and columns: 3,4
```

```
The zig-zag matrix of size 3X4 is:
```

```
1  2  3  4
8  7  6  5
9 10 11 12
```

```
Enter the numbers of rows and columns: 0,0
```

Try using your program to print several different zig-zag matrices.

Problem 2.

Suppose there are m students in a department. Each student took n courses. The marks of these courses are recorded in a table such that one row records one student's marks and one column records the marks of one course. Thus these marks form a matrix. All the marks are between 0 and 100. Write a function to check whether a student had any course failed (the mark is below 50). If so, print out the student's number (the number of row) and all the numbers of failed courses (i.e., the number of column). Also write a function (or functions) to find the best student (with the highest total marks).

Finally, write a driver program to test the functions. In the driver program, you first create a matrix of random integers between 0 and 100. You need to use your ID number as a seed of `srand()` and then use `rand()%100` to create the numbers. Then call the functions to find the best student and the failure students. You might choose your own values of m and n .