Programming Technique

Test 2

Duration: 120 minutes.

Note: Do not copy. If any hint of plagiarism is found, both students will receive 0.

Problem 1 (2 points).

Given a 2D float array of size M x N. Find:

a) Its minimum value (1.0).
b) The average value (1.0).

Note: M and N are inputs from user. Each value of the array is randomly generated.

Problem 2 (2 points).

Write a function that do all of the following:

- Prompt user to enter a positive integer M (0.5).
- Create an array of size M (0.5).
- Return M **and** the array (1.0).

Problem 3 (2 points).

a) Define a new class called Screen with the following protected properties (0.5):
- Integer Width.
- Integer Height.
- Integer Area (= Width * Height).
- Integer dpi.

b) Define two new classes of your own (TV, monitor, mobile screen, etc.), inherited from Screen. Implement their constructors so that a user can initialize Width, Height and dpi when he creates a new instance of the class.

c) Add another static member into the base class Screen called KnownMaxArea. This variable is 0 at the start of the program. Rework your previous codes so that each time you create a new instance (with a new Area), the program will update KnownMaxArea with the new area if the new area is greater than the existing KnownMaxArea (0.5).

Problem 4 (2 points).

Given a M x N integer array that only consists 0, 1, -1 and 2. Example:

1	-1	-1	-1	-1
0	-1	1	1	1
1	-1	1	-1	2
1	1	1	-1	-1
-1	-1	1	-1	-1

The program starts from 0 and finds its way to 2. It can only move to the tile with number 1 that is next to it (can't move to a -1 tile). It can only move up, down, left and right (no diagonal movement allowed).

If there is a path between 0 and 2, print "Path exists". Otherwise, print "No path".

Problem 5 (1 points).

Given a char array of length N (N is input from user). Return the number of words in the array. A group of characters is considered a word when there is no space between them. Examples:

"a1b jsa" -> 2

"ssk 21ka asda_as" -> 3

Problem 6 (1 points).

Write a recursive function to revert an integer. Examples:

- Input: 3214. Output: 4123.
- Input: 45530. Output: 3554.

You must use the following prototype:

```
int revert(int n)
```

Do not use loop structure.

Hint: you can use math library.