Lab exercise_Arrays

Part A:

1. Create a short program that uses array.
   a. Ask the user for number of students.
   b. Declare an array of string to store the names.
   c. Using a loop, read in each name into the array. (Use cin)
   d. Using a loop, display the names to the user. (Use cout)
2. Once you have the above tasks working do the following:
   a. Declare an array of grades. (Type double)
   b. Using a loop, prompt the grade of each student.
      Read the grade of each student.
   c. Using a loop, display the name and the grade of each students.

3. Calculate and output the average of grades from the above questions.

Part B: Below problems are copied from Prof. Ryba's website

1. Write a C++ program that sets up an array of integers with capacity 20. It should then generate the 20 entries randomly in turn. Each entry must be an integer between 1 and 20, however it must also be different from all previous entries in the array. Generate the entries as random numbers and repeatedly make new numbers until a legal entry value is found. The program should finish by printing the list of 20 array values that it has selected.
   (Hint: Required to use nested for loops)
   ```
   for(int i = 0; i < 20; i++)
       for(int j = 0; j < i; j++)
   ```

2. Write a program to read an array of 11 integers from a user and compute the median entry of the array. (Hint: sort the array and get the middle position)

3. Eight queens are to be placed on an 8 x 8 chessboard in such a way that one queen is to be in each column. A program will store an array x[] with capacity 8 to represent such a configuration. If x[c] has value r then in row r there is a queen in column c. Write a program that asks a user to enter the rows that contain queens in the 8 columns. The program then prints the board. For example, if the user enters: 2,3,4,0,1,7,6,5 the program should print:

```
...Q....
....Q...
Q.......
.Q......
..Q.....
.......Q
......Q.
.....Q..
```

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4. Eight queens are to be placed on an 8 x 8 chessboard in such a way that one queen is to be in each row and one queen is to be in each column. A program will store an array x[] with capacity 8 to represent such a configuration. If x[c] has value r then in row r there is a queen in column c. Write a program that asks a user to enter the rows that contain queens in the 8 columns. The program then checks whether there is just one queen per row. For example, if the user enters: 2,3,4,0,1,7,6,5 the program should print: OK (because the user has entered the configuration that was entered in problem 3). But if the user enters 0,0,1,2,3,4,5,6 the program should print: No good. (Why?)