Assignment #3
pointers/arrays/strings/recursion/files

Points: 30

Instructions (3 points)

1. Write a comment at the top that contains the following information
```
// Your Name
// CS 52
// Assignment #3
```
2. Properly indent, format and comment your code as necessary

Warning: - No late submission is accepted!
- Points will be deducted for entirely commented files!
- Name your files *problem{#}.cpp*, for example *problem1.cpp, problem2.cpp, etc.*
- *Canvas may append -1, such as problem2-1.cpp which is okay!*

Problem 1 Matrix 6 points

Create a 5x5 matrix of int values as shown below. Write a program that finds the minimum, maximum, and average value of all values in the matrix. Create a function for each value that is computed (max, min, avg). Print out the results (limit the average to two decimal points!).

```
Matrix:    [ 7,  2, 10,  3,  6],
           [ 1, 12,  2,  0, 20],
           [ 3,14,19,  5,  4],
           [ 6,  0, 17, 18,  8],
           [ 1, 13, 10,  9, 11];
```

Example: `Min: 0, Max: 20, Avg: 8.04`

Problem 2 Dynamically Allocated Arrays 9 points

Write a program that dynamically allocates an array based on a size determined by the user. You must declare the array as a pointer to get full credit! The program then uses a pointer to initialize each element in the array with a value that is also entered by a user. Finally, sort the array and print it to the console.

Example:
```
Enter a size: 5
Item 1: 3
Item 2: 8
Item 3: 5
Item 4: 2
Item 5: 9
Sorted: 2, 3, 5, 8, 9
```

Example 2:
```
Enter a size: 3
Item 1: 15
Item 2: 3
Item 3: 7
Sorted: 3, 7, 15
```

Problem 3 First Non-repeated char 5 points

Write a program that prompts the user for a string (the string may consist of multiple words). Implement a function that finds and returns the first non-repeated *char* in the string. The program calls the function and prints out the returned *char*.

Problem 4 Count Chars In File 7 points

Write a program that counts the number of upper case letters, lower case letters, digits, spaces, and any other chars in a file. The program prompts the user to enter a file name (including file path). The program then opens the file and counts each of the before mentioned categories, then prints the output.

Hint:

- Use the library `#include<fstream>`
- Create a variable of type `ifstream` with the file name passed in as argument, e.g. `ifstream myFile(filename);`
- Use `getline(cin, string);` function to read an entire line including whitespace

Example:

```
Enter a file: /Users/kalisch/Desktop/sample.txt
File contains
Lowercase letters: 1938
Uppercase letters: 128
Digits: 17
Spaces: 35
```