CST 238 Spring 2020
Dr. Gross, CSUMB

Homework 1: Building Histograms

Due: Tuesday, Jan 28, 11:55pm
How to turn in:

- Write three programs and submit them on iLearn
- If you write the programs in repl.it, the files will be named main.cpp; you will need to rename them
- The names are in the assignment; incorrect names will be graded as 0

Before doing this homework, read the slides named *read_data_from_input_file.ppt* on iLearn to understand how you can read integer numbers from an input data file

Part 1: Distinct Numbers (10 points)

This program should:

1. Read an input file name from a user (note: the input file contains several integer numbers)
2. Display the minimum number among the input values
3. Display a list of distinct elements in the input and the number of occurrences of each distinct value
4. Be submitted as hw1-1.cpp

For the assignment, you can assume that the number of input values in a file can't be more than 30.

This is a sample execution of your program. For the assignment, your program has to display the result exactly as the sample run. User input is in **bold**.

```
Enter input file name: t1.txt

Min Number: -3

Number         Count
2              3
1              1
-3             1
```

For the sample run, this is the input file t1.txt. Note that the first number (5) in the file indicates that there are 5 values (= 2, 1, 2, -3, 2) in the file.

```
5
2
1
2
-3
2
```

This is another sample run:

```
Enter input file name: t2.txt
```

```
Min Number: -5

Number   Count
-5       1
1        1
5        2
3        2
10       1
2        1
```

This is the content of the input file t2.txt:

```
8
-5
1
5
3
10
2
3
5
```

Part 2: Horizontal Histogram (5 points)

This program should:

1. Read an input file name from a user (note: the input file will always contain exactly five integers)
2. Draw a horizontal histogram for the numbers
3. Be submitted as hw1-2.cpp

For example, let's assume that an input file named t3.txt in your repl has the following numbers.

```
5
2
1
3
7
```

A sample run of your program should look exactly as below (user input in **bold**):

```
Enter input file name: t3.txt

===== Horizontal Histogram =====
5: * * * * *
2: * *
1: *
3: * * *
7: * * * * * * *
```

This is another sample input file named t4.txt which includes the following numbers.

```
1
```

```
1
5
2
4
```

This is the sample run with the file.

```
Enter input file name: t4.txt

===== Horizontal Histogram =====
1: *
1: *
5: * * * * *
2: * *
4: * * * *
```

Part 2: Vertical Histogram (10 points)

This program should:

1. Read an input file name from a user (note: the input file will always contain exactly seven integers)
2. Draw a horizontal histogram for the numbers
3. Have a height of the vertical histogram the same as the maximum value in the data set
4. Be submitted as hw1-3.cpp

For example, let's assume that an input file named t5.txt in your repl has the following numbers.

```
5
2
1
3
7
4
2
```

A sample run of your program should look exactly as below (user input in **bold**).

```
Enter input file name: t5.txt

===== Vertical Histogram =====
        *
        *
*       *
*       * *
*     * * *
* *   * * * *
* * * * * * *
-------------
5 2 1 3 7 4 2
```

This is another sample input file named 6.txt which includes the following numbers.

```
1
```

```
1
5
2
4
5
2
```

This is the sample run with the file.

```
Enter input file name: t6.txt

===== Vertical Histogram =====
    *     *
    *   * *
    *   * *
    * * * * *
* * * * * * *
-------------
1 1 5 2 4 5 2
```

Reminder: Include the header comment as described below. If you miss parts, you will get the penalty.

```
/*
 * Title: hw1_1.cpp
 * Abstract: This program displays a message Hello World on the screen.
 * Author: Dr. Gross
 * Email: jgross@csumb.edu
 * Estimate: 4 hours
 * Date: 5/5/1955
 */

#include <iostream>
using namespace std;

int main(){
    cout << "Hello World!\n";

    return 0;
}
```