Contestant Number: _____

Time: _____

Rank: _____

C++ PROGRAMMING
(335)

REGIONAL – 2019

Production Portion:

Job 1: Department Graph   _____ (320 points)

TOTAL POINTS   _____ *(320 points)*

Failure to adhere to any of the following rules will result in disqualification:
1. **Contestant must hand in this test booklet and all printouts. Failure to do so will result in disqualification.**
2. **No equipment, supplies, or materials other than those specified for this event are allowed in the testing area. No previous BPA tests and/or sample tests or facsimile (handwritten, photocopied, or keyed) are allowed in the testing area.**
3. **Electronic devices will be monitored according to ACT standards.**

No more than ten (10) minutes orientation
No more than ninety (90) minutes testing time
No more than ten (10) minutes wrap-up

You will have ninety (90) minutes to complete your work.

Your name and/or school name should *not* appear on any work you submit for grading.

Your application will be graded on the following criteria:

Solution and Project

Project was found on the flash drive	_____	10 points
Project is named following the naming convention	_____	10 points

Program Execution

Program runs	_____	20 points

If program does not execute, then remaining items in this section are not scored.

The program gracefully handles any data errors	_____	20 points
The program shows a department menu to choose from	_____	10 points
The program displays a prompt for collecting student sizes from the user which includes which class is currently be collected.	_____	10 points
The program displays an error message for bad user data	_____	10 points
The program displays both types of graphs	_____	20 points
The program displays prompts for user control	_____	20 points
The program shows all data on clean console screens	_____	10 points
The program allows the user to rerun the program without closing and restarting the current copy.	_____	5 points

Source Code Review

Contestant ID is commented at the top of the program	_____	5 points
Code is commented at the top, for each method and as needed	_____	15 points
Code uses reasonable and consistent variable naming conventions	_____	15 points
The program reads the class sizes into the correct data structure	_____	10 points
The program gracefully handles remaining error checking	_____	20 points
A method called "menu_collect" is implemented	_____	30 points
A method called "horizontal_graph" is implemented	_____	30 points
A method called "vertical_graph" is implemented	_____	40 points
The program uses the bool data type in a logical manor	_____	10 points

Total _____/320 points

Department Graph

The local university – Up-Town University is looking for a program to display in graph form the number of students in each class of a given department. The university wants a program that will take a departments ID# (a single digit number 0 – 9), and then ask for the number of students found in that departments 10 classes. The classes are always the department's number plus 00 – 09. A class can have a student size of 0 – 40. Let the user pick from a menu the department they wish to see (Fig. #1).
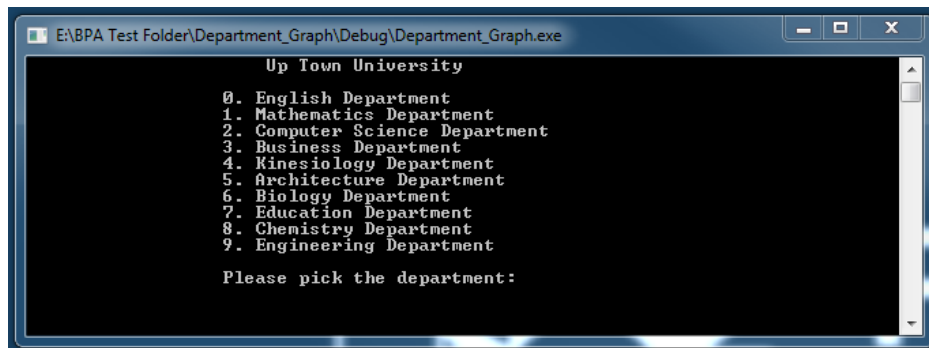
```
E:\BPA Test Folder\Department_Graph\Debug\Department_Graph.exe
               Up Town University

         0. English Department
         1. Mathematics Department
         2. Computer Science Department
         3. Business Department
         4. Kinesiology Department
         5. Architecture Department
         6. Biology Department
         7. Education Department
         8. Chemistry Department
         9. Engineering Department

         Please pick the department:
```
Fig. #1

Collecting a department's classes should look something like this:

```
E:\BPA Test Folder\Department_Graph\Debug\Department...
Class sizes are from 0 - 40 students.
400 22
Class sizes are from 0 - 40 students.
401 14
Class sizes are from 0 - 40 students.
402 31
Class sizes are from 0 - 40 students.
403 52
Pleasse enter ONLY numbers 0 - 40

Class sizes are from 0 - 40 students.
403 25
Class sizes are from 0 - 40 students.
404
```
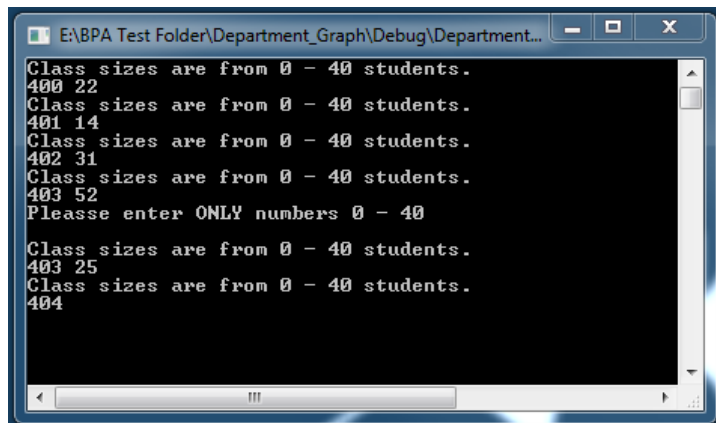Fig. #2

<u>PLEASE NOTE: The user entered an incorrect value and was reminded for correct valid answers only.</u>

You must ask for all the student numbers first then display the class size using the following two forms:

Horizontal Graph

Take the data entered for the department's classes and display them in a horizontal graph. The output might look like this:
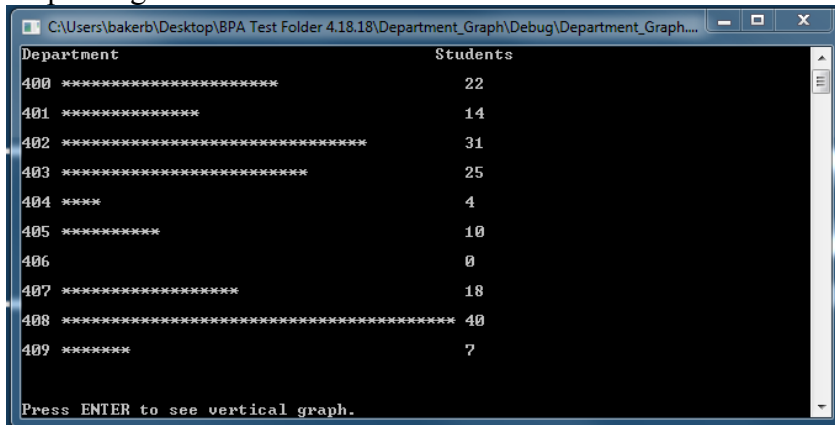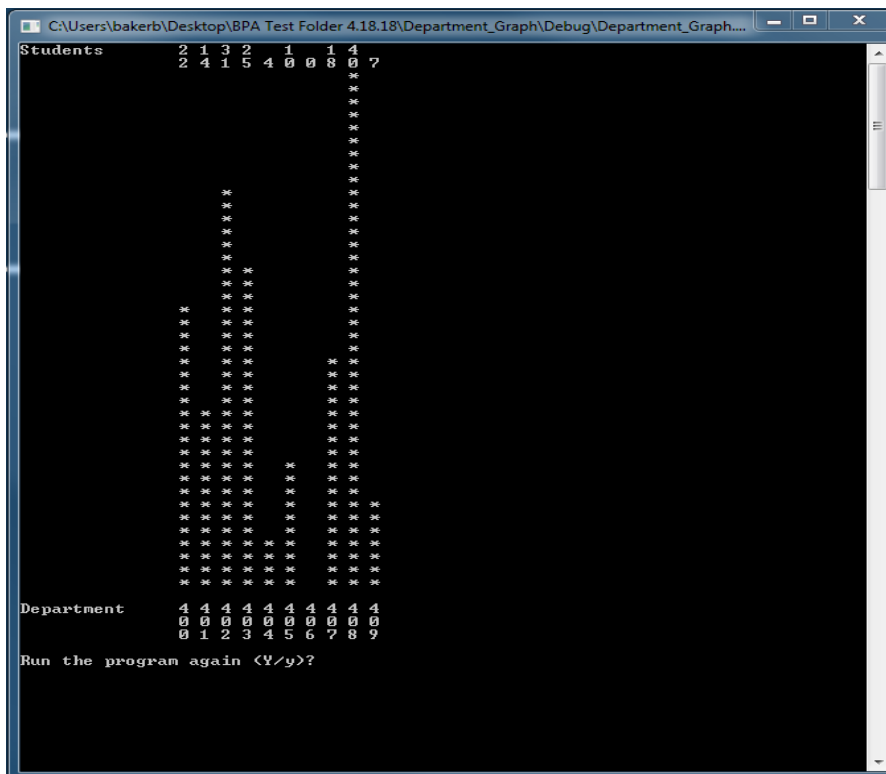

Fig.#3

Make sure to hold the graph on the screen until the user is ready to continue.

Vertical Graph

Now display the same data in a vertical graph. The output might look like this:

Remember to ask the user if they would like to run the program again. Each new screen should be cleared of old before new data is displayed. When saving the program remember to call it Depart_Graph.