CS 150 Lab 11
More Functions

The main objective of today's lab is to continue writing functions to understand passed by value versus passed by reference.

- Be sure your output looks exactly like the specified output.
- Submit the completed project to CS150-02 Lab by Friday at 5pm.
- Follow the coding standards and add comments to your code!
- Your projects are to be created in **PUNetIDLabsSecond**

Lab 11.1

Write a complete C++ program in a project **11_1_Grader** that will process a class of student grades. The data file "grades.txt" is:

```
5 10.0 10.0 15.0 50.0 100.0
smith 9.0 10.0 12.0 46.0 88.0
jones 8.0 7.0 15.0 48.0 75.0
done 0.0 0.0 0.0 0.0 0.0
```

The first line is the number of assignments for each student and the maximum number of points on each assignment. Each subsequent line of data is a student's last name followed by the scores they achieved on each assignment.

I have written most of the program that will process each student's grades. You must write each function definition and add a small amount of code in the main that will loop until the student "done" is read from the file. In the main loop, you will need to call the function **readScores** and **printIndividualResults** with the correct arguments.

The output results must look exactly like the following:

```
********************
* Grading Program
********************
     Name     Average
     ----     -------
    smith      89.19
    jones      82.70
Press any key to continue . . .
```

```cpp
#include <iostream>
#include <string>
#include <fstream>
#include <iomanip>

using namespace std;

void printTitle (string heading);
void printColumnHeadings ();
void readScores (ifstream &inputFile, int numScores, double &totalPoints);
void printIndividualResults (string name, double pointsPossible, double pointsAchieved);

int main ()
{
  const string GRADING_TITLE = "Grading Program";
  const string FILE_OPEN_ERROR = "Error opening file";
  const string GRADES_TXT = "grades.txt";
  const string NO_STUDENT = "done";

  double totalPointsPossible, totalPointsAchieved;
  int numScores;
  ifstream inputFile;
  string name;

  inputFile.open (GRADES_TXT);
  if (inputFile.fail ())
  {
    cout << FILE_OPEN_ERROR << endl;
    exit (EXIT_FAILURE);
  }

  printTitle (GRADING_TITLE);
  printColumnHeadings ();

  inputFile >> numScores;
  readScores (inputFile, numScores, totalPointsPossible);

  // Write loop logic here to process each student in the class. The pseudo-code is
  // read a name
  // while (name is not the last student)
  // {
  //   call readScores to get the points the student has achieved
  //   call printIndividualResults to print the student's results
  //   get the next name
  // }

  inputFile.close ();
  return EXIT_SUCCESS;
}

//Function definitions go here
```

Optional Challenge:

Show a histogram of grades

```
Histogram

A's: ***
B's: *
C's: ****
D's: *
F's: *
```

1) Your program is to compile without any errors or warnings.

2) The entire program is to be documented as well as each function is to be documented including main.

3) I have placed the undocumented program **grader.cpp** in the CS150 Public folder on grace. Create a new project and then copy this code into your main.cpp.

Once your project is complete, place your solution **PUNetIDLabsSecond** into the CS150 Drop folder on grace. Your solution is to have ALL previous projects completely working and correct.