CS 161A: Programming and Problem Solving I

Midterm Exam Version A

Academic Integrity

You may NOT, under any circumstances, begin an assessment by looking for a completed solution on StackOverflow or Chegg or any such website, which you can claim as your own. All students need to be familiar with the Student Conduct Code. Please check out the Student Code of Conduct at PCC.

This assessment is individual work only. You may not discuss this assessment with anyone. You may not use the internet to search for any answers or any concepts during the exam. **It is a closed book, closed internet exam**.

I may ask you to explain your code verbally. If you cannot satisfactorily explain what your code or solution does, and answer questions about why you wrote it in a particular way, then you should also expect a zero.

Copy the below section and paste in your Design Document

I understand that acts of academic dishonesty may be penalized to the full extent allowed by the Portland Community College Student Conduct Code, including receiving a failing grade for this exam. I recognize that I am responsible for understanding the provisions of the PCC Student Conduct Code as they relate to this Course Challenge Exam.

Your name here.

It's that time again - the Rock Collecting Championships are here! Who will win the top three prizes?

Purpose

The purpose of this midterm exam is to test your knowledge of the concepts learned in this course so far:

- Variables and data types
- Expressions
- Input and output
- Reading in strings with spaces
- Data type casting
- Conditionals

Task

- ❏ Open the Algorithmic Design Document, make a copy, and follow the steps to create your algorithm.
- ❏ You must express your algorithm as **pseudocode** or a **flowchart.**
- ❏ Please take a look at the **sample run** below before you continue!
- ❏ Write a program to output the winners of a Rock Collecting Competition.
- ❏ Prompt the user for three contestants: input their names as strings and the number of rocks collected as integers.
- ❏ Contestant names may contain spaces, use `getline()` to read in the string. **(Coding construct requirement)**
- ❏ Include the contestant name in the prompt for the number of rocks. **(Coding construct requirement)**
- ❏ If the number of rocks entered is less than 0, print a warning and set the number of rocks to 0. **(Coding construct requirement)**
- ❏ After the three contestants have been entered, determine the first, second and third place winners and print a message. Your logic must account for three way and two way ties (see sample run). Use appropriate conditional statements to write this code - this is the coding construct you are being tested on.
- ❏ Calculate and print the average number of rocks collected - the average should print two decimal places. You must define and use an integer constant NUM_PLAYERS = 3 for this calculation. **(Coding construct requirement)**
- ❏ Print a welcome and goodbye message.
- ❏ **Use only the concepts we have learned so far.**

Criteria for Success

- ❏ Test your program using the following sample runs, making sure you get the same output when using the given inputs (in **blue**).
- ❏ Try other inputs to test different combinations of winners (1 and 2 tie for first, 2 and 3 tie for first, 1 and 3 tie for first, etc.).

```
Welcome to the Rock Collector Championships!

Enter player 1 name: Gordan Freeman
How many rocks did Gordan Freeman collect? -9
Invalid amount. 0 will be entered.

Enter player 2 name: Link
How many rocks did Link collect? 45

Enter player 3 name: D. Va
How many rocks did D. Va collect? 45

Link and D. Va are tied for first place.
Gordan Freeman is in second place!

The average number of rocks collected by the top three players is
30.00 rocks!

Congratulations Rock Collectors!
```

```
Welcome to the Rock Collector Championships!

Enter player 1 name: Mario
How many rocks did Mario collect? 56

Enter player 2 name: Master Chief
How many rocks did Master Chief collect? 56

Enter player 3 name: Sonic
How many rocks did Sonic collect? 56

It is a three way tie!

The average number of rocks collected by the top three players is
56.00 rocks!

Congratulations Rock Collectors!
```

```
Welcome to the Rock Collector Championships!

Enter player 1 name: King Dedede
How many rocks did King Dedede collect? 57
```

```
Enter player 2 name: Samus
How many rocks did Samus collect? 102

Enter player 3 name: Kirby
How many rocks did Kirby collect? 62

Samus is in first place!
Kirby is in second place.
King Dedede is in third place.

The average number of rocks collected by the top three players is
73.67 rocks!

Congratulations Rock Collectors!
```

- ❏ Complete all sections of your Algorithmic Design Document.
- ❏ Include **pseudocode** or a **flowchart** in part d of the design document.
- ❏ **Follow these Coding Construct Requirements:**
  - ❏ Contestant names may contain spaces, use `getline()` to read in the string. **(Coding construct requirement)**
  - ❏ Include the contestant name in the prompt for the number of rocks. **(Coding construct requirement)**
  - ❏ If the number of rocks entered is less than 0, print a warning and set the number of rocks to 0. **(Coding construct requirement)**
  - ❏ You must define and use an integer constant NUM_PLAYERS = 3 for the average rock calculation. **(Coding construct requirement)**
  - ❏ Print a welcome and goodbye message.
- ❏ Please open and compare your work with the grading rubric before submitting.
- ❏ Remember to follow all style guidelines.
- ❏ Download your Algorithmic Design Document as a PDF (File -> Download -> PDF), rename it to `mid.pdf`.
- ❏ Name your C++ source file `mid.cpp` and upload with `mid.pdf` to the D2L assignment.
- ❏ Do your own work. Consult the syllabus for more information about academic integrity.