Background

Analyzing data is an important part of Engineering. It is important to learn to read from an input file because it provides a fast, efficient way to analyze lengthy data sets.

Problem Statement

You are an engineer hired by a gumdrop company that has been getting a lot of customer complaints about inconsistent gumdrop sizes. The gumdrops are all perfect spheres. They have collected a random sampling of gumdrops and measured their diameters. They are trying to complete a study of the data and need you to write a program that reads this list of diameters and analyzes the data. They want it to display each radius, the volume for each radius, and the surface area for each radius. To determine the validity of customer complaints, they want to know the average radius, volume, and surface area, the number of gumdrops with a radius less than or equal to the average radius, and the number of gumdrops with a radius greater than the average radius. The company has determined that the average volume of the gumdrops should be no less than 3 cm cubed. Are the customer complaints valid?

Instructions

Represent

- Create a flowchart, algorithm, or pseudo code for solving the problem.

Plan

- Copy the file **EWA_06_gumdrops.dat**, which contains the list of gumdrop diameters (in cm.) from: **`/srv/share/EED/engr1281/students/EWA/EWA_06`**
- Create a file named **EWA_06.cpp**.
- Outline the steps your program will take by adding comment statements to your file based on the flowchart, algorithm, or pseudo code.

Implement

- In the file **EWA_06.cpp**, perform the following tasks:
  - Read in each diameter.
  - Compute the volume and surface area of a sphere with that diameter.
  - Displays on the screen the:
    - radius
    - sphere volume for that radius
    - sphere surface area for that radius
    - average radius, average volume, and average surface area
    - the number spheres with radius less than or equal to the average radius
    - the number spheres with radius greater than the average radius
      - Use a field width of 10 with 3 decimal places for floating point output (i.e., radius, volume, and surface area).
  - Display a descriptive heading (e.g., name and units) at the top of each column on the screen
  - Indicates the program has completed.
  - Write the same information to the output file, **EWA_06.txt.**
  - Closes all open files.
- Compile, Link, and Run your program.

Evaluate

- Perform a hand calculation to verify and check your results.

Document

- Assemble all of your code and documentation into a single PDF and submit to Carmen according to the DAL.

Include the standard comment and **`fprintf()`** statements indicating name, seat number, etc.