CS 37 C++ Programming

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Programming Assignment #2

Date Due:
03/26/20

Deliverables:
- A hard copy of your program (.cpp file only) with the output results appended at the end.
- A copy of the same uploaded to Canvas under the Assignment 2 section.

Requirements:
- Use the template provided on Canvas (Assignment_2_Template.txt).
- **Staple** your hard copy together if it is more than one page long.

Grading:
- 25 points possible
  - 3 pts - Comments
  - 4 pts - Consistency/Readability (Spacing / Indentation / Style)
  - 10 pts - Program works and generates results in the expected format (Effectiveness)
  - 8 pts - Use appropriate tools/structures, include required elements (Efficiency)

- While you may collaborate, you are expected to turn in your own work.

Description:

Rupert Crane, an employee with SpaceMiser Materials, has hired you to write a program that will help him decide whether a certain layout for loading boxes into the smallest shipping container possible meets the company's requirements for efficiency. Below is an example using 3 boxes, **Rupert Crane will want to check 10 boxes.**

	Data entered into the program like this:
Box 1:	
Standard tools	Standard tools
0,0 0,5 14,5 14,0 5	0 0 0 5 14 5 14 0 5
Box 2:	
Metric tools	Metric tools
0,10 5,10 5,5 0,5 5	0 10 5 10 5 5 0 5 5
Box 3:	
Plastic parts	Plastic parts
10,10, 10,5 5,5 5,10 5	10 10 10 5 5 5 5 10 5

The pairs of numbers are coordinates on a grid, the last number is the height of the box. **AFTER ENTERING THE DATA FOR ALL 10 OBJECTS**, you will use the data to provide the following information:

1. The description and volume of each box. You **must** use the format below to provide the information (Shape and Description column are left justified, Volume is right justified).

Box#	**Description**	**Volume(cu/units)**
1	**Standard tools**	**350.0**
2	**Metric tools**	**125.0**
3	**Plastic parts**	**125.0**

2. The total volume of the combined boxes, in this format:

   The total volume of the boxes is: ###.# cu/units.

3. The specifications for the smallest shipping container in which the boxes can be loaded as described, in this format:

   Minimum container specifications:
   Length: ##.# Width: ##.# Height: ##.# Volume: ##.# cu/units

4. Determine whether the layout meets the SpaceMiser Logistics efficiency requirement which is to use at least 90% of the space in the shipping container. If the layout meets the requirement, print the following message:

   The layout is efficient, it uses ##.#% of the space.

   If the layout does not meet the requirement, print the following message:

   The layout is not efficient, it wastes ##.#% of the space.

Put it all together and the output should have this format **(Last line is only if the efficiency threshold is met otherwise last line would be different):**

Shape#	**Description**	**Volume(cu/units)**
1	**Standard tools**	**70**
2	**Metric tools**	**25**
3	**Plastic parts**	**25**

The total volume of the boxes is: ###.# cu/units.

Minimum container specifications:
Length: ##.# Width: ##.# Height: ##.# Volume: ##.# cu/units

The layout is efficient, it uses ##.#% of the space.