File Input/Output Programming Example

Problem Description:

You are taking an art class in which you are learning to make your own painting canvas by stretching the cloth over a wooden frame and stapling it to the back of the frame. For a given size painting, you must determine how much wood to buy for the frame, how large a piece of canvas to purchase and the cost of the materials.

The input is four floating-point numbers: The length and width of the painting, the cost per inch of the wood and the cost per square foot of the canvas.

Discussion:

The length of wood required is twice the sum of the length and width of the painting. The cost of the wood is simply its length times its cost per inch.

According to the art instructor, the dimensions of the canvas are the length and width of the painting, each with 5 inches added for the part that wraps around to the backside of the frame. The area of the canvas in square inches is its length times its width. However, we are given the cost per square foot for the canvas. Therefore, divide the area of the canvas by the number of square inches in a square foot. Before multiplying by the cost.

Assumptions:

The input values are positive – checking for erroneous data is not performed.

Functional Decomposition:

Canvas supply calculation

Obtain length and width of frame
  Prompt for and read the length and width of the frame
Get wood cost
  Prompt for and read the cost per inch for the framing wood
Get Canvas Cost
  Prompt for and read the cost per square foot for the canvas
Compute Dimensions and Cost
  Calculate length of framing wood needed 2(length + width)
  Determine canvas size by adding 5" to frame length and width
  Calculate canvas area in square inches
  Calculate canvas area in square feet
  Calculate cost of the wood, canvas and the total cost of all materials
Print out Dimensions and Cost
  Print out for a picture of size length and width how much wood and the size of canvas to buy
  Print out the price per inch for the wood and price per square foot of the canvas
  Print out total cost for the wood and the canvas
  Print out total cost for all materials
Program Output:
Enter length and width of painting:
20 30
Enter cost per inch of the framing wood in dollars:
1.00
Enter cost per square foot of canvas in dollars:
2.00

For a painting 20.0 in. long and 30.0 in. wide, you need to buy 100.0 in. of wood, and the canvas must be 25.0 in. long and 35.0 in. wide.

Given a wood cost of $1.00 per in. and a canvas cost of $2.00 per sq. ft., the wood will cost $100.00,