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// Attached: HW 1(a-e)
// File: HW_1d.pdf
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//
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//
// Program: caculate volume
//
// Description:
// Program validates three sides of a rectangle, and calculates the volume if
// the sides are of valid length.
//
#include <iostream>
// function prototypes
void getDimensions(float &width, float &length, float &depth);
bool areValid(float &width, float &length, float &depth);
float calcVolume(float &width, float &length, float &depth);
void displayVolume(float &width, float &length, float &depth, float volume);

int main() {
    // declare variables
    float width = 0;
    float length = 0;
    float depth = 0;
    // function to get dimensions of the rectangle
    getDimensions(width, length, depth);
    // function to check validity of the sides
    if (areValid(width, length, depth)) {
        // function to display the total volume and sides    // function to
        // calculate volume
        displayVolume(width, length, depth, calcVolume(width, length, depth));
    } else {
        std::cout << "Invalid input, try again." << '\n';
    }

    return 0;
} // end of main

// getDimensions
// fuction accepts 3 values as input for the three dimensions of rectangle
//
// input: values for width, length,, and depth
// output: width, length, depth
void getDimensions(float &width, float &length, float &depth) {
    // Prompt for sides, and fill variables with input
    std::cout << "Enter width: " << '\n';
    std::cin >> width;
    std::cout << "Enter length: " << '\n';
    std::cin >> length;
    std::cout << "Enter depth: " << '\n';

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    |   std::cin >> depth;
} // end of getDimensions

// areValid
// function checks that all sides are valid
//
// Input: width, length, and depth
//
// output: true or false depending on validity of sides
bool areValid(float &width, float &length, float &depth) {
    |   bool widthvalid = false;
    |   bool lengthvalid = false;
    |   bool depthvalid = false;
    |   if (width > 5 && width < 20) {
    |       |   widthvalid = true;
    |       }
    |   if (length > 5 && length < 100) {
    |       |   lengthvalid = true;
    |       }
    |   if (depth > 1 && depth < 12) {
    |       |   depthvalid = true;
    |       }
    |   if (widthvalid && lengthvalid && depthvalid) {
    |       |   return true;
    |       } else {
    |       |   return false;
    |       }
    |   }
} // end of areValid

// calcVolume
// fuction calculates the total volume based on width length and depth
// returns volume to main
//
// input: width, length, and depth
// output: volume
float calcVolume(float &width, float &length, float &depth) {
    |   return width * length * depth;
} // end of calcVolume

// displayVolume
// function displays all relevant values including volume, width, length, and
// depth of the rectangle
//
// input: width, length, depth, and volume
//
// output: displays all values to console
void displayVolume(float &width, float &length, float &depth, float volume) {
    |   std::cout << "The volume is " << volume << '\n';
    |   std::cout << "DIMENSIONS: " << '\n';
    |   std::cout << "width: " << width << '\n';
    |   std::cout << "length: " << length << '\n';
    |   std::cout << "depth: " << depth << '\n';
} // end of displayVolume

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// PROGRAM OUTPUT
// Enter width:
// 15
// Enter length:
// 87
// Enter depth:
// 5
// The volume is 6525
// DIMENSIONS:
// width: 15
// length: 87
// depth: 5
```