

CSci 1113: Introduction to C/C++
Programming for Scientists and Engineers
Homework 0
Spring 2018

Due Date: Thursday, Feb. 1, 2018 before 11:55pm.

Instructions: This is an individual homework assignment. There is one problem worth 20 points. Solve the problem below by yourself (unlike the labs, where you work collaboratively), and submit the solution as a C++ source code file. Here are a few more important details:

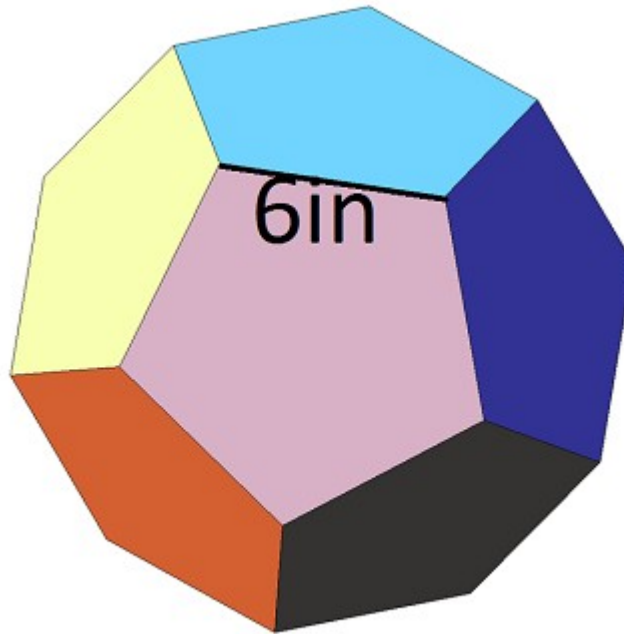
1. Unlike the computer lab exercises, this is not a collaborative assignment. You must design, implement, and test the solution to each problem on your own without the assistance of anyone other than the course instructor or TAs. In addition, you may not include solutions or portions of solutions obtained from any source other than those provided in class: examples from the textbook, lectures, or code you and your partner write to solve lab problems. Otherwise obtaining or providing solutions to any homework problems for this class is considered academic misconduct. See the “collaboration rules” file on the class website page for more details, and ask the instructor if you have questions.
2. Because all homework assignments are submitted and tested electronically, the following are important:
 - You follow any naming conventions mentioned in the homework instructions.
 - You submit the correct file(s) through Moodle by the due deadline.
 - You follow the example input and output formats exactly given in each problem description.
 - **Regardless of how or where you develop your solutions, your programs compile and execute on cselabs computers running the Linux operating system.**
3. The problem descriptions will usually show at least one test case and the resulting correct output. However, you should test your program on other test cases (that you make up) as well. Making up good test cases is a valuable programming skill, and is part of ensuring your code solution is correct.

Problem A: Dodecahedron (20 points)

Make a simple program that asks a user to enter the edge length of a dodecahedron. You should display to the user that you expect them to enter a value (as shown in the example), read a single number and then show both the volume and surface area of the dodecahedron. The formulas for these are below, where “E” is the length of one edge of the dodecahedron:
(Hint, hint: use cmath)

$$\text{Volume: } \frac{15+7\cdot\sqrt{5}}{4} \cdot E^3$$

$$\text{Surface Area: } 3 \cdot \sqrt{25 + 10 \cdot \sqrt{5}} \cdot E^2$$



Dodecahedron with edges measuring 6 inches

Example 1 (user input is underlined):

What is the length of an edge?

6

Volume:

1655.23

Surface area:

743.246

Example 2 (user input is underlined):

What is the length of an edge?

2.694

Volume:

149.83

Surface area:

149.839

Test your program using not only the example data above, but other cases as well. And revise your program until you are sure it is correct.

When you are done, name the source code file <username>_0A.cpp. Here you replace <username> with your U of M email address; for example, if your email address is smithx1234@umn.edu, your file should be named smithx1234_0A.cpp. Then submit your program using the HW 0 Problem A submission link in Moodle.

It is important that you follow the file naming conventions very carefully. For example, note your username should be all in lowercase, you should not include “@umn.edu”, the file name should contain an underscore (not a dash), the ‘A’ in the “0A” part is upper case,

the extension is .cpp, etc. Following rigorous naming conventions is something computer programmers often must do in “real life” programming, and so submitting your program with the correct name is part of doing this assignment correctly.