

Introduction To Computer Programming C++
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Program C3A, 3G

Program 3A Sphere Of Influence 20 points

Write a program that calculates the surface area and volume of a sphere. Save the program as LastNameFirstNameP3A.cpp in your "S:" directory. To see a model for this program, look at the source codes for the programs "books.cpp" and "pizza.cpp" in the network directory titled: IntroCompProgFiles. Look in the folder, Other C++ Resources and the folder Other Textbook Examples.

As you type all your programs this year, be sure not to type past the 80-column line in Borland C++ 5.02 for Windows. If you have any statements longer than 80 columns, press the return key to "wrap" the statement around to the next line.

- 1) Type comments at the beginning of the program to display your name and other information just like those used for program 1A. **Make sure to change the program name and program description in these comments, so that the program number, name, and description say what is listed above.**
- 2) Include <iostream.h> (so you can use the cout and cin commands), include <iomanip.h> (so we can use the setprecision command), and include <conio.h> so you can use getch() to leave your output displayed on the screen until the user presses any key to continue.
- 3) Declare a constant of type **double** for PI. Also declare a constant named FOUR_THIRDS to represent 4.0/3.0, being careful **not** to use integer division.
For example: **const double** PI = 3.14159;
const double FOUR_THIRDS = 4.0/3.0;
- 4) Inside the **int** main() function, on the first line below the left curly bracket that begins the main function, declare variables of type **double** for radius, surface_area, and volume. In these declarations, initialize all of these values to 0.0.
- 5) In all our programs, follow the Input, Calculations, and Output organization of your program. Make sure that you include the following comment lines in the **int** main () portion of your program (each comment followed by the appropriate source code).

6) After the variable declarations (before the input section) use **cout** statements to display your name and period output just like those used for program 1A **Make sure to change the program name and program description in these cout statements.** Start these commands with the following statement:

```
//-----Display My Information-----
```

7) For the Input section, ask the user to enter the value for the radius. Make your program user friendly by prompting them for this value. Start these commands with the following statement:

```
//-----Input-----
```

8) The calculations section of your program should consist of the comment line and the following formulas for the volume and surface area of a sphere.

Start these commands with the following statement:

```
//-----Calculations-----  
surface_area = 4 * PI * radius * radius;  
volume = FOUR_THIRDS*PI * radius * radius * radius;
```

9) For the output section of the program use the set precision command found in the source code named SetPrecision.cpp on the network directory named: IntroCompProgFiles. Also in your output portion of your program, echo out the value of the radius before displaying the results of your calculations: the answers to the surface area, and volume of the sphere. Make sure that you use descriptive identifiers for your variables and your constants. Start these commands with the following statement:

```
//-----Output-----
```

When you are finished with your program, have tested it thoroughly to make sure that your calculations are correct, and are sure that you don't need to make any changes, then save your program in the "W" network mapping, and the Program 3A folder.

Program 3G Still Life Graphics (30 points)

Draw a "still life" picture that you will have fill the entire screen with some object. Sketch a drawing of your object on graph paper, add detail, decide on colors, and write a program to draw the picture. This is NOT to be a nature scene, but an object in life that you will draw to fill the entire screen. You will add a lot of detail to this object. Some students in the past have drawn a slice of pizza, a boom box, a car, or truck, a helicopter, a computer, a big screen TV with an image on the screen, etc.

1) Open the source code for the program "GraphicsTemplate.cpp" in the network directory titled: IntroCompProgFiles. Look in the folder, Other C++ Resources and the folder Graphics Save the program as LastNameFirstNameP3G.cpp in your "S:" directory.

2) Don't forget that you need to create a DOS project with the proper settings for your program to work. Here is the link to the notes on how to set up the project:

http://www.lcusd.net/lchs/dclausen/intro_programming/Lectures/Borland_Graphics_Project.pdf

The Name of the project should be your ID number, then PC3G. For example: 9999PC3G.ide

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3) Type comments at the beginning of the program to display your name and other information just like those used for program 1A.

4) Include <conio.h> so you can use getch() to leave your output displayed on the screen until the user presses any key to continue. Include <graphics.h> so you can draw your graphics commands.

- 5) Inside the **int** main() function, add your commands to the program to complete the assignment. Use any or all of the graphics commands that we have learned so far. Draw your picture on graph paper first. Have your still life fill the screen and add as much detail as you can.
- 6) You need to separate the commands that draw each part of the still life object from the other commands with comment lines that tell me which part of the object that you are drawing.