CSCE 206 Spring2018 Lab: Assignment #2

Submission Deadline: 23:59, Feb 25, 2018, Sunday.

1. **Follow the submission guideline to submit the assignment through eCampus.**
2. **Add comments to your code, including your name, UIN and the class section you are in with the block comments to the head of your code file.**

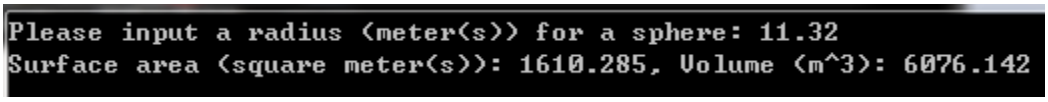
Question 1. Geometry Calculator (30 points)

Write a program to calculate surface area and volume of a sphere (ball). The program will ask user to input radius (meter(s)) of a sphere and return its area and volume (output should round to three decimal places). Use macro **#define** for value of π (suppose $\pi = 3.1415927$). Learn to use **pow** function for evaluating square and cubic in **math.h** of C programming library (Google "pow c programming"). You can use **scanf** function and **double** type for radius input. Name your program file Hw2_q1_code.c.

Example input and output: (purple texts are what the program should print on the screen to instruct the user, the black texts are what the user types in or results output.)

Please input a radius (meter(s)) for a sphere: 11.32

Surface area (square meter(s)): 1610.285, Volume (m^3): 6076.142



Question 2. Sorting (30 points)

For random input of three numbers, design a C program to store these three numbers and sort them and then output your results from smallest to largest. You can use **scanf** function and use **double** type for numbers input. Name your program file Hw2_q2_code.c.

Example input and output: (purple texts are what the program should print on the screen to instruct the user, the black texts are what the user types in or results output.)

Please input three numbers: 112.38 43.77 5.91

Sorting smallest to largest: 5.91 43.77 112.38

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Please input three numbers: 112.38 43.77 5.91
Sorting smallest to largest: 5.910000 43.770000 112.380000
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Please input three numbers: 43.77 5.91 112.38
Sorting smallest to largest: 5.910000 43.770000 112.380000
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Please input three numbers: 43.77 112.38 5.91
Sorting smallest to largest: 5.910000 43.770000 112.380000
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Please input three numbers: 5.91 43.77 112.38
Sorting smallest to largest: 5.910000 43.770000 112.380000
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Hint: Use the method you learned from Problem 2 of Lab 1.

Question 3. Federal Tax Calculator (40 points)

Federal tax brackets of 2017 (taxes due April 17, 2018) for Single are listing below:

Tax rate	Single (Annual Income)
Level 1: 10%	Up to $9,525
Level 2: 12%	$9,526 to $38,700
Level 3: 22%	$38,701 to $82,500
Level 4: 24%	$82,501 to $157,500
Level 5: 32%	$157,501 to $200,000
Level 6: 35%	$200,001 to $500,000
Level 7: 37%	$500,001 or more

For example, if an annual income is $100,000, the Federal tax collected will be calculated as following:

$$\$9525 * 10\% + (\$38700 - \$9525) * 12\% + (\$82500 - \$38700) * 22\% + (\$100000 - \$82500) * 24\% = \$18289.50$$

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You are supposed to design a C program to **continuously** accept an income and return with tax calculated correctly from above. The program designed should ask your name and display the name correctly. Besides, the program should be designed to have some fault-tolerant ability that

means if a negative value was entered, your program would identify it and give a correct response before stopping running. The output of income tax is required to round to two decimal places precision.

You can use **scanf** function and are encourage to use macro **#define** for tax levels. For data types of income and tax, you are encouraged to use **double** first and then try **float** instead (You don't have to write two programs. Just modify definitions of variables from **double** to **float**.). Pay attention to the differences between two types of outputs when your program is executing. Why are they different? Leave your reasons as comment in code.

Name your program file Hw2_q3_code.c. Submit to ecampus as **double** type.

Example inputs and output: (purple texts are what the program should print on the screen to instruct the user, the black texts are what the user types in or results output.)

Input your name (no space, use _ instead): taylor_swift

2017 Federal Tax calculator was built by: taylor_swift

Please input your personal income: 0

Your income: $0.00, will have tax $0.00

Please input your personal income: 6525.1

Your income: $6525.10, will have tax: $652.51

Please input your personal income: 20000

Your income: $20000.00, will have tax: $2209.50

Please input your personal income: 65101.2

Your income: $65101.20, will have tax: $10261.76

Please input your personal income: 100000

Your income: $100000.00, will have tax: $18289.50

Please input your personal income: 225559.32

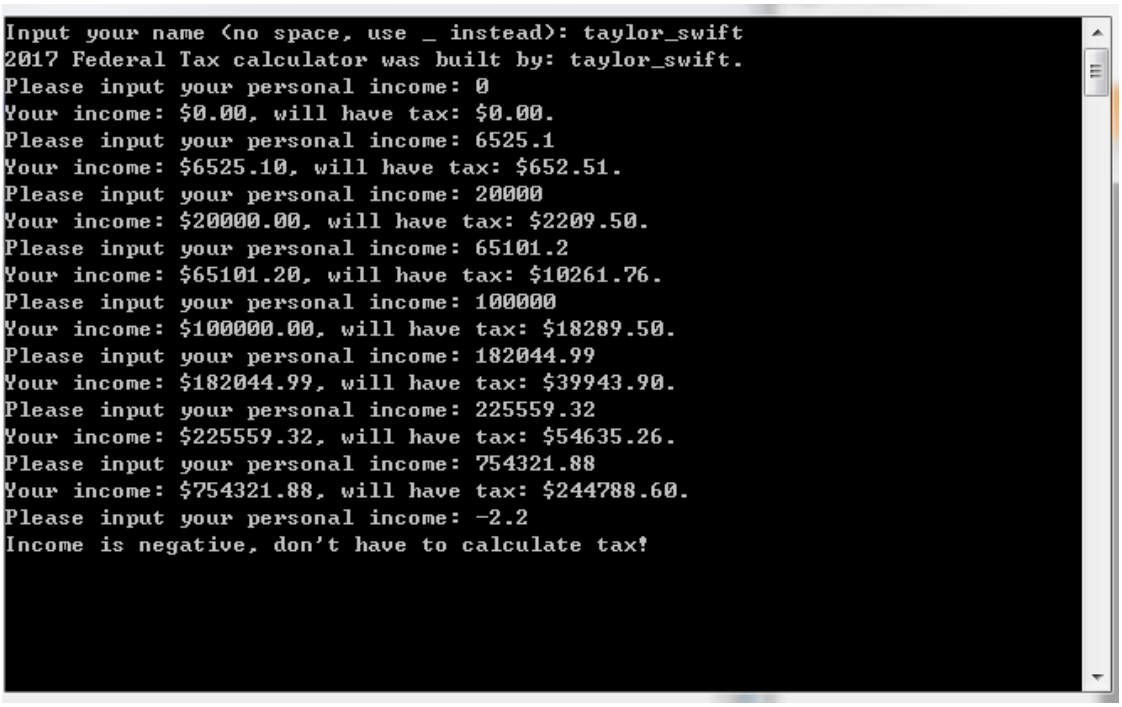
Your income: $225559.32 will have tax: $54635.26

Please input your personal income: 754321.88

Your income: $754321.88, will have tax: $244788.60

Please input your personal income: -2.2

Income is negative, don’t have to calculate tax!



Hint:

Firstly, try to design an income and tax calculator and make it function well;

Then, use **do-while/while** for continuous input of income and output of tax calculated.