

## Lab 1 Solution CSE 1310

### Programming guidelines:

- Missing indentation: -5
- Missing comments in each program: -5
- Missing name, ID, lab 1: -5
- **Missing Honor Code with signature/name: -20**
- Missing best time to code Lab1 problems: -20
- Output not as shown in the question: 0

### HONOR CODE

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or that I contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

I will not engage in any form of cheating

- Include your best time to code a working solution for EACH of the problems in Lab 1. You will not be penalized if you take longer to code a problem. This part is simply to ensure that you are doing the needful to do well in the departmental final.
- You will get no additional points for indentation, comments, and including your name, id, and best coding time. However, you will lose points if you do not include these
- The deadline to submit this assignment is September 24, 2020 by 11:59 PM.
- Please read the instructions carefully before you implement these.
- Please solve all these problems yourself without looking at anyone else's code. However, you may discuss the problems with each other.
- Before uploading the solutions, make sure you copy all your programs into a folder and compress the folder to a zip file.
- Please upload your solutions in a zip file named with your firstname\_lastname\_id.zip format as follows:

Contents of bhanu\_jain\_1000xxxxx.zip

////////////////////////////////////

A folder that contains all the code files: Q1.c, Q2.c, ..., Q13.c

////////////////////////////////////

**Q1. For an equilateral triangle, its perimeter  $P$  can be calculated by its side length:  $P = 3 \times l$ ; its area  $A$  can be calculated as  $A = 0.433 \times l \times l$ . Write a program that:**

- Defines a variable called "side" and sets its value to 3.
- Computes the perimeter of the triangle and stores it in a variable called "perimeter".
- Computes the area of the triangle and stores it in a variable called "area".
- Prints out the perimeter and the area of the triangle.

////////////////////////////////////

//output Q1

9.0

3.9

////////////////////////////////////

**Q2. For a right triangle, its area  $A$  can be calculated by its two legs  $a$  and  $b$ :  $A = a \times b / 2$ ; the square of its hypotenuse can be calculated as  $c^2 = a^2 + b^2$  ( $= a \times a + b \times b$ ). Write a program that:**

- ```

////////////////////////////////////
//output Q2
6.0
25.0

```

- Defines a variable called "base\_a" and sets its value to 3.
- Defines a variable called "base\_b" and sets its value to 5.
- Defines a variable called "height " and sets its value to 4.
- Computes the area of the trapezoid and stores it in a variable called "area".
- Prints out the area.

Q4. According to Albert Einstein's famous "Theory of Special Relativity", the amount of energy an object can possess is determined by its relative mass and the speed of light; the relative mass of an object moving at high speed is increased. Given a spacecraft of static mass  $m$  moving at speed  $v$ , write a program that:

- Hint:**  $m_{rel} = m / \text{sqrt}(1 - v^2/c^2)$   
 $E = m_{rel} \times c^2$   
 To call sqrt() function, you'll need to include <math.h> header.

Q5. Write a program that:

- Hint: To call string functions, you'll need to include `<string.h>` header.**

- Asks the user to enter a string that contains at least five letters. It is OK if your program crashes when the entered string has length less than five.
- Asks the user to enter an integer and stores it in a variable called “n”.
- Creates a variable called “first” and sets it equal to the first letter of the string.
- Prints out the next n-1 letters of the string.
- Prints out the rest of the string.

////////////////////////////////////

The rest of the string is ing.

////////////////////////////////////

////////////////////////////////////

The last 3 letters are: day.

////////////////////////////////////

////////////////////////////////////

Output string: MAVERICKS

[illegible]

**Q11. Write a program that does the following:**

- Asks the user to enter a string.
- Asks the user to enter an integer “n”.
- Prints out the string with the last n letters shown and the rest letters replaced by ‘\$’ in the following format.

**Hint: You can use functions `memset()` from `<string.h>`.**

////////////////////////////////////

```
//output Q11
```

Please enter a string: MyPassword

Please enter an integer n: 4

Output string: \$\$\$\$\$\$word

////////////////////////////////////

**Q12. Write a program that does the following:**

- Asks the user to enter an integer, a string, and a double number, and saves them as variables called “number”, “goods”, and “price”.
- Prints them out like this: “*number goods for \$price*”.
- Only two decimal digits should be displayed for “price”.

////////////////////////////////////

```
//output Q12
```

Please enter the number: 2

Please enter the goods: apples

Please enter the price: 4.99

2 apples for \$4.99

////////////////////////////////////

**Q13. A king wanted to put some wheat on an 8x8 chess board. He put one grain on the first square, two on the second, four on the third, eight on the fourth and so on. Write a program that does the following:**

- Defines an integer variable “p” and assign it to 2.
- Defines an integer variable “n” and asks the user to enter its value.
- Calculates how many grains would be put on the first “n” squares and prints out the result.
- It is OK if the result is shown as a negative number when “n” is too large.

////////////////////////////////////

```
//output Q13
```

Please enter the square number: 20

1048575 gains would be put on the first 20 squares.