National University of Computer and Emerging Sciences, Lahore Campus

Course:	**Programming Fundamentals**	**Course Code:**	**CS-1004**
Program:	**BS (Computer Science)**	**Semester:**	**Fall 2022**
Deadline:	**18 Sept 22 (11:59 PM)**	**Total Marks:**	**50**
Section:	**BCS-1J and BSE-1C**		
	Homework-1		

Instruction/Notes:

Task#1:

Write a program that prompts the user to enter the area and the width of rectangle. Your task is to calculate the square of the difference between the area and perimeter of the rectangle. You are not allowed to use built-in **pow** function to calculate the square**.**

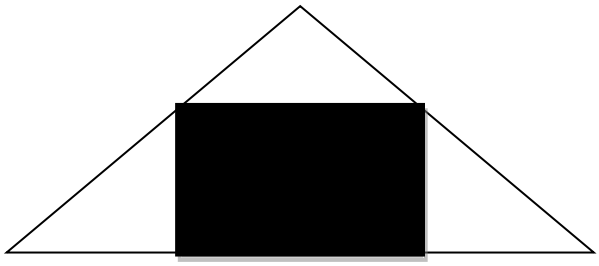
$$\boldsymbol{A = length * width}$$
$$\boldsymbol{P = 2 * (length + width)}$$

Sample Output:

Enter the area of rectangle**: 60 //(input from user)**
Enter the width of rectangle**: 5 (input from user)**
Length of the rectangle **= 12 (calculate this value by using the formula)**
Perimeter of the rectangle **= 34 (calculate this value by using the formula)**
difference between the values of square and perimeter **= (60 - 34) = 26**
square of the difference = **676**

Task#2:

Write a program that calculate the area of unshaded region of the figure. Assume that we have the following case as shown in the figure. There is a shaded rectangle in the triangle. Your task is to prompt the user to enter the base and height of the triangle and for the rectangle prompt the user to enter perimeter and width of rectangle. We are assuming here that the user is providing valid inputs. Your task is to calculate the unshaded region.



Sample Output:

Enter the base of triangle: 24 (input)
Enter the height of the triangle: 10 (input)
Enter the perimeter of the rectangle: 30 (input)
Enter the width of rectangle: 6 (input)
Length of the rectangle = 9 (calculate)
Area of the rectangle = 54 (calculate)
Area of unshaded region = 66 (difference between the area of triangle and rectangle)

Task#3:

Write a program that prompts the user to enter the current sea level. Assume that the sea level is rising at the rate of 8.5% each year. Your task is to calculate the sea level after 5 years. (get the input and store the result in float variable).

Sample Output:

Enter the current sea level: 2580 (input)
Sea level after 1 year: 2799.300
Sea level after 2 years: 3037.241
Sea level after 3 years: 3295.407
Sea level after 4 years: 3575.517
Sea level after 5 years: 3879.436

Task#4:

Write a program that prompts the user to enter the net annual salary. Remember that there is a deduction of income tax and provident fund each month, so the net annual salary is inclusive of these deductions. Prompt the user to enter the percentage of income tax and provident fund deducted each month. Your task is to calculate the net monthly salary, total monthly and annual salary, monthly and annual tax deduction, monthly provident fund deduction and the amount of provident fund in the account after 1 year. Provident fund is basically an amount deducted from the salary of an employee and the same amount is contributed by the organization. The employee will receive this provident fund at the time of resignation/retirement. (In simple words if the amount of provident fund deducted each month is 2000 then after one month the provident fund amount in the account will be 4000 i.e., doubled).

Sample Output:

Enter the net annual salary: 1,357, 500
Enter the percentage of tax deducted each month: 5 (5% of the monthly salary)
Enter the percentage of provident fund deducted each month: 4.5 (4.5% of the monthly salary)
Net monthly salary: 113,125
Total monthly salary: 125,000
Total annual salary: 1,500,000
Monthly tax deduction: 6250
Annual tax deduction: 75000
Provident fund: 5625 (Remember that this is contribution from the salary of an employee the same amount is contributed by the organization)
Provident fund in the account after one year: 135,000

Task#5: Write a program that prompts the user to enter the sales record for north, east, west, and south division. cost of raw products, production cost, total number of employees and the salary of an employee, miscellaneous expenses like electricity bills, transportation charges etc. percentage of tax to be paid. Your task is to calculate the net profit.

Sample output:

Enter the sales of north division: 4,500,000
Enter the sales of east division: 6,500,000
Enter the sales of south division: 8,500,000
Enter the sales of west division: 9,500,000
Enter the number of employees currently working in the organization: 20
Enter the salary of an employee: 125000 (Assume that salary is same for all the employees)
Enter the cost of raw products: 2,500,000
Enter the production cost: 6,800,000
Enter the amount of miscellaneous expenses: 1,850,000
Enter the percentage of tax to be paid on the revenue: 15%
Total Sales: 29,000,000
Total expenses: 13, 650, 000
Tax amount: 4,350,000
Profit: 11,000,000

Important guidelines:

- **Learning is the main objective of this activity so do not try to copy the code. If you are facing any difficulty in problem understanding you can discuss with your T.A and I am also available in my office on Tuesday, Thursday, and Friday.**
- Write generic code that can be used to run on any input. Sample output is provided to demonstrate the working of the program. You can test the working of your programs on the given input data.
- Use meaningful variable names, indent your code properly and write proper comments
- **Submit only cpp files in the classroom.**
- Follow the naming convention (roll-number_question no) e.g., **22L-7542_q1**