

**Programming Fundamentals LAB – Spring 2020**  
(BS-CS-F19 Morning & Afternoon)

**Lab # 3**

Instructions:

- **Attempt the following tasks exactly in the given order.**
- **Indent** your code properly.
- Use meaningful variable names. Use the **camelCase** notation to name variables.
- Use meaningful prompt lines/labels for all input/output that is performed by your algorithms.

Write C++ programs for the following tasks:

**Task # 1**

Write a C++ program which uses a **single cout statement** to display (on screen) your complete **name**, your **batch** at PUCIT, your **section** (Morning/Afternoon), and your **marks** in the PUCIT entrance test.

**Task # 2**

Write a C++ program that asks the user how many eggs he/she has bought and then tells the user how many dozen eggs he/she has and how many extra eggs are left over. A sample run of your program is given below. Text shown in **red** is entered by the user.

*Sample run:*

How many Eggs you bought: <b>40</b> You bought 3 dozen and 4 extra Eggs
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*Hint:* Use the division operator (/) and the modulus (%) operator.

**Task # 3**

Write a C++ program that asks the user to enter **two** integers, and determines and displays the larger number, or indicates that both numbers are equal.

*Note:* In your program, you are only allowed to use one-way selection (**if**). You are **NOT** allowed to use two-way selection (**if-else**).

#### **Task # 4**

Write a C++ program that asks the user to enter an integer, and determines whether the integer is Even or Odd.

#### **Task # 5**

Write a C++ program which asks the user to enter a 3-digit positive integer. Then, the program should calculate and display the sum of the digits of that integer. For example, if the user enters 786, then your program should display 21 on screen.

#### **Task # 6**

Write a C++ program that takes two integers from the user, displays them on screen, **swaps** them, and again displays them on screen.

#### **Task # 7**

The area of a rectangle is the rectangle's length times its width. Write a C++ program that asks for the length and width of two rectangles. The program should tell the user which rectangle has the greater area, or whether the areas are the same.

#### **Task # 8**

Write a C++ program that takes the marks obtained by a student in a course and determines whether the student was PASS or FAIL in the course. Assume that the passing marks are 50. Your program should display an appropriate error message, if the marks entered by the user are negative or greater than 100.

**Note:** In your program, you are only allowed to use one-way selection (**if**). You are **NOT** allowed to use two-way selection (**if-else**).

#### **Task # 9**

Write a C++ program that asks the user to enter **three** integers, and determines and displays the largest number.

#### **Task # 10**

Write a C++ program that asks the user to enter a 3-digit positive integer, and stores its reverse in another variable, and then, displays both integers on screen.

**Task # 11**

A book store awards points to its customers based on the number of books purchased each month. The points are awarded as follows:

- If a customer purchases 0 books, he or she earns 0 points.
- If a customer purchases 1 book, he or she earns 5 points.
- If a customer purchases 2 books, he or she earns 15 points.
- If a customer purchases 3 or more books, he or she earns 30 points.

Write a C++ program that asks the user to enter the number of books that he or she has purchased this month and displays the number of points awarded.

**Note:** In your program, you are only allowed to use one-way selection (**if**). You are **NOT** allowed to use two-way selection (**if-else**).

**Task # 12**

The following table lists the freezing and boiling points of 3 substances. Write a C++ program that asks the user to enter a temperature and then shows all the substances that will freeze at that temperature and all that will boil at that temperature. For example, if the user enters **-20** the program should report that Oxygen will boil and Water will freeze at that temperature.

Substance	Freezing Point (°F)	Boiling Point (°F)
Mercury	-38	676
Oxygen	-362	-306
Water	32	212

**Task # 13**

A company has determined that its annual profit is typically 23 percent of total sales. Write a C++ program that asks the user to enter the amount of total sales, and then determines and displays the annual profit that will be made from that amount.

**Note:** In C++, to store real numbers you can use the data type **float** or **double**.

**Task # 14**

Write a C++ program that will ask the user to enter the amount of a purchase. The program should then compute the federal and provincial sales tax. Assume that the federal sales tax is 4 percent and the provincial sales tax is 2 percent. The program should display the amount of the purchase, the federal sales tax, the provincial sales tax, the total sales tax, and the total of the sale (which is the sum of the amount of purchase plus the total sales tax).

**Task # 15**

A car's mileage in kilometers per liter (KMPL) can be calculated with the following formula:

$$\text{Mileage (in KMPL)} = \text{Kilometers driven} / \text{Liters of petrol used}$$

Write a C++ program that asks the user for the number of kilometers driven and the liters of petrol used. It should calculate the car's mileage (in KMPL) and display the result on screen.

**Note:** In C++, to store real numbers you can use the data type **float** or **double**.

**Task # 16**

A furniture company sells chairs at Rs.1250 each. Quantity discounts are given according to the following table:

Quantity	Discount
Less than 10	No discount
10 – 19	20%
20 – 49	30%
50 – 99	40%
100 or more	50%

Write a C++ program that asks for the number of chairs sold and computes the total cost of the purchase (after applying the discount).

**Input Validation:** Make sure that the number of chairs entered by the user is greater than 0.