Subject: PRF192 - Programming Fundamental with C
Workshop 2

Objectives:

- The primary goal of this program is to simulate a salary calculation system for a company using C programming language.
- The system requires **modular design**, **advanced control structures**, and **function-based** computation to calculate salaries, allowances, and generate company statistics.
- This task is designed to enhance their understanding of modular programming, parameter passing, and control flow.

Problem Description:

The company needs a program to calculate employee salaries based on the following rules:

- Each employee has a basic salary. Based on this, allowances and total income are calculated.
- The program must also:
  - Validate inputs.
  - Provide aggregated statistics about the company.
  - Demonstrate modular programming through user-defined functions.

Situation Description:

The company has employees with varying levels of salaries, and a new HR system is required to:

1. **Input Details**:
   - The number of employees.
   - The basic salary of each employee.
2. **Perform the following calculations**:
   - **Allowance Calculation**:
     - If the basic salary is below 6,000,000, the allowance is 25% of the basic salary.
     - If the basic salary is between 6,000,000 and 15,000,000 (inclusive), the allowance is 15%.

    - If the basic salary exceeds 15,000,000, the allowance is 10%.
- **Income Tax Deduction**:
    - Income tax is applied to the total income after adding the allowance:
        - If total income <= 8,000,000, no tax is applied.
        - If total income > 8,000,000, a 10% tax is applied on the amount exceeding 8,000,000.
- **Total Net Income**:
    - Net income is calculated as:

$$\textbf{Net Income} = \textbf{Basic Salary} + \textbf{Allowance} - \textbf{Tax Deduction}$$

3. **Generate Statistics**:

- The total salary cost (sum of all employees' net incomes).
- The number of employees in each allowance category.

Syntax Use in the Problem:

The program must incorporate the following syntax elements effectively:

1. **if and else if**:

- To determine the allowance percentage based on the basic salary range.
- To apply the income tax conditionally.

2. **for loop**:

- To process the salary calculations for multiple employees iteratively.

3. **while loop**:

- To ensure valid input (e.g., the number of employees and basic salary must be non-negative).

4. **User-Defined Functions**:

- Separate the logic into functions for:
    - Input validation.
    - Allowance calculation.
    - Tax deduction.
    - Net income calculation.

5. **Parameter Passing by Value**:

- All data between functions is passed by value to ensure simplicity.

Specific Requirements:

- **Input**:
  - Read the number of employees.
  - For each employee, input the basic salary (ensure it is non-negative).
- **Calculations:**
  - Compute allowance based on the salary range.
  - Deduct income tax if applicable.
  - Calculate total net income.
- **Statistics:**
  - Compute the total salary cost.
  - Count the number of employees in each allowance category.
- **Output:**
  - Display detailed salary breakdown for each employee.
  - Provide aggregated statistics for the company.

Hint: Code Design

```c
#include <stdio.h>
#include <stdlib.h>

// Function prototypes
float inputSalary();
float calculateAllowance(float basic_salary);
float calculateTax(float total_income);
float calculateNetIncome(float basic_salary, float allowance, float tax);

int main() {
    // Step 1: Initialize variables used in the program
    int num_employees;             // Number of employees
    float total_salary_cost = 0;   // Total net salary cost for the company
    int count_25 = 0, count_15 = 0, count_10 = 0; // Count employees in each allowance category

    // Step 2: Input the number of employees

    // Step 3: Validate input number of employees. If numberOfEmployees < 1 then exit the program

    // Step 4: Process each employee

        // Call function to Input the basic salary

        // Call function Calculate allowance

        // Count allowance category

        // Calculate total income and Call function to calculate tax
```

```
29
30          // Call function to Calculate net income
31
32          // Update total salary cost
33
34          // Display employee details
35
36      // Step 5: Display Salary Statistics
37
38      system("pause");
39      return 0;
40  }
41
42  // Function to input basic salary
43  float inputSalary() {
44      // ...
45  }
46
47  // Function to calculate allowance
48  float calculateAllowance(float basic_salary) {
49      // ...
50  }
51
52  // Function to calculate tax
53  float calculateTax(float total_income) {
54      // ...
55  }
56
57  // Function to calculate net income
58  float calculateNetIncome(float basic_salary, float allowance, float tax) {
59      // ...
60  }
```

Output Sample:

```
D:\MonHoc\PRF192\ThucHanh\Workshop02.exe
Enter the number of employees: 3

Processing employee 1:
Enter the basic salary (>= 0): -5000000
Invalid salary. Please enter a non-negative value.
Enter the basic salary (>= 0): 5000000
Basic Salary: 5000000.00
Allowance: 1250000.00
Tax Deduction: 0.00
Net Income: 6250000.00

Processing employee 2:
Enter the basic salary (>= 0): 12000000
Basic Salary: 12000000.00
Allowance: 1800000.00
Tax Deduction: 580000.00
Net Income: 13220000.00

Processing employee 3:
Enter the basic salary (>= 0): 20000000
Basic Salary: 20000000.00
Allowance: 2000000.00
Tax Deduction: 1400000.00
Net Income: 20600000.00

=== Salary Statistics ===
Total salary cost of the company: 40070000.00
Number of employees with allowance of 25%: 1
Number of employees with allowance of 15%: 1
Number of employees with allowance of 10%: 1
Press any key to continue . . .
```