02 - Programming Exercises
Functions and Arrays

Program each of the following tasks in your C++ compiler. Keep compiling and executing even after writing a single line of code.

Task 1

Write a program that computes and displays the charges for a patient's hospital stay. First, the program should inquire whether the patient was admitted as an in-patient or an out-patient. If the patient was an in-patient, the following data should be entered:

- The number of days spent in the hospital
- The daily rate
- Hospital medication charges
- Charges for hospital services (lab tests, etc.)

The program should prompt for the following data if the patient was an out-patient:

- Charges for hospital services (lab tests, etc.)
- Hospital medication charges

Utilize two overloaded functions (named **charges**) to calculate the total charges. One function should accept arguments for in-patient data, while the other should accept arguments for out-patient information. Both functions should return the total charges. Implement your main function and thoroughly test the functionality of your application.

Task 02

Implement the following functions having the prescribed functionalities.

Function	Functionality
getData	Accept an integer array with its size as the function's argument and fill its elements with data entered by the user
displayData	Accept an integer array with its size as the function's argument and display its contents on the screen.
countEvens	Accept an array with its size as the function's argument and return the count of even numbers existing in that array. The function should NOT perform any input/output.
mean	Accept an array with its size as the function's argument and return the mean of its elements. The mean of a sequence of n numbers is the number m defined by the formula: $$m = \frac{x_0 + x_1 + x_2 + x_3 + \cdots + x_{n-1} + x_n}{n}$$ The function should NOT perform any input/output. Choose the return type of your function wisely.

In the main function, declare an array of 10 integers named **data** and pass this array to the functions implemented above. Display the count of even numbers and mean returned by the functions. DO NOT perform any input in the main function.

Task 03

Write a program that performs matrix transpose. The program should prompt the user to enter data for a 4×4 matrix. Once the matrix is entered, the program should display the original matrix and then compute and display its transpose.

The transpose of a matrix (denoted as A^T, where A is the matrix and T indicates its transpose) is obtained by switching its rows with its columns, resulting in a flipped version of the original matrix.

The program should provide clear user prompts, display the contents of the original matrix, calculate its transpose, and finally, display both the original matrix and its transpose.

Ensure proper handling of user input and a clean presentation of the matrices.

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