



CL1002

Programming Fundamentals

Lab 08

Tasks

NATIONAL UNIVERSITY OF COMPUTER AND EMERGING SCIENCES

Fall 2025

LAB EXERCISES

Task 1 – Auditorium Seating Labels

During a campus event, the university administration wants to label every seat in the main auditorium according to its position, for example, “Row 1 Seat 1”, “Row 1 Seat 2”, and so on. Each row contains an equal number of seats, and the total number of rows is provided by the event manager. Write a C program using nested loops that generates and prints all seat labels in proper order. This exercise helps understand how outer and inner loops cooperate to process repeated, structured data.

Task 2 – Festival Light Pyramid

For the annual university festival, the decoration team needs to design a pyramid pattern of LED lights that grows row by row. The program should take the number of rows as input and display a pyramid of asterisks (*) to visualize the lighting pattern. By using nested loops, students can see how inner loops control pattern width while outer loops manage the height of the design.

Task 3 – Multiplication Chart for Bookstore Posters

A local bookstore plans to print colorful multiplication charts for school students. Your task is to help the designer generate a complete multiplication table up to a given number N. The program should use nested loops to display the table neatly in rows and columns. This task strengthens logical sequencing and reinforces the connection between iteration and tabular output.

Task 4 – Student Marks Summary

A teacher wants to automate the process of calculating total marks for her students. Each student has scores in multiple subjects stored in a 2D array where rows represent students and columns represent subjects. Using nested loops, write a program that computes and displays the total marks for every student. This simulation demonstrates how 2D arrays can represent real-world tabular data like class mark sheets.

Task 5 – Weekly Temperature Report

A small weather station records morning and evening temperatures throughout the week. The readings for each day are stored in a 2D array with two columns for the two readings. Your program should calculate and print the average temperature for each day, showing clear understanding of nested loops and array traversal. This example illustrates how simple arrays can organize and analyze daily environmental data.

Task 6 – Library Shelf Arrangement

In the university library, books are organized on multiple shelves, and each shelf holds a fixed number of books. The librarian wants a program that displays the arrangement of book IDs shelf by shelf. Using a 2D array, input the IDs of all books and then print them in a structured format. The goal is to simulate a real library's categorization using basic nested loop iteration.

Task 7 – RGB Color Simulation

A design student is experimenting with combinations of red, green, and blue light intensities to generate new colors. These intensity levels can be stored in a 3D array representing multiple layers of RGB values. Develop a program that initializes and displays the RGB cube values using three nested loops. This hands-on example connects programming logic with real-world graphics and visualization concepts.

Task 8 – Retail Store Sales Tracker

A retail store keeps track of weekly sales of two different products across several branches. The data is recorded for multiple weeks, forming a 3D array (product × branch × week). Write a program that calculates the total sales for each product using nested loops. This scenario helps students relate multidimensional arrays to business analytics and data aggregation tasks.

Task 9 – Hospital Temperature Records

A hospital monitors patients' body temperature at three different times each day — morning, afternoon, and evening — across two wards. The readings for all patients are stored in a 3D array. Write a program to compute the average temperature of each ward. This example demonstrates how 3D arrays can organize hierarchical real-world data such as patient monitoring records.

Task 10 – Cinema Revenue Analysis

A cinema complex runs two screens, each showing multiple movies daily over several days. Management wants to calculate total and average ticket revenue for each screen. The data for screens, days, and shows can be stored in a 3D array. Write a program that iterates through this dataset using nested loops to compute and display the results. This case study provides a practical link between programming logic and commercial data management.