

# Final Examination

Date: Dec 2025; Duration: 90 minutes

**Open-book; Offline.** Laptops/PC with Internet connection **are not allowed.**

<b>SUBJECT: Programming for Engineers Laboratory (EE058IU)</b>	
Approval by the School of Electrical Engineering Signature	Lecturer: Signature
Full name:	Full name:
Proctor 1 Signature	Proctor 2 Signature
Full name:	Full name:
<b>STUDENT INFO</b>	
<b>Student name:</b>	
<b>Student ID:</b>	

**INSTRUCTIONS:** the total of point is 100 (equivalent to 30% of the course)

1. *Purpose:*

- Formulate algorithms to solve simple programming problems. (G1.1)
- Frame and solve unstructured problems, create practical applications to accomplish useful goals (G2.2)
- Design, implement and test programs using the C techniques (selections, loops, functions, arrays, pointers, characters and strings, structures, etc.) with applications to engineering (G3.1)
- Create and manipulate dynamic data structures such as linked lists, queues, stacks and binary trees studies (G3.2)

2. *Requirement:*

- Carefully read each question and answer it following the requirements.
- Save your answer files as: **ID\_Name\_Q1.c**. E.g: EEACIU12345\_Q1.c
- Submit your exam including this paper inside

## INDEX 02

## QUESTIONS

### **Q1. (40 marks)**

Write a C program to print diamond star pattern. Size of the pattern is 20. At line 10, insert your first name in the middle of the pattern.

## Output:

## **Q2. (60 marks)**

- a. Design a structure named **Date** (containing day, month, year) and a structure named **Author** (containing first name, last name, and nationality). Create a main structure named **BOOK** that includes:

Title

*Author* (of type *struct Author*)

Price

*Publication Date (of type struct Date)*

Write a C program that accepts details for N books (where N is input by the user). The program must perform the following:

- b. Display the details of the most expensive book.
  - c. List all books published after the year 2010.

Test your program with 3 books

## **Example output:**

Output

```
Enter the number of books (N): 3

--- Enter details for Book 1 ---
Title: Physics
Author First Name: Thien
Author Last Name: Nguyen
Author Nationality: VN
Price: 23
Publication Date (DD MM YYYY): 11 2 2009

--- Enter details for Book 2 ---
Title: English Grammar
Author First Name: Trang
Author Last Name: Mai
Author Nationality: VN
Price: 24
Publication Date (DD MM YYYY): 06 07 2023

--- Enter details for Book 3 ---
Title: Chemistry
Author First Name: Tu
Author Last Name: Le
Author Nationality: VN
Price: 50
Publication Date (DD MM YYYY): 04 11 2004

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MOST EXPENSIVE BOOK DETAILS
=====
Title: Chemistry
Author: Tu Le
Price: 50.00
Date: 04/11/2004

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BOOKS PUBLISHED AFTER 2010
=====
- English Grammar (Year: 2023)
```

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