

Final Examination

Date: Dec 2025; Duration: 90 minutes

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

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

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

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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:

```

      *
    ***
  *****
*****
*****
*****
*****
*****
*****
***** TRAN *****
*****
*****
*****
*****
*****
*****
*****
*****
*****
      *
```

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:

- Display the details of the most expensive book.
- 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)
```

- END -