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 Full name:	Lecturer: Signature Full name:
Proctor 1 Signature Full name:	Proctor 2 Signature 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_NguyenVanA_Q1.c

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QUESTIONS

Q1. (40 marks)

Write a C program to print pyramid of star pattern of size N (N is inputted by user). At the first line, insert **your** first name (input by user) in the middle of the pattern.

Output:

```
Enter the size: 10
Enter your first name: Harris
       Harris
          *
         ***
        *****
       *******
      *********
     ***********
    *************
   ***************
  *****************
 *******************
```

Q2. (60 marks)

a. Design a structure named **Origin** (containing brand, type). Create a main structure named Mbike that includes:

Name

Origin (of type struct Origin)

Price

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

b. List the details of all Honda scooter motorbikes.

c. Display the most expensive Yamha motorbike.

Hint: useful function: **strcmp()**

Test your program with 3 – 5 motorbikes.

Example output:

```
Enter number of motorbikes (N): 4

--- Enter details for Motorbike 1 ---
Name: pcx
Brand (e.g., Honda, Yamaha): Honda
Type (e.g., scooter): scooter
Price: 3000

--- Enter details for Motorbike 2 ---
Name: Vario
Brand (e.g., Honda, Yamaha): Honda
Type (e.g., scooter): scooter
Price: 2400

--- Enter details for Motorbike 3 ---
Name: R15
Brand (e.g., Honda, Yamaha): Yamaha
Type (e.g., scooter): sport
Price: 4000

--- Enter details for Motorbike 4 ---
Name: XRS155
Brand (e.g., Honda, Yamaha): Yamaha
Type (e.g., scooter): sport
Price: 3400

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>>> LIST OF HONDA SCOOTERS:
Name: pcx | Price: $3000.00
Name: Vario | Price: $2400.00

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>>> MOST EXPENSIVE YAMAHA MOTORBIKE:
Name: R15
Type: sport
Price: $4000.00
```

- END –