# ELDO -HUB DATA SCIENCE DEPARTMENT

# Midterm Exam: Introduction to Computer Science and Programming Using Python

**Part A: Theory (20 marks)**  
Answer all questions. Multiple choice questions are 1 mark each; short-answer questions are 3 marks each.

### Multiple Choice (1 mark each)

1. (Intro) **Which of the following best describes an** algorithm**?**  
   A. A type of hardware device  
   B. A program that runs automatically  
   C. A step-by-step procedure to solve a problem  
   D. A high-level programming language
2. (Strings/I/O) **What is the output of the following code?**

Python Code:

print("Hello" + "World")

A. Hello World (with space)  
B. HelloWorld  
C. Hello + World  
D. Error

1. (Loops over Strings) **What does the following code print?**

Python Code:

for c in "abc":

print(c)

A. abc on one line  
B. a, b, c each on its own line  
C. cba on one line  
D. a b c separated by spaces

1. (Iteration) **What is the output of this code?**

Python Code:

count = 0

while count < 3:

print(count)

count = count + 1

A. 0 1 2 (each on a new line)  
B. 1 2 3  
C. 0 1 2 3  
D. Error

1. (Binary) **What is the decimal equivalent of the binary number** 1011**?**  
   A. 10  
   B. 11  
   C. 13  
   D. 12

### Short Answer (3 marks each)

1. **What is a** variable **in a computer program? Provide a Python example.**
2. **What does the** input() **function do in Python? Give an example of its use.**
3. **Describe what an** if **statement does. Provide a simple example in Python using** if **and** else**.**
4. **Explain what a** loop **(iteration) does in programming. Provide an example of a** for **or** while **loop.**
5. **Explain the binary number system. How would you convert the binary number** 1101 **to decimal?**

**Part B: Coding Practical (30 marks)**  
Write Python code for the following tasks. Include input prompts and output as indicated.

1. **Grade Converter (8 marks):** Write a program that asks the user for an exam score (integer 0–100) and prints the corresponding letter grade according to:

* 90–100: A
* 80–89: B
* 70–79: C
* 60–69: D
* 0–59: F  
  For example, if the input is 85, the program should print:

Python Code output:

Grade: B

1. **Vowel Counter (7 marks):** Ask the user to enter a sentence (string). Write a program that counts how many vowels (a, e, i, o, u, case-insensitive) appear in the sentence. Print the total count.
2. **Decimal to Binary Converter (8 marks):** Write a program that asks the user for a non-negative integer and prints its binary representation as a string of 0 and 1. Do not use Python’s bin() function; use a loop or other logic. For example, input 13 should output 1101.
3. **Sum of Digits (7 marks):** Ask the user to enter a positive integer. Write a program to compute the sum of its digits. For example, input 253 should output 10 (since 2+5+3=10).