



# Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Midterm Examination, Fall 2025

Course Code: CSE113, Course Title: Programming and Problem Solving

Level: 1 Term: 2 Batch: 69

Time: 01:30 Hrs

Marks: 25

## Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1	From the following code <b>identify</b> and <b>list</b> all the keywords and identifiers present in the code.	[02]	CO1
	<pre>#include &lt;stdio.h&gt; int main() {     int total = 10;     float price = 25.5;     char greeting = '#';     if (total &gt; 0) {         total = total + 5;         printf("%c Your total is: %d\n", greeting, total);     } else {         printf("No items found.\n");     }     return 0; }</pre>		
2. a)	<b>Identify</b> the syntax errors in the following code snippet. Write down each error with the line number and why you think this is an error: 1. #include <studio.h> 2. int main() { 3.     int numbers[4] = {10, 20, 30, 40, 50}; 4.     int i; 5.     for (i = 0, i <= 4, i++) { 6.         if numbers[i] > 25 { 7.             printf("Number %d is greater than 25\n", numbers[i]); 8.         } else { 9.             printf("Number %d is less than or equal to 25\n", numbers[i]); 10.        } 11.    } 12.    return 0 13. }	[02]	CO2
b)	Write a corrected version of the above program.	[02]	
	Draw a flowchart to solve each of the following problems.		CO3
a)	At the DIU canteen, students get a discount based on their total bill amount: <ul style="list-style-type: none"><li>• If the total bill is less than 100 BDT, no discount is applied.</li><li>• If the bill is between 100 and 300 BDT (inclusive), a 10% discount is given.</li><li>• If the bill is more than 300 BDT, a 20% discount is applied.</li></ul> <b>Draw</b> a flowchart that takes the total bill amount as input and calculates the final amount after applying the discount.	[02]	

	<p>b) Two DIU students are working on a problem to determine whether a positive integer N is a prime number. They first check if the input number is positive; if not, they ask the user to enter a positive number again and keep reading until a positive number is entered. Then, they check all numbers from 2 up to N-1 to see if any of them divides N without a remainder. If they find any such divisor, they conclude that N is not prime; otherwise, it is prime.</p> <p>Draw a flowchart that inputs a number N, validates that it is positive, and then checks whether it is prime or not.</p>	[02]											
4.	Identify the problem scenarios given below and write a complete <b>C program</b> for each problem statement.		CO4										
	<p>a) You are working on an automated health data tracker for DIU Health Center. The system records a student's morning and evening pulse rate. Write a C program that takes these two integer values as input and displays their total pulse count for the day.</p> <p><b>Input:</b></p> <ul style="list-style-type: none"><li>First line contains two integers separated by space representing the morning and evening pulse rate.</li></ul> <p><b>Output:</b></p> <ul style="list-style-type: none"><li>Print the total pulse count in a single line.</li></ul> <table><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>65 75</td><td>Total pulse count in a day: 140</td></tr></table>	Sample Input	Sample Output	65 75	Total pulse count in a day: 140	[02]							
Sample Input	Sample Output												
65 75	Total pulse count in a day: 140												
	<p>b) The DIU Health Analytics Lab tracks students' strength improvement during fitness programs. Each student starts with an initial strength score S, which increases by R% every month. Write a C program to calculate the final strength score after N months.</p> <p>Hints: <math>\text{Strength} = S \left(1 + \frac{R}{100}\right)^N</math></p> <p><b>Input:</b></p> <ul style="list-style-type: none"><li>First line contains three numbers:<ul style="list-style-type: none"><li>Initial strength score S (integer)</li><li>Monthly growth rate R (floating-point number)</li><li>Number of months N (integer)</li></ul></li></ul> <p><b>Output:</b></p> <ul style="list-style-type: none"><li>Print the final strength score after N months rounded to two decimal places.</li></ul> <table><tr><th>Sample Input</th><th>Sample Output</th></tr><tr><td>100 10 3</td><td>Final strength score after 3 months: 133.10</td></tr></table>	Sample Input	Sample Output	100 10 3	Final strength score after 3 months: 133.10	[03]							
Sample Input	Sample Output												
100 10 3	Final strength score after 3 months: 133.10												
	<p>c) DIU Medical Center is developing a health monitoring system to analyze students' physical condition based on their <b>BMI</b> and <b>average heart rate</b>. Write a C program that classifies their health condition according to the following rules:</p> <table><tr><th>Condition</th><th>Output</th></tr><tr><td>BMI &lt; 18.5 and heart rate &gt; 100</td><td>Underweight with Tachycardia</td></tr><tr><td>BMI between 18.5–24.9 and heart rate between 60–100</td><td>Healthy Condition</td></tr><tr><td>BMI between 25–29.9 or heart rate &gt; 110</td><td>Overweight or High Heart Rate</td></tr><tr><td>Otherwise</td><td>Consult Doctor Immediately</td></tr></table> <p><b>Input:</b></p> <ul style="list-style-type: none"><li>Two numbers representing BMI (floating-point) and heart rate (integer).</li></ul> <p><b>Output:</b></p> <ul style="list-style-type: none"><li>Print the corresponding health condition message.</li></ul>	Condition	Output	BMI < 18.5 and heart rate > 100	Underweight with Tachycardia	BMI between 18.5–24.9 and heart rate between 60–100	Healthy Condition	BMI between 25–29.9 or heart rate > 110	Overweight or High Heart Rate	Otherwise	Consult Doctor Immediately	[03]	
Condition	Output												
BMI < 18.5 and heart rate > 100	Underweight with Tachycardia												
BMI between 18.5–24.9 and heart rate between 60–100	Healthy Condition												
BMI between 25–29.9 or heart rate > 110	Overweight or High Heart Rate												
Otherwise	Consult Doctor Immediately												

Sample Input	Sample Output
26.3 115	Overweight or High Heart Rate

- d) The DIU Health Club monitors students' daily water intake to encourage proper hydration. Write a C program that takes the number of days and the amount of water (in liters) consumed each day, then prints the total and average water intake. [03]

**Input:**

- First line contains an integer **N** representing the number of days.
- Second line contains **N** space-separated integers representing the daily water intake in liters.

**Output:**

- Print the total water intake and average intake per day (up to two decimal places).

Sample Input	Sample Output
7 2 1 2 3 2 1 3	Total water intake: 14 liters Average per day: 2.00 liters

- e) Two DIU students are analyzing the daily health improvement scores of a student over **N** days. The scores can be **positive** (improvement) or **negative** (decline). They want to find the **second maximum** score recorded during these days to identify the runner-up best health day. [04]

**Input:**

- First line contains an integer **N** representing the number of days.
- Second line contains **N** space-separated integers representing the daily health improvement scores.

**Output:**

- Print the second maximum score among the **N** days.

Sample Input	Sample Output
8 -3 4 6 -2 5 -7 3 4	Second Maximum Score: 5