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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 **identify** and **list** all the keywords and identifiers present in the code.	[02]	CO1

		`#include <stdio.h>`
		`int main() {`
		`  int total = 10;`
		`  float price = 25.5;`
		`  char greeting = '#';`
		`  if (total > 0) {`
		`  total = total + 5;`
		`  printf("%c Your total is: %d\n", greeting, total);`
		`  } else {`
		`  printf("No items found.\n");`
		`  }`
		`  return 0;`
		`}`		

2.	*a)*	**Identify** 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]	
3.		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: • If the total bill is less than 100 BDT, no discount is applied. • If the bill is between 100 and 300 BDT (inclusive), a 10% discount is given. • If the bill is more than 300 BDT, a 20% discount is applied. **Draw** a flowchart that takes the total bill amount as input and calculates the final amount after applying the discount.	[02]	

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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.
Draw a flowchart that inputs a number N, validates that it is positive, and then checks whether it is prime or not. **[02]**

4. Identify the problem scenarios given below and write a complete **C program** for each problem statement. **CO4**

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. **[02]**

Input:
- First line contains two integers separated by space representing the morning and evening pulse rate.

Output:
- Print the total pulse count in a single line.

Sample Input	Sample Output
65 75	Total pulse count in a day: 140

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. **[03]**

Hints: Strength = $S\left(1+\frac{R}{100}\right)^N$

Input:
- First line contains three numbers:
  - Initial strength score S (integer)
  - Monthly growth rate R (floating-point number)
  - Number of months N (integer)

Output:
- Print the final strength score after N months rounded to two decimal places.

Sample Input	Sample Output
100 10 3	Final strength score after 3 months: 133.10

c) DIU Medical Center is developing a health monitoring system to analyze students' physical condition based on their **BMI** and **average heart rate**. Write a C program that classifies their health condition according to the following rules: **[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

Input:
- Two numbers representing BMI (floating-point) and heart rate (integer).

Output:
- Print the corresponding health condition message.

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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