

# United International University

## Department of Computer Science and Engineering

DS 1501: Programming for Data Science

Midterm Examination : Fall 2024

Total Marks: 30      Time: 1 hour 30 minutes

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*Answer all the 3 questions. Numbers to the right of the questions denote their marks.*

**Any examinee found adopting unfair means will be expelled from the trimester / program as per UIU disciplinary rules.**

1. (a) Find the output of the following Python code : [3]

```
a = 4
b = 3
c = True
print(a+b > b ** 2 or not c)
```

- (b) Correct the errors in the following Python code snippet and ensure valid variable usage: [3]

```
a = input("provide the first number: ")
b = input("provide the second number: ")
if(a > b):
    print("The larger number is: " , a)
else_if(a < b):
    print("The larger number is: " ; b)
else:
    print("They are equal")
```

- (c) Manually trace the following code segment and find the output of it. [4]

```
start_index = 0
end_index = 10
numbers = [25,35,45,55,4]
iterations = 0
while iterations < end_index//2:
    print("Iteration:", iterations + 1)
    if start_index < len(numbers) - 1:
        numbers[start_index] = numbers[start_index] - 3
        start_index += 1
    print("Updated list:", numbers)
    end_index -= 2
    iterations += 1
print("Final slice:", numbers[-5:-2])
```

2. (a) Write a Python program to calculate the cost of a ride for a ride-sharing app. The user will input the travel distance in kilometers and the time of day ('Morning', 'Noon', 'Afternoon', or 'Night'). The cost is calculated as follows: [6]

- Base cost: 50 taka
- Cost per kilometer: 30 taka
- Morning: Total cost increases by 20%
- Afternoon: Total cost increases by 30%
- Noon and Night: No additional charges.

Input	Output
Distance: 10 Time: Morning	Total cost: 420
Explanation: $((10\text{km} \times 30) + 50) \times 1.2 = 420$	

- (b) A university calculates the trimester fee for students based on their CGPA, number of credits, and scholarship eligibility.
- **Per Credit Fee:** 5000 TK
  - **Registration Fee:** 5000 TK

The scholarship eligibility is determined by the student's CGPA:

- **100% Scholarship:** If the CGPA is 4.0.
- **50% Scholarship:** If the CGPA is 3.67 or above but less than 4.0.
- **25% Scholarship:** If the CGPA is below 3.67.
- **No Scholarship:** If the CGPA is below 3.00.

Write a program that takes the student's CGPA and the number of credits they are taking as input from the user. The program should calculate the total trimester fee, considering the tuition fee, the scholarship, and the registration fee. [4]

3. (a) You have a list where each item is a string, and the items in the list are unique (each item exists only once). Take a string from user to search in the list. If the string is found at an even index, it will be replaced by the item at the next index, and if the string is found at an odd index, it will be replaced by the item at the previous index. After making the replacements, the program will print the updated list. [6]

Table 1 shows the sample input and output of the program.

- (b) What will be the output of the following snippet of code? [4]

```
rows = 3
cols = 5
for i in range(1, rows + 1):
    for j in range(1, cols + 1):
        if (i + j) % 4 == 0 or (i == 2 and j % 4 == 0):
            print('*', end='')
        else:
            print(' ', end='')
    print()
```

Sample Input	Sample Output
["apple", "banana", "cherry", "date"] Enter the string to search for: banana	Updated list: ["apple", "apple", "cherry", "date"]

Table 1: Sample Input and Output (Question-3(a))