ASSIGNMENT – 1

DATA SCIENCE & GEN AI LLMS

H NO - 2406DGAL135

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Question 1:

Number game between user and computer. The user starts by entering either 1 or 2 or 3 digits starting from 1 sequentially. The computer can return either 1 or 2 or 3 next digits in sequence, starting from the max number played by the user. User enters the next 1 or 2 or 3 next digits in sequence, starting from the max number played by the computer. Whoever reaches 20 first wins the game.

Note:

- the numbers should be in sequence starting from 1.

- minimum number user or computer should pick is at least 1 digit in sequence

- maximum number user or computer can pick only 3 digits in sequence

Program:-

```
def number_game():
    current_number = 0
    while current_number < 20:

        player_input = input("Enter 1 to 3 sequential numbers (e.g., '1 2 3'): ")
        player_numbers = list(map(int, player_input.split()))

        if len(player_numbers) < 1 or len(player_numbers) > 3 or any(num != current_number + i + 1 for i, num in enumerate(player_numbers)):
```

```
            print("Invalid input. Make sure to enter 1 to 3 sequential numbers starting from", current_number + 1)
            continue

        current_number += len(player_numbers)
        print(f"player's turn: {', '.join(map(str, player_numbers))} -> Current total: {current_number}")

        if current_number >= 20:
            print("player wins!")
            break

        computer_numbers = []
        for _ in range(min(3, 20 - current_number)):
            computer_numbers.append(current_number + 1)
            current_number += 1
            if current_number >= 20:
                break

        print(f"Computer's turn: {', '.join(map(str, computer_numbers))} -> Current total: {current_number}")

        if current_number >= 20:
            print("Computer wins!")

if __name__ == "__main__":
    number_game()
```

output :-

```
Enter 1 to 3 sequential numbers (e.g., '1 2 3'): 1
player's turn: 1 -> Current total: 1
Computer's turn: 2, 3, 4 -> Current total: 4
Enter 1 to 3 sequential numbers (e.g., '1 2 3'): 5 6
player's turn: 5, 6 -> Current total: 6
Computer's turn: 7, 8, 9 -> Current total: 9
Enter 1 to 3 sequential numbers (e.g., '1 2 3'): 10 11
player's turn: 10, 11 -> Current total: 11
Computer's turn: 12, 13, 14 -> Current total: 14
Enter 1 to 3 sequential numbers (e.g., '1 2 3'): 15
player's turn: 15 -> Current total: 15
Computer's turn: 16, 17, 18 -> Current total: 18
Enter 1 to 3 sequential numbers (e.g., '1 2 3'): 19 20
player's turn: 19, 20 -> Current total: 20
player wins!

=== Code Execution Successful ===
```

Question 2:

Develop a function called ncr(n,r) which computes r-combinations of n-distinct object . use this function to print pascal triangle, where number of rows is the input

Program:

```
  def fact(n):
    i=1
    f=1
    while (i<=n):
        f=f*i
        i+=1
    return f

def ncr(n,r):
    return fact(n)//(fact(n-r)*fact(r))

def triangle(r):
    for i in range(r):
        print(' ' * (r - i), end='')
        for j in range(i+1):
            print(ncr(i,j), end=' ')
        print()

n= int(input("Enter n rows : "))
triangle(n)
```

output:-

```
Enter n rows : 8
        1
       1 1
      1 2 1
     1 3 3 1
    1 4 6 4 1
   1 5 10 10 5 1
  1 6 15 20 15 6 1
 1 7 21 35 35 21 7 1

=== Code Execution Successful ===
```

Question 3:

Read a list of n numbers during runtime. Write a Python program to print the repeated elements with frequency count in a list.

Program :

```
list1 = list(map(int,input("Enter numbers : ").split()))

count = {}

for i in list1:
    if i in count:
        count[i] += 1
    else:
        count[i] = 1

print(count)

for i , j in count.items():
  if j>1:
    print('Element' ,i ,'has come', j ,'times')
```

output :

```
Enter numbers : 2 1 2 3 4 5 1 3 6 2 3 4

{2: 3, 1: 2, 3: 3, 4: 2, 5: 1, 6: 1}

Element 2 has come 3 times
Element 1 has come 2 times
Element 3 has come 3 times
Element 4 has come 2 times

=== Code Execution Successful ===
```

Question 4:-

Develop a python code to read matric A of order 2X2 and Matrix B of order 2X2 from a file and perform the addition of Matrices A & B and Print the results.

Program :-

```
def read_matrix(matrices.txt, matrix_num):
    matrix = []
    with open(matrices.txt, 'r') as file:
        lines = file.readlines()
        start_index = lines.index(f'Matrix{matrix_num}:\n') + 1
        for i in range(start_index, start_index + 2):
            row = list(map(int, lines[i].split()))
            matrix.append(row)
    return matrix

def add_matrices(matrix1, matrix2):
    result = [
            [matrix1[i][j] + matrix2[i][j] for j in range(2)]
        for i in range(2)
             ]
    return result
matrix1 = read_matrix('matrices.txt', 1)
matrix2 = read_matrix('matrices.txt', 2)

# Add matrices
result = add_matrices(matrix1, matrix2)
```

```
print("Resultant Matrix:")
for row in result:
    print(row)
```

input from file matrices.txt :-

Matrix1:-

1 2

3 4

Matrix2:-

5 6

7 8

output :-

Resultant matrix:

[6, 8]

[10, 12]

Question 5:-

Write a program that overloads the + operator so that it can add two objects of the class Fraction. Fraction can be considered of the for P/Q where P is the numerator and Q is the denominator

Program :-

```
class Addition:
    def __init__(self, p, q):
        self.p = p
        self.q = q
    def display(self):
        print(self.p, "/", self.q)
    def __add__(self, other):
        fun1 = self.p * other.q + other.p * self.q
        fun2 = self.q * other.q
        return f"{fun1}/{fun2}"

ob1 = Addition(3, 2)
ob2 = Addition(4, 1)

result = ob1 + ob2
print(result)
```

output :-

```
        11/2
=== Code Execution Successful ===
```