Advance Python Programming & Application

2-March-2024 (Saturday)

Python task statements covering previous topics:

1. List Manipulation:

- Create a list of numbers and find the sum of all elements.
- Given a list of strings, concatenate them into a single string.
- Find the maximum and minimum element in a list of numbers.
- Check if a certain element exists in a list.

2. Tuple Operations:

- Create a tuple of mixed data types and access individual elements.
- Concatenate two tuples and create a new tuple.
- Check if an element exists in a tuple.
- Convert a tuple into a list.

3. String Manipulation:

- Reverse a given string.

- Count the occurrences of a particular character in a string.

- Convert a string to uppercase or lowercase.

4. Number Operations:

- Find the square root of a given number (use built-in function).

- Check if the number is prime.

- Generate a list of prime numbers within a given range of 99.

- Calculate the factorial of a number.

5. Logical Statements:

- Implement logical AND, OR, and NOT operations.

- Write a program to determine if a given year is a leap year.

6. Arithmetic Operators (runtime input):

- Implement basic arithmetic operations (+, -, *, /) on two numbers input by user.

- Calculate the remainder of the division.

- Increment and decrement a number.

7. Loops:

- Use a for loop to iterate over elements in a list and perform some operation.

- Use a while loop to find the factorial of a number.

- Iterate through a string and print each character.

8. match Statement:

- Implement a switch-like behavior using if-elif-else statements.

Make a mini calculator using match statement and airthematic operators, take values and operator choices by user

9. Comparison Operators:

- Compare two numbers and print whether they are equal, greater, or lesser.

- Check if two strings are equal.

- Compare elements of two lists.

10. Conditional Statements:

- Write a program to determine the type of a given triangle based on its sides.

- Check if a given number is positive, negative, or zero.

SOLUTIONS:

List Manipulation:

```
# Sum of all elements in a list
numbers = [1, 2, 3, 4, 5]
total = sum(numbers)
print("Sum of all elements:", total)

# Concatenate strings in a list
strings = ["hello", "world", "python"]
concatenated_string = ''.join(strings)
print("Concatenated string:", concatenated_string)

# Maximum and minimum element
max_num = max(numbers)
min_num = min(numbers)
print("Maximum element:", max_num)
print("Minimum element:", min_num)
```

```
# Check if element exists
element = 3
if element in numbers:
    print("Element", element, "exists in the list")
```

Tuple Operations:

```
# Accessing elements
mixed_tuple = (1, "hello", 3.14)
print("First element:", mixed_tuple[0])

# Concatenating tuples
tuple1 = (1, 2)
tuple2 = ("a", "b")
concatenated_tuple = tuple1 + tuple2
print("Concatenated tuple:", concatenated_tuple)

# Checking element existence
if "hello" in mixed_tuple:
    print("Element 'hello' exists in the tuple")
```

```
# Converting tuple to list
tuple_to_list = list(mixed_tuple)
print("Tuple converted to list:", tuple_to_list)
```

String manipulation:

```
# Reversing a string
string = "hello"
reversed_string = string[::-1]
print("Reversed string:", reversed_string)

# Counting occurrences of a character
char = 'l'
count = string.count(char)
print("Occurrences of", char, "in", string, ":", count)

# Converting to uppercase or lowercase
upper_case = string.upper()
lower_case = string.lower()
```

```
print("Uppercase:", upper_case)
print("Lowercase:", lower_case)
```

Number Operations:

```
import math
# Square root of a number
num = 16
square_root = math.sqrt(num)
print("Square root of", num, ":", square_root)

# Checking if a number is prime
 # Taking input from the user
num = int(input("Enter a number: "))

# Checking if the number is prime
if num > 1:
    is_prime = True
    for i in range(2, int(num**0.5) + 1):
        if num % i == 0:
```

```
            is_prime = False
            break
    if is_prime:
        print(num, "is a prime number")
    else:
        print(num, "is not a prime number")
else:
    print(num, "is not a prime number")

# Factorial of a number
# Taking input from the user
num = int(input("Enter a number: "))

# Calculating factorial
factorial = 1
if num < 0:
    print("Factorial is not defined for negative numbers.")
elif num == 0:
    print("Factorial of 0 is 1")
else:
    for i in range(1, num + 1):
```

```
    factorial *= i

# Printing the factorial
print("Factorial of", num, "is", factorial)
```

Logical Statement:

```
# Leap year check
year = 2024
is_leap_year = (year % 4 == 0 and year % 100 != 0) or (year % 400 == 0)
print(year, "is a leap year:", is_leap_year)
```

Arithmetic Operators:

```
a = float(input("Enter the first number: "))
b = float(input("Enter the second number: "))
# Basic arithmetic operations
addition = a + b
subtraction = a - b
```

```
multiplication = a * b
division = a / b
print("Addition:", addition)
print("Subtraction:", subtraction)
print("Multiplication:", multiplication)
print("Division:", division)

# Remainder of division
remainder = a % b
print("Remainder of division:", remainder)

# Increment and decrement
a += 1
b -= 1
print("Incremented a:", a)
print("Decremented b:", b)
```

Loops:

```
# For loop
for i in range(1, 6):
```

```
    print(i)

# While loop for factorial
num = 5
factorial = 1
while num > 0:
    factorial *= num
    num -= 1
print("Factorial of 5:", factorial)

# Iterating through a string
string = "Python"
for char in string:
    print(char)
```

Comparison Operators:

```
# Comparison of numbers
a, b = 5, 10
if a == b:
```

```
    print("a and b are equal")
elif a > b:
    print("a is greater than b")
else:
    print("a is less than b")

# Comparison of strings
str1 = "hello"
str2 = "world"
if str1 == str2:
    print("Strings are equal")
else:
    print("Strings are not equal")

# Comparison of lists
list1 = [1, 2, 3]
list2 = [1, 2, 4]
if list1 == list2:
    print("Lists are equal")
else:
```

```
    print("Lists are not equal")
```

Conditional statement:

```
# Triangle type determination
a, b, c = 3, 4, 5
if a == b == c:
    print("Equilateral triangle")
elif a == b or b == c or a == c:
    print("Isosceles triangle")
else:
    print("Scalene triangle")

# Checking if a number is positive, negative, or zero
num = -5
if num > 0:
    print("Positive number")
elif num < 0:
    print("Negative number")
else:
```

```
print("Zero")
```