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Assignment 1 - Python Programming Concepts

Q.1 A simple program that displays "Hello, World!". It's often used to illustrate the syntax of the language.

Ans

```
# To print in python we use simple print statement
print("Hello, World!")
```

Q.2 Give the example of interactive mode and script mode.

Ans

1. Interactive Mode

- It allows you to enter python commands and see the immediate results.
- You can simply open python interactive shell by simply typing 'python' or 'python3' in your terminal or command prompt.

```
$ python
>>> print("Hello, Interactive Mode")
Hello, Interactive mode
>>> 2+3
5
>>> exit
```

2. Script Mode

- Script mode involves creating a python script file containing a series of python command and then executing the script.
- You can create a file using a text editor and save it with .py extension.

```
print("Hello World")
>>Hello World
num1 = 10
num2 = 20
add = num1 + num2
print(add)

>> 30
```

Q.3 Write a program on types of variable and also which type of variable is immutable or mutable
Eg. List -> list = [1, 2, 3], int, boolean, ... etc.

Ans

1. Integer (Immutable)

```
integer_variable = 32
print(integer_variable)
```

2. Float (Immutable)

```
float_variable = 32.69
print(float_variable)
```

3. String (Immutable)

```
string_variable = "Hello Python"
print(string_variable)
```

4. Tuple (Immutable)

```
tuple_variable = (1, 2, 3)
print(tuple_variable)
```

5. List (Mutable)

```
list_variable = [1, 2, 3]
print(list_variable)

modify list_variable
list_variable.append(4)
print(list_variable)
```

6 set (Mutable)

```
set_variable = {1, 2, 3}
print(set_variable)

modify set_variable
set_variable.append(4)
print(set_variable)
```

7. Dictionary (Mutable)

```
dict_variable = {'key 1': 'value 1', 'key 2': 'value 2'}
print(dict_variable)

modify dict_variable
dict_variable['key 3'] = 'value 3'
print(dict_variable)
```

Q.4 Write a program on operators with priority and associativity

Ans

```
# Arithmetic Operators
result = 10 + 3 * 5 / 2   # * and / have higher priority
                          # than +
print(result)

# Comparison Operators
comparison_result = 5 < 10 <= 15   # Chained comparisons
                                   # left to Right
print(comparison_result)

# Logical Operators
logical_result = True and False or True   # and has
                                          # higher priority than or
print(logical_result)

# Assignment Operators
x = 5
x += 2 * 3   # += has lower priority than arithmetic
print(x)

# Bitwise Operators
bitwise_result = 0b101 & 0b110 | 0b011
      # & has higher priority than |
print(bitwise_result)
```

```
# Membership Operators
list_example = [1, 2, 3, 4, 5]
membership_result = 3 in list_example
print(membership_result)

# Identity Operators
a = [1, 2, 3]
b = a
identity_result = a is b    # is checks for object
                            # identity
print(identity_result)

# Conditional (Ternary) Operator
condition = True
ternary_result = "True Value" if condition else "False"
print(ternary_result)
```

Q 5 Write a simple program for using comment

Ans

```
# This is a single-line comment

# Input
num = int(input("Enter a number : ")) # User Input

# Process
print(num, "User Entered "). # To print output
```

>> Enter a number : 32
32

Q.6 A simple program in python program to Add Two Numbers. Accept number from user.

Ans

```
num1 = float(input("Enter first number : "))
num2 = float(input("Enter second number : "))
add = num1 + num2
print(add)
```

>> Enter first number : 10
Enter second number : 22
32

Q.7 Write A python program in python language to find the square root.

Ans

```
import math
math.sqrt(9)
```

>> 3.0

Q.8 Write a python program to calculate the Area of Triangle.

Ans

```
height = float("Enter height of the triangle : "))
base = float("Enter base of the triangle : "))
Area = 1/2 * (base * height)

print("Area of the triangle is : ", Area)
```

Q.9. Write a python program to solve quadratic equation

Ans

```
import math

a = float(input("Enter the coefficient of a : "))
b = float(input("Enter the coefficient of b : "))
c = float(input("Enter the coefficient of c : "))

disc = b**2 - 4*a*c  # Calculate discriminant

if disc > 0:
    root1 = (-b + math.sqrt(disc)) / (2*a)
    root2 = (-b - math.sqrt(disc)) / (2*a)
    print("The roots of quadratic equation
          are ", root1, "and", root2)

elif disc == 0:
    root = -b / (2*a)
    print(root)

else:
    real_num = -b/(2*a)
    img_num = math.sqrt(abs(disc)) / (2*a)
    root1 = complex(real_num, img_num)
    root2 = complex(real_num, img_num)
    print("The complex roots of the quadratic
      equation are", root1, "and", root2)
```

Q. 10 Write a python program to check if a number is positive, negative or zero.

Ans

```
num = float(input("Enter a number :"))
if num < 0:
    print(num, "is negative number")
elif num == 0:
    print(num, "is zero number")
else:
    print(num, "is positive number")
```

Q. 11 Write a python program to check if a number is odd or even.

Ans

```
num = int(input("Enter a number :"))
if num % 2 == 0:
    print(num, "is even number")
else:
    print(num, "is odd number")
```

Q. 12 Write a python program to check leap year

Ans

```
year = int(input("Enter a year:"))
if (year % 4 == 0 and year % 200 != 0) or
    (year % 400 == 0):
    print(year, "is a leap year")
else:
    print(year, "is not a leap year")
```

Q.13 Write a python program to find the largest among three numbers.

Ans

```
num1 = int(input("Enter first number : "))
num2 = int(input("Enter second number : "))
num3 = int(input("Enter third number : "))

if num1 > num2 and num1 > num3:
    print(num1, " is greater or largest")
elif num2 > num1 and num2 > num3:
    print(num2, " is greater or largest")
else:
    print(num3, " is greater or largest")
```

Q.14 Write a python program to check prime number

Ans

```
num = int(input("Enter a number : "))

if num > 1:
    for i in range(2, int(num ** 0.5) + 1):
        if (num % i) == 0:
            print(num, "is not a prime number")
            break
        else:
            print(num, "is a prime number")
else:
    print(num, "is not a prime number")
```

Q. 15 Write a program on complex number

Ans

```
real1 = float(input("Enter real number : "))
img1 = float(input("Enter imaginary number : "))
complex1 = complex(real1, img1)

real2 = float(input("Enter real number : "))
img2 = float(input("Enter imaginary number : "))
complex2 = complex(real2, img2)

sum = complex1 + complex2
difference = complex1 - complex2
product = complex1 * complex2
quotient = complex1 / complex2

print(sum)
print(difference)
print(product)
print(quotient)
```