THE UNIVERSITY OF DODOMA

THE COLLEGE OF INFORMATICS AND VIRTUAL EDUCATION

DEPARTMENT OF COMPUTER SCIENCES AND ENGINEERING

LAB ASSIGMENT 1

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VARIABLES AND DATA TYPES

Q1: Write a Python program to declare variables of different data types (integer, float, string, Boolean) and print their types using the type() function.

Answer:

program1.py > ...

```python

# declaration of variable
YEAR_OF_STUDY = 3
GPA = 4.9
NAME = "Ali Juma"
IS_TANZANIAN = True
# Output type  of each variable
print(f"year_of_study is of type {type(YEAR_OF_STUDY)}")
print(f"gpa is of type {type(GPA)}")
print(f"name is of type {type(NAME)}")
print(f"is_tanzanian is of type {type(IS_TANZANIAN)}")


# Program developed by : Group 9 members

```

```
[Running] python -u "/home/crypte/Desktop/Python Programming /program1.py"
year_of_study is of type <class 'int'>
gpa is of type <class 'float'>
name is of type <class 'str'>
is_tanzanian is of type <class 'bool'>

[Done] exited with code=0 in 0.055 seconds
```

Q2: Create a program that takes the name, age, and height of a person as input and then displays a message like: "Hello, [name]! You are [age] years old and [height] meters tall."

Answer:

```python
# variable and data type
name = input("Enter your name: ")
age = int(input("Enter your age: "))
height = float(input("Enter your height: "))
print(f"Hello,{name} ! You are {age} years old and {height} meters tall.")

#Program developed by : Group 9 members
```

Output of the program

```
(base) ┌──(crypte㉿Knight)-[~/Desktop/Python Programming ]
└─$ python3 program2.py
Enter your name: Suleiman
Enter your age: 23
Enter your height: 96
Hello,Suleiman  ! You are 23 years old and 96.0 meters tall.

(base) ┌──(crypte㉿Knight)-[~/Desktop/Python Programming ]
└─$
```

Q3: Write a program that swaps the values of two variables without using a third variable. (Hint: Use Python's multiple assignment feature).

Answer:

```python
# program that swap two variable without using third variable
number1 = int(input("Enter first number: "))
number2 = int(input("Enter second number: "))
# output before swapping
print(f"Before swapping: number1 = {number1} and number2 = {number2}")
# swapping
number1, number2 = number2, number1
# output after swapping
print(f"After swapping: number1 = {number1} and number2 = {number2}")

# Program developed by : Group 9 members
```

Output of the program

```
(base) ┌──(crypte㉿Knight)-[~/Desktop/Python Programming ]
└─$ python3 program3.py
Enter first number: 88
Enter second number: 33
Before swapping: number1 = 88 and number2 = 33
After swapping: number1 = 33 and number2 = 88

(base) ┌──(crypte㉿Knight)-[~/Desktop/Python Programming ]
└─$
```

OPERATORS IN PYTHON

Q4: Write a program that reads two integers and performs the following arithmetic operations: addition, subtraction, multiplication, division, modulus, and exponentiation.

Answer:

program4.py > ...

```python
# program perform arithmetic operations between two numbers
value1 = int(input("Enter first number: "))
value2 = int(input("Enter second number: "))
# addition
addition = value1 + value2
# subtraction
subtraction = value1 - value2
# multiplication
multiplication = value1 * value2
# division
division = value1 / value2
# modulus
modulus = value1 % value2
# Exponentiation
exponentiation = value1 ** value2
# output of arithmetic operations
print(f"Addition: {value1} + {value2} = {addition}")
print(f"Subtraction: {value1} - {value2} = {subtraction}")
print(f"Multiplication: {value1} * {value2} = {multiplication}")
print(f"Division: {value1} / {value2} = {division}")
print(f"Modulus: {value1} % {value2} = {modulus}")
print(f"Exponentiation: {value1} ** {value2} = {exponentiation}")

# Program developed by : Group 9 members
```

Output of the program

```
(base) ┌──(crypte㉿Knight)-[~/Desktop/Python Programming ]
└─$ python3 program4.py
Enter first number: 12
Enter second number: 3
Addition: 12 + 3 = 15
Subtraction: 12 - 3 = 9
Multiplication: 12 * 3 = 36
Division: 12 / 3 = 4.0
Modulus: 12 % 3 = 0
Exponentiation: 12 ** 3 = 1728

(base) ┌──(crypte㉿Knight)-[~/Desktop/Python Programming ]
└─$
```

Q5: Demonstrate the use of assignment operators (+=, -=, *=, /=, etc.) in a Python program.

Answer:

program5.py > ...

```python
# Demonstration of the use of assignment operators
num1 = 24
num2 = 5

# Addition
num1 += num2
print(f"Addition: {num1}")

# Subtraction
num1 -= num2
print(f"Subtraction: {num1}")

# Multiplication
num1 *= num2
print(f"Multiplication: {num1}")

# Division
num1 /= num2
print(f"Division: {num1}")
```

```
20
21  # Modulus
22  num1 %= num2
23  print(f"Modulus: {num1}")
24
25  # Exponentiation
26  num1 **= num2
27  print(f"Exponentiation: {num1}")
28
29  # Floor division
30  num1 //= num2
31  print(f"Floor division: {num1}")
32
33  # Program developed by: Group 9 members
34
```

Output of the program

```
[Running] python -u "/home/crypte/Desktop/Python Programming /program5.py"
Addition: 29
Subtraction: 24
Multiplication: 120
Division: 24.0
Modulus: 4.0
Exponentiation: 1024.0
Floor division: 204.0

[Done] exited with code=0 in 0.059 seconds
```

Q6: Write a program that calculates the area of a rectangle using the formula: area = length * breadth, and display the result. Use assignment operators to modify the values of length and breadth.

Answer:

```python
# Program to calculate the area of a rectangle

# Initial values
length = 5
breadth = 3

# Modify values using assignment operators
length += 2  # length is now 7
breadth *= 2  # breadth is now 6

# Calculate area
area = length * breadth

# Display the result
print("The area of the rectangle is:", area)

# program developed by : Group 9 members
```

Output of the program

```
(base) ┌──(crypte㉿Knight)-[~/Desktop/Python Programming ]
└─$ python3 program6.py
The area of the rectangle is: 42

(base) ┌──(crypte㉿Knight)-[~/Desktop/Python Programming ]
└─$
```

Q7: Using logical and comparison operators, write a program that checks whether a given number is within a specific range (e.g., between 10 and 50).

Answer:

program7.py > ...

```python
# Program to check if a given number is within a specific range (e.g., between 10 and 50)

def is_within_range(num, low_bound, up_bound):
    return low_bound <= num <= up_bound


# Sample data to test the function
number = 25
lower_bound = 10
upper_bound = 50

if is_within_range(number, lower_bound, upper_bound):
    print(f"{number} is within the range of {lower_bound} and {upper_bound}.")
else:
    print(f"{number} is not within the range of {
        lower_bound} and {upper_bound}.")

# program developed by: Group 9 members

```

Output of the program

```
[Running] python -u "/home/crypte/Desktop/Python Programming /program7.py"
25 is within the range of 10 and 50.

[Done] exited with code=0 in 0.073 seconds
```