**Assignment - 1: Python Basics**

**Instructions:**

1. Complete the following tasks based on the concepts covered in the "Python Basics" session. Write your Python code using Google Colab Notebook to solve the problems.

2. Ensure that your code is well-commented, and variable names are descriptive.

3. If any task requires output, print the result to the console.

4. Submit the completed Notebook as .ipynb file.

**Task 1:** Variables and Data Types

a) Create three variables: one for storing your age (integer), one for your name (string), and one to check if you are a student (Boolean). Print the variables.

b) Perform the following operations and print the results:

- Add 25 to your age variable.

- Concatenate your name with the string "Smith."

- Negate the Boolean variable (if True, make it False, and vice versa).

**Task 2:** Expressions and Operators

a) A rectangle has a width of 5.5 units and a height of 3.25 units. Store width and height in variables. Create a new variable called area and write an expression to calculate the area. Print the area in the output.

b) Take temperature input from user in Celsius. Convert it to Fahrenheit using the formula:

F = (C \* 9/5) + 32

Store this temperature in a variable called Fahrenheit and print this variable.

c)Take radius of the circle as input from user. Calculate the area of a circle with this radius and store it in a variable called area. Print area at the end of your code.

(Use the formula: area = π \* radius^2, where π (pi) is approximately 3.14159).

**Task 3:** List Manipulation

a) Create a list called "fruits" containing the following fruits: "apple", "banana", "cherry", "date", "strawberry", "fig", and "grape". Print the list.

1. Remove the first and last elements from the "fruits" list. Print the updated list.

2. Replace the second to fourth items with ["kiwi", "lemon", "mango"] using list slicing.

3. Use the len() function to find how many fruits are in the list.

**Task 4:** Dictionary Operations

a) Create a dictionary named "capitals" with three key-value pairs: "USA" - "Washington D.C.," "France" - "Paris," and "Japan" - "Tokyo." Print the dictionary.

b) Add a new country and its capital to the "capitals" dictionary. The country is "Germany," and the capital is "Berlin." Print the updated dictionary.

c) Check if "France" exists in the "capitals" dictionary. If it does, print "France is in the dictionary," otherwise, print "France is not in the dictionary."

**Task 5:** Comparison Operators, Logical Operators and If/Else:

a) Create a variable called number that takes user input. Write a block of code that checks if the number is positive or negative. If the number is positive only then further check if it is even or odd.

Your output should print “The number is even”, or the “The number is odd”.

b) Create two variables called age and GPA. Give them values of your choice. Next, write a block of code to check if a student with this age and GPA is eligible for admission. The following are the conditions:

- The student must be at least 18 years old.

- The student's GPA must be 3.0 or higher on a scale of 4.0.

Your output should print “Eligible for admission” or “Not eligible for admission”.

**Task 6:** Strings Manipulation

a) Create a string variable containing the following sentence:

"Python programming is fun and powerful!"

Write Python code to do the following and print the results:

1. Find the length of the string.

2. Convert the string to uppercase.

3. Replace "fun" with "exciting."

4. Check if the string contains the word "Python."

6. Extract the last word "powerful!"

5. Remove the word programming from the sentence and print the rest of the sentence.

b) Given the string email = "user@example.com", perform the following:

* Extract the username part (everything before the "@" symbol).
* Extract the domain part (everything after the "@" symbol).
* Check if the email contains the substring "example".