DSA Lab 1: Python Introduction

Notes

- Two methods of comments in Python. Inline comments start with `#`. Multi line comments are within `"""`.
- You can add elements to the list using the '+' operator or `list_name.append(<var>)`, where `list_name` is the name of the list.
- len() function

```
print(len(list_name))
```

- Logical Blocks:
  - A block of code is a sequence of instructions that belong together. It is defined by consistent indentation.
  - Python uses indentation to signify which statements belong to the same block of code (e.g., inside a function, loop, or conditional statement).
  - Exiting a block is done by reducing the level of indentation.

```
for i in range(5):
    if i%2==0 :
        print("Even")
    else
        print("Odd")
```

- Understand when and how to indent in Python and when to exit indentation. Proper indentation is critical in Python because it determines the structure and flow of the code. Unlike other languages that use braces or keywords to define code blocks, Python relies entirely on indentation.
  - Correct indentation

```
0
  if True:
1
      print("This␣is␣inside␣the␣block")
2
      print("Still␣inside␣the␣block")
3
  print("This␣is␣outside␣the␣block")
4
```

  - Incorrect indentation will throw an error

```
0
  if True:
1
  print("This␣line␣is␣incorrectly␣indented")
2
```

- Lexical Blocks:
  - A lexical block defines a domain of an environment, and the variables defined here are accessible only inside this block. Functions could lead to creation of lexical blocks.
  - Top-Level Lexical Block manages global variables and serves as the root scope for the program.
  - function level lexical block refers to the namespaces created from functions.

```
0
  def bar():
1
      y = 5 # Function-level lexical block
2
      print(y)
3
  bar()
```

```
4
  # print(y) # Raises NameError
5
```

The above example would raise a NameError because y is not defined in the global scope.

```
0
  x = 42 # Top-level lexical block
1
  def foo():
2
      print(x) # x is accessible here (global scope).
3
  foo()
4
```

Problems

Perform the following tasks, add a picture of the output onto a separate Google Doc, and submit the same on Moodle. Feel free to discuss and use resources from the internet.

1. Print the words "Hello World!!!".
2. Use three variables to store the age, name, and roll number. Assign your own details to these variables and print the same.
3. Now try taking an input with a prompt saying "Name: ". Store this and print the line "Hi X" where X was the name received as input.
4. Automatic unpacking present in Python.

```
0
  x, y, z = "Orange", "Banana", "Cherry"
1
  print(x)
2
  print(y)
3
  print(z)
4
```

6. Variables:

```
x = 5, y = 7

print(x + y)

s = "abc"

print("abcde" + "fghij")

```

7. Lists : Take an input N and create a list of the first N integers.
8. Write a python program to find a factorial of number N.
9. Write a python program to print the first N fibonnaci numbers using while loops.
10. Given List A and B of the same length, write a python program to find the dot product of them.
11. Given two matrices A and B of size $N \times M$ and $M \times K$ respectively, write a python program to find matrix multiplication of $A \times B$. Use the function created in the previous problem.