**Python Lab Manual**

**B.Tech - CSE**

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# **Lab 1:** Understanding Jupyter IDE for creating and executing a Python program

***Learning Outcome CO1*:** *Student will be able to get the Python environment up and running and the basics of Python programming language*

***Blooms Taxonomy Level****: BT1, BT2*

1. Introducing the Python language, Understanding the Python shell.
2. Development environment setup, Configuring – Installation of Anaconda IDE.
3. Introduction to jupyter notebook.
4. Working with jupyter notebook.
5. Writing a simple program.

# **Lab-2:** Programming constructs in python -hands-on practice

***Learning Outcome:*** *Student will be able to understand the basics of Python programming language*

***Blooms Taxonomy Level****: BT2*, *BT3*

1. [Check whether a number is even or odd](https://www.programiz.com/python-programming/examples/prime-number)
2. [Check whether an entered year is leap year or not.](https://www.programiz.com/python-programming/examples/prime-number)
3. Write a program to check whether a character is vowel or consonants.
4. Write a program to find the smallest of two numbers.
5. [Find the Factorial of a Number](https://www.programiz.com/python-programming/examples/factorial)
6. Write a program to print this patterns

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1. Write a program to print this series

1 1 2 3 5 8 13

1. [Check whether a number is prime or not](https://www.programiz.com/python-programming/examples/prime-number)
2. [Make a Simple Calculator](https://www.programiz.com/python-programming/examples/calculator).

# **Lab-3:** Strings and list- hands-on practice

***Learning Outcome*:** *Student will be able to implement String Operations.*

***Blooms Taxonomy Level****: BT1, BT2*, *BT3*

1. Write a Python program to demonstrate while loop with else statement.
2. Write a Python program to print 1st 5 even numbers (use break statement).
3. Write a Python program to print 1st 4 even numbers (use continue statement).
4. Write a Python program to demonstrate Pass statements.
5. Write a Python program to calculate the length of a string.
6. Write a Python program to count the number of characters (character frequency) in a string
7. Write a Python program to get a string made of the first 2 and the last 2 chars from a given a string. If the string length is less than 2, return instead of the empty string.
8. Write a Python program to get a string from a given string where all occurrences of its first char have been changed to '$', except the first char itself
9. Write a Python program to get a single string from two given strings, separated by a space and swap the first two characters of each string.
10. Write a Python program to add 'ing' at the end of a given string (length should be at least 3). If the given string already ends with 'ing' then add 'ly' instead. If the string length of the given string is less than 3, leave it unchanged

# **Lab 4:** Operation on Tuples and List: hands-on practice

***Learning Outcome*:** *Student will be able to implement Tuple*

***Blooms Taxonomy Level****: BT1, BT2,BT3*

**1.** Write a Python program to create a tuple.

**2.** Write a Python program to create a tuple with different data types.

**3.** Write a Python program to create a tuple with numbers and print one item.

**4.** Write a Python program to unpack a tuple in several variables.

**5.** Write a Python program to add an item in a tuple.

**6.** Write a Python program to convert a tuple to a string.

**7.** Write a Python program to get the 4th element and 4th element from last of a tuple

**8.** Write a Python program to create the colon of a tuple.

**9.** Write a Python program to find the repeated items of a tuple.

**10.** Write a Python program to check whether an element exists within a tuple.

**11.** Write a Python program to convert a list to a tuple.

**12.** Write a Python program to remove an item from a tuple.

**13.** Write a Python program to slice a tuple

**14.** Write a Python program to find the index of an item of a tuple.

**15.** Write a Python program to find the length of a tuple.

**16**. Write a Python program to reverse a tuple.

# **Lab 5:** Operation on List: hands-on practice

***Learning Outcome*:** *Student will be able to implement List:*

***Blooms Taxonomy Level****: BT1, BT2,BT3*

**1.** Write a Python program to sum all the items in a list.

**2.** Write a Python program to multiplies all the items in a list. 

**3.** Write a Python program to get the largest number from a list

**4.** Write a Python program to get the smallest number from list.

**5.** Write a Python program to count the number of strings where the string length is 2 or more and the first and last character are same from a given list of strings   
Sample List : ['abc', 'xyz', 'aba', '1221']. Expected Result : 2

**6.** Write a Python program to get a list, sorted in increasing order by the last element in each tuple from a given list of non-empty tuples.    
Sample List : [(2, 5), (1, 2), (4, 4), (2, 3), (2, 1)]

Expected Result : [(2, 1), (1, 2), (2, 3), (4, 4), (2, 5)]

**7.**Write a Python program to remove duplicates from a list.

**8.**Write a Python program to check a list is empty or not.

**9.**Write a Python program to clone or copy a list.

**10.**Write a Python program to find the list of words that are longer than n from a given list of words.

**11.**Write a Python function that takes two lists and returns True if they have at least one common member.

**12.**Write a Python program to print a specified list after removing the 0th, 4th and 5th elements.    
Sample List : ['Red', 'Green', 'White', 'Black', 'Pink', 'Yellow']  
Expected Output : ['Green', 'White', 'Black']

# **Lab 6:** Operation on dictionary and sets: hands-on practice

***Learning Outcome CO1*:** *Student will be able to implement concepts of Dictionary & Sets in Python*

***Blooms Taxonomy Level****: BT1, BT2*, *BT3*

***Dictionary***

1. Create an empty dictionary
2. Create the following dictionary
   1. Key value
   2. A 10
   3. B 20
3. Create a dictionary with different datatypes for keys
4. Print all the items of a dictionary
5. Delete an element of a dictionary
6. Delete full dictionary
7. Print a value for a key
8. To check if a key id present in a dictionary
9. Update a value of a key
10. Add a new key value pair
11. Print dictionary for keys{1,10} and values as square of keys
12. Print nested dictionary
13. Concatenate three dictionaries

Sample Dictionary :  
dic1={1:10, 2:20}  
dic2={3:30, 4:40}  
dic3={5:50,6:60}  
Expected Result : {1: 10, 2: 20, 3: 30, 4: 40, 5: 50, 6: 60}

1. Sum all the values of a dictionary
2. Accessing an element of a nested dictionary
3. Write a Python script to print a dictionary where the keys are numbers between 1 and 15 (both included) and the values are square of keys.

Sample Dictionary  
{1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64, 9: 81, 10: 100, 11: 121, 12: 144, 13: 169, 14: 196, 15: 225}

1. Insert factorial of keys in values. And print dictionary

***Sets***

1. Write a program to create a set
2. Write a program to add an element to set
3. Write a program to add multiple items using update function
4. Write a program to find length of a set
5. Write a program to remove value from a set
6. Write a program to pop an element from a set
7. Write a program to update a set
8. Write a Python program to create an intersection of sets.
9. Write a Python program to create a union of sets.
10. Write a Python program to clear a set.
11. Write a Python program to issubset and issuperset.
12. Write a Python program to create set difference.
13. Write a Python program to create a symmetric difference.

# **Lab-7:** Function- Pass by reference: hands-on practice

***Learning Outcome CO*:** *Student will be able to implement Functions*

***Blooms Taxonomy Level****: BT1,BT3*

1. Write a program to multiply two numbers using functions.
2. Write a program to add two numbers using functions.
3. Calculate factorial of a number using function.
4. Create sequence of Fibonacci using function.
5. Write a program to swapping of two numbers using functions.
6. Write a function to find the HCF of some given numbers.
7. Write a function to find the ASCII value of the character.
8. Write a program that demonstrates the (built in function) mathematical functions.
9. Write a program that demonstrates the (built in function) Date & Time functions.
10. Write a program that demonstrates Required arguments.
11. Write a program that demonstrates keyword arguments.
12. Write a program that demonstrates Default arguments.
13. Write a program that demonstrates Variable –length arguments.

# **Lab-8:** UML, Object-Oriented Programming

***Learning Outcome*:** *Student will be able to implement concepts of OOPS.*

***Blooms Taxonomy Level****: BT1, BT2*, *BT3*

**1.** Write a Python program that create a class tringle and define two methods, create\_triangle() and print\_sides().

**2.** Write a Python program to create a class with two methods get\_String() and print\_String().

**3.** Write a Python program to create a class Rectangle that takes the parameter length and width. The class should also contain a method for computing its perimeter.

**4.**  Write a Python program to create a class Circle that takes the parameter radius. The class should also contain two methods for computing its area & perimeter respectively. Use constructor to implement initialization of parameters

**5.**Create a Circle class and initialize it with radius. Make two methods getArea and getCircumference inside this class.

**6.** Create a Temperature class. Make two methods:

1. convertFahrenheit - It will take Celsius and will print it into Fahrenheit.
2. convertCelsius - It will take Fahrenheit and will convert it into Celsius.

**7.** Create a Student class and initialize it with name and roll number. Make methods to:  
1. Display - It should display all information’s of the student.  
2. setAge - It should assign age to student  
3. setMarks - It should assign marks to the student.

**8.** Write a Python class to reverse a string word by word.

# **Lab-9:** Class inheritance & Method overriding hands-on practice

***Learning Outcome*:** *Student will be able to implement concepts of inheritance, polymorphism.*

***Blooms Taxonomy Level****: BT1, BT2*, *BT3*

1. Write a Python program that has a class Animal with a method legs(). Create two subclasses Tiger and Dog, access the method leg explicitly with class Dog and implicitly with the class Tiger.
2. Write a Python program to create a class Employee. Define two subclasses: Engineer and Manager. Every class should have method named printDesignation() that prints Engineer for Engineer class and Manager for Manager Class.
3. Write a Python program to demonstrate classes and their attributes.
4. Write a Python program to demonstrate Inheritance and method overriding.
5. Write a Python program to demonstrate multiple Inheritance.

# **Lab-10:** Series and Data-Frames: hands-on practice

***Learning Outcome*:** *Student will be able to implement concepts of datatypes used for handling analytics.*

***Blooms Taxonomy Level****: BT1, BT2*, *BT3*

1. Create the following:
   1. empty series
   2. series from an array
   3. series from dictionary
   4. scalar series
2. Create indexed series for above b-d points
3. Retrieve elements from the series using
   1. Index names
   2. Index numbers
   3. Slicing
4. Create a DataFrame using the following:
   1. Empty DataFrame
   2. DataFrame using list
   3. DataFrame using dictionary
   4. DataFrame using series
5. Create 3-4 four colums in a DataFrame for Q4 b-d points
6. Add index to all the rows in Q5
7. Display all the values from the DataFrame mentioned in Q6 using index and index name for :
   1. Second row values
   2. Second column values
8. Perform slicing by displaying 3rd and 4th row on the DataFrame
9. Delete a row
10. Delete a column