R. N. G. PATEL INSTITUTE OF TECHNOLOGY (RNGPIT)

ISROLI-AFWA BARDOLI

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

YEAR- IV SEMESTER – VIII

2180711- PYTHON PROGRAMMING

TERM- 202

LABORATORY MANUAL

Vision

To create a holistic teaching -learning ecosystem with a vision to prepare globally competent computer professionals for the development of society and the nation.

Mission

M1: To ensure effective and efficient teaching learning process for sound fundamentals.

M2: To impart technical skill through effective hands on practice on advanced technologies and Value education.

M3: To prepare industry ready professionals by industry partnerships and entrepreneurs activities.

M4: To inculcate human values, research capabilities, leadership abilities and ethics in young minds.

Program Educational Objectives

PEO1: The graduates will be able to interact with their peers in industries and society as an engineering professionals, entrepreneurs and leaders to set up technical ambience in the society

PEO2 The graduates will be able to reveal professionalism, ethical attitude, strong communication skills and maintain good team work spirit in their profession.

PEO3 The graduate will be able to utilize their skills with strong foundation to prepare them for higher learning and research activity.

PEO4: The graduate will be able to build up an ability to analyse the requirements, comprehend professional specifications, design and provide engineering

PROGRAM OUTCOMES

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life- long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

COURSE OUTCOMES

1. To develop proficiency in creating based applications using the Python Programming Language.
2. To be able to understand the various data structures available in Python programming language and Apply them in solving computational problems.
3. To be able to do testing and debugging of code written in Python.
4. To be able to draw various kinds of plots using PyLab.
5. To be able to do text filtering with regular expressions in Python
6. To be able to create socket applications in Python
7. To be able to create GUI applications in Python

LIST OF EXPERIMENTS

1. Develop programs to understand the control structures of python
2. Develop programs to learn different types of structures (list, dictionary, tuples) in python
3. Develop programs to learn concept of functions scoping, recursion and list mutability.
4. Develop programs to understand working of exception handling and assertions.
5. Develop programs for data structure algorithms using python – searching, sorting and hash tables.
6. Develop programs to learn regular expressions using python.
7. Develop chat room application using multithreading.
8. Learn to plot different types of graphs using PyPlot.
9. Implement classical ciphers using python.
10. Draw graphics using Turtle.
11. Develop programs to learn GUI programming using Tkinter.

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PEN:

NAME:

SUBJECT: Python Programming (2180711)

SR. NO.	DATE	TITLE	PG NO.	GRADE	SIGNATURE
1		Develop programs to understand the control structures of python			
2		Develop programs to learn different types of structures (list, dictionary, tuples) in python			
3		Develop programs to learn concept of functions scoping, recursion and list mutability			
4		Develop programs to understand working of exception handling and assertions			
5		Develop programs for data structure algorithms using python – searching, sorting and hash tables.			
6		Develop programs to learn regular expressions using python			
7		Develop chat room application using multithreading.			
8		Learn to plot different types of graphs using PyPlot.			
9		Implement classical ciphers using python.			
10		Draw graphics using Turtle			
11		Develop programs to learn GUI programming using Tkinter			

SR. No.	Practical List	CO
1.	**Develop Programs To Understand The Control Structures, Branching Programs , Strings and Input Of Python and functions**	**CO1**
	1.1 Write a Python Program to find those numbers which are divisible by 7 and multiple of 5, between 1500 and 2700.	
	1.2 Write a Python program to construct the following pattern, using nested for loop. *	
	1.3 Write a Python program that accepts a word from user and reverse it (without using the reverse function)	
	1.4 Write a Python program to check whether an alphabet is a vowel or consonant.	
	1.5 Write a Python program to find reverse of given number using user defined function.	
	1.6 Write a Python program to check whether the given no is Armstrong or not using user defined function.	
	1.7 To write a Python program to find first n prime numbers.	
	1.8 Write a Python program to print Fibonacci series upto n terms.	
	1.9 Give the output of following Python code:	
	a) myStr = 'GTU is the best University' print myStr [15 : : 1] print myStr [-10 : -1 : 2]	b) t = (1, 2, 3, (4,), [5, 6]) print t[3] t[4][0] = 7 print t
	c) I=[(x, y) for x in [1,2,3] for y in [3,1,4] if x != y]	d) str1 = 'This is Pyhton' print "Slice of String : ", str1[1 : 4 : 1]

	print I	print "Slice of String : ", str1[0 : -1 : 2]	
2.	**Develop programs to learn different types of structures (list, dictionary, tuples) in python**		**CO3**
	2.1 To write a Python Program to find the maximum from a list of numbers.		
	2.2 Write a Python program which will return the sum of the numbers in the array, returning 0 for an empty array. Except the number 13 is very unlucky, so it does not count and number that come immediately after 13 also do not count. Example : [1, 2, 3, 4] = 10 [1, 2, 3, 4, 13] = 10 [13, 1, 2, 3, 13] = 5		
	2.2 Write a Python program which takes a list and returns a list with the elements "shifted left by one position" so [1, 2, 3] yields [2, 3, 1]. Example: [1, 2, 3] → [2, 3, 1] [11, 12, 13] → [12, 13, 11]		
	2.3 Write a program to convert a list of characters into a string		
	2.4 Write a Python program 1) To generate a list except for the first 5 elements, where the values are square of numbers between 1 and 30(both included) 2) To generate a list of first and last 5 elements where the values are square of numbers btween 1 and 30.		
	2.5 Write a python program to print numbers given in the list after removing even numbers from it.		
	2.6 Write a program to count the numbers of characters in the string and store them in a dictionary data structure.		
	2.7 Write a program to use split and join methods in the string and trace a birthday with a dictionary data structure.		
	2.8Write a python program to sort a dictionary by value		
3	**Develop programs to learn concept of functions scoping, recursion, list mutability, and files**		**CO2, CO3**
	3.1 Create a Python program to read a text file and do following: I. Print no. of lines II. Print no. of unique words III. Store each word with its occurrence in dictionary		
	3.2 Write a Python program to read a text file and do following: 1. Print no. of words 2. Print no. statements		3.3
	3.4 Write a python program to append data to an existing file 'python.py'. Read data to be appended from the user. Then display the contents of entire file.		3.5

	3.6 Write a python program to retrieve name and date of birth (mm-dd-yyyy) of students from a given file student.txt	3.7
	3.8 Write a python program to know the current working directory and to print all contents of the current directory. What changes we need to make in the program if we wish to display the contents of only 'mysub' directory available in current directory?	3.9
4	**Develop programs to understand working of exception handling and assertions, Classes and Object-Oriented Programming**	**CO4, CO5**
	4.1 Write a python program which will throw an exception for divisible by zero.	
	4.2 Write a python program which will throw an exception if any I/O related errors using files.	
	4.3 Write a python program which will throw an exception for valueError.	
	4.4 Write a python program which will throw user defined Exception if the number is not in the range 1 to 10.	
	4.5 Write a python program which will throw an exception if the value entered by user is less than zero.	
	4.6 Write a Python program to implement the concept of inheritance.	
	4.7 Create a class Employee with data members: name, department and salary. Create suitable methods for reading and printing employee information.	
	4.8 Write a Python program to overload + operator.	
	4.9 Write a Python program that counts the number of occurrences of the character in the given string. Provide two implementations: recursive and iterative	
	4.9 Write a python program in which Maruti and Santro sub classes implement the abstract methods of the super class Car.	
	4.10 Create a class student with following member attributes: roll no, name, age and total marks. Create suitable methods for reading and printing member variables. Write a python program to overload '==' operator to print the details of students having same marks.	
	4.11 Write a Python program to create class GTU with attributes like class variable cnt, instance variables x and y, instance methods get_value and print_value.	
5	**Develop programs for data structure algorithms using python – searching, sorting and hash tables.**	**CO6**
	5.1 Write a Python program to search a specific value from a given list of values using binary search method.	
	5.2 Write a python program to arrange the characters of a given string 'welcome' in an alphabetical order using insertion sort algorithm.	

<table>
<tr><td></td><td>5.3 To write a Python Program to perform Selection sort.</td><td></td></tr>
<tr><td></td><td>5.4 To write a Python Program to perform Merge sort.</td><td></td></tr>
<tr><td></td><td>5.5 To write a Python Program to perform bubble sort.</td><td></td></tr>
<tr><td>6</td><td>Develop programs to learn regular expressions using python</td><td>CO7</td></tr>
<tr><td></td><td>6.1 Write a python program to retrieve strings starting with m and having 5 characters.</td><td></td></tr>
<tr><td></td><td>6.2Write a Python program to check that a string contains only a certain set of characters (in this case a-z, A-Z and 0-9).</td><td></td></tr>
<tr><td></td><td>6.3 Write a Python program to match a string that contains only upper and lowercase letters, numbers, and underscores using Regular Expression</td><td></td></tr>
<tr><td></td><td>6.4 Write a Python program to find the substrings within a string using Regular Expression</td><td></td></tr>
<tr><td></td><td>6.5 Write a Python program to Validate an Email Address Using Python</td><td></td></tr>
<tr><td>7</td><td>Develop chat room application using multithreading.</td><td>CO7</td></tr>
<tr><td></td><td>7.1 Write a python program to create a TCP/IP client-server chat application.</td><td></td></tr>
<tr><td></td><td>7.2 Write a python program to create a TCP/IP client-server chat application using multi threading.</td><td></td></tr>
<tr><td></td><td>7.3 Write a Program to Transfer files using Client-server Application</td><td></td></tr>
<tr><td>8</td><td>Learn to plot different types of graphs using PyPlot.</td><td>CO7</td></tr>
<tr><td></td><td>8.1 Write a Python program to plot following Equation using PyPlot
Y= 5*x + 1</td><td></td></tr>
<tr><td></td><td>8.2 Write a Python Program to plot sin and cosine wave in the same figure using subplot()</td><td></td></tr>
<tr><td></td><td>8.3 In a recent test, this many students got these grades:
<table>
<tr><td>Grade:</td><td>AA</td><td>BB</td><td>CC</td><td>DD</td></tr>
<tr><td>Students:</td><td>4</td><td>12</td><td>10</td><td>2</td></tr>
</table>
Draw the bar graph and pie chart using Pyplot</td><td></td></tr>
<tr><td>9</td><td>Implement classical ciphers using python.</td><td>CO8</td></tr>
<tr><td></td><td>9.1 Write a python program to implement ceaser cipher</td><td></td></tr>
<tr><td></td><td>9.2 Write a python program to implement brute force attack</td><td></td></tr>
<tr><td></td><td>9.3 Write a python program to implement reverse ceaser cipher</td><td></td></tr>
<tr><td></td><td>9.4 Write a python program to implement Transposition cipher</td><td></td></tr>
<tr><td></td><td>9.5 Write a python program to implement Block cipher(SHA1, MD5)</td><td></td></tr>
<tr><td></td><td>9.6 Write a python program to implement RSA Algorithm</td><td></td></tr>
<tr><td>10</td><td>Draw graphics using Turtle</td><td>CO8</td></tr>
<tr><td></td><td>10.1 Create following regular polygons (regular means all sides the same lengths, all angles the same) using for loop in turtle
• An equilateral triangle • A square • A hexagon • An octagon</td><td></td></tr>
<tr><td></td><td>10.2 Draw Counter clock wise circle using iterations</td><td></td></tr>
</table>

	10.3 Draw circle and triangle shapes using Turtle and fill them with red color	
	10.4 Write a program to draw star using Turtle Programming	
	10.5 Python program to draw spiral square Outside In and Inside Out using Turtle Programming	
	10.6 Python program to draw spiral Helix pattern using Turtle Programming	
	10.7 Python program to draw rainbow benzene using Turtle Programming	
11	**Develop programs to learn GUI programming using Tkinter**	**CO8**
	11.1 Explain steps to create widgets. Write Python program to display a label on clicking a push button.	
	11.2 Write Python GUI program to create three push buttons using Tkinter. Background color of a frame should be changed when different buttons are clicked.	