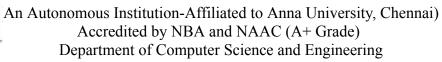
P.S.R. ENGINEERING COLLEGE





231ESF1- Problem Solving and Python Programming

Question Bank

I Semester

2023 -2024(ODD)

Course Outcomes:	
CO1: Develop algorithmic solutions to simple computational problems.	
CO2: Write and execute simple Python programs.	
CO3: Apply conditionals and loop concepts in Python programming.	
CO4: Decompose a Python program into functions.	
CO5: Represent compound data using Python lists, tuples, dictionaries, etc.	
CO6: Read and write data from/to files in Python programs.	

Unit -I

SYLLABUS

Algorithms, building blocks of algorithms (statements, state, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Illustrative problems: find minimum in a list, insert a card in a list of sorted cards, guess an integer number in a range, Towers of Hanoi.

PART – A

Q.No	PART – A Questions	Bloom's Category Level	Course Outcome
1	Point out any 5 programming language	K4	CO1
2	Define an algorithm	K1	CO1
3	Distinguish between pseudo code and flowchart.	K2	CO1
4	Define control flow statement with an eg:	K1	CO1
5	Describe recursion.	K2	CO1
6	Discover the concept of towers of Hanoi.	К3	CO1
7	Explain list	K4	CO1
8	Explain Iteration	K5	CO1
9	Define simple computational problem	K1	CO1
10	Assess problem solving method.	K5	CO1
11	What is meant by sorting? mention its types	K1	CO1
12	Develop algorithm for Celsius to Fahrenheit and vice versa	K6	CO1
13	Define programming language	K1	CO1
14	Identify the function types	K1	CO1
15	Examine a simple program to print the integer number from 1 to 50	K3	CO1
16	Discuss building blocks of algorithm	K2	CO1
17	Discover the steps of simple strategies for developing algorithms.	K3	CO1
18	Differentiate user defined function and predefined function	K6	CO1
19	Analyze the notations used in algorithmic problem solving	K4	CO1
20	Describe some example for recursion function	K2	CO1
	PART-B (16 MARK)		
1	Explain the algorithm GCD and find LCM	K4	CO1
2	Discuss with suitable examples i)Find minimum in a list	K2	CO1

	i)Find Maximum in a list		1		flowcharts and preparing flow chart for quadratic
	i)Summarize advantage		i		equation
	and disadvantage of flow)		-
	chart		,		Describe the algorithm for
3			•		finding sum and average of
	ii)Summarize the symbol used in flow chart		C	3	n numbers.
	used in now chart		0	٦	Also state the properties o
	Describe Build an		Č		a good algorithm
	algorithm for the following		n	4	
	+		t	4 tow	Describe the algorithm of vers of honai problem.
4	(i) Prime number or not		r	igw	reis of nonar problem.
	(ii) odd or even		1		
	(iii) odd of even		О		
5	Explain the rules for		1		
	pseudo code and uses of		F		
	keywords		Г		
	Ex		1		
	pla in		0		
	in the				
	fol		W		
	lo	8	Describe State and	-+	
	wi		function in Building Block		
	ng		and examples.		
	pro	9	Draw a flow chart		
	gra		print all prime	-	
	rh.		print an prime		
	mi 1		number between to		
	ng lan		1	-	
	gu		intervals i).		
	ag		Describe pseudo		
	e		•		
	i).		code for Fibonacci	\rightarrow	
	Ма				
	chi		sequence using		
	ne	10	::> 		:
	lan		ii). Draw a flow chart for		i
	gu		factorial given number (3*3)	-+	i
	ag		,		į
6			i). Describe the program to		į
	il). Assembly language		insert an element in a	-	.
	ı iii). High level language	11	sorted list		!
		11	ii). Draw the flow chart		:
	Neat sketch explain the		sum of n numbers		
	following building blocks				:
	of alg.		i). Summarize the		
7	i		difference between		
)	12	algorithm, flow chart and		
	,	14	pseudo code		
			•		
		1 ^			
	S	13	(i). Explain algorithmic problem solving technique		

t in detail. a 14 Explain program life cycle t What is pseudo code? Explain how it can be e m designed and write 1 e benefits and limitations. n **Explain** guidelines for preparing flowcharts, t benefits and limitation of S 2

K5 CO1

K2

K3

K1

K3

K6

K1 K2

K1

K1 K3

K2 K34 K4

K6

K4

K1 K1

Unit -II

SYLLABUS

Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments; Illustrative programs: exchange the values of two variables, circulate the values of n variables, distance between two points

Q.No	Questions	Bloom's Category Level	Course Outcome
1	Define the two modes in Python.	K1	CO2
2	Give the various data types in Python.	K2	CO2
3	Point Out the rules to be followed for naming any identifier.	K4	CO2
4	Assess a program to assign and access variables.	K5	CO2
5	Compose the importance of indentation in python.	K6	CO2
6	Select and assign how an input operation was done in python.	K5	CO2
7	Demonstrate the various operators in python.	К3	CO2
8	Discover the difference between logical and bitwise operator.	K3	CO2
9	Give the reserved words in Python.	K2	CO2
10	Give the operator precedence in python.	K2	CO2
11	Define the scope and lifetime of a variable in python.	K1	CO2
12	Point out the uses of default arguments in python.	K4	CO2
13	Generalize the uses of python module.	K6	CO2
14	Demonstrate how a function calls another function. Justify your answer.	K3	CO2
15	List the syntax for function call with and without arguments.	K1	CO2
16	Define recursive function.	K1	CO2
17	Define the syntax for passing arguments.	K1	CO2
18	What are the two parts of function definition give the syntax	K1	CO2
19	Point out the difference between recursive and iterative technique.	K1	CO2
20	Give the syntax for variable length arguments.	K2	CO2

	PART-B (16 MARK)		
1	 i) Illustrate a program to display different data types using variables and literal constants. ii) Show how an input and output function is performed in python with an example. 	К3	CO2
2	Explain in detail about the various operators in python with suitable examples.	K4	CO2
3	i) Discuss the difference between tuples and list ii) Discuss the various operation that can be performed on a tuple and Lists (minimum 5) with an example program.	K2	CO2
4	i) How the area of circle is calculated explain with an example. ii) Describe a program to calculate student result based on two examinations, one sports event and three activities conducted. The weightage of the activity = 30%, sports =20%, and examination=50%	K1	CO2
5	Demonstrate the various expressions in python with suitable examples.	К3	CO2
6	 i) What is membership and identity operators. ii) Write a program to perform addition, subtraction, multiplication, integer division, floor division and modulo division on two integer and float. 	K1	CO2
7	 i)Formulate the difference between type casting and type coercion with suitable example ii) Write a a program to print the digit at ones place and hundreds place of a number. iii) Write a program to convert degree Fahrenheit to Celsius 	K6	CO2
8	 i) Discuss the need and importance of function in python. ii) Illustrate a program to exchange the value of two variables with temporary variables 	K2	CO2
9	Briefly discuss in detail about function prototyping in python. With suitable example program	K2	CO2
10	i)Analyze the difference between local and global variables.ii) Explain with an example program to circulate the values of n	K4	CO2

	variables.		
11	 i) Describe in detail about lambda functions or anonymous function. ii) Describe in detail about the rules to be followed while using Lambda function. 	K1	CO2
12	i) Explain with an example program to return the average of its argumentii) Explain the various features of functions in python.	K4	CO2
13	i) Describe the syntax and rules involved in the return statement in python ii) Write a program to demonstrate the flow of control after the return statement in python	K1	CO2
14	i)Analyze with a program to find out the distance between two points using python.ii) Write a program to calculate the simple interest using python.	K4	CO2
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15	Explain how to write and execute a program in python illustrate the steps for writing a python program to check whether the number is palindrome or not.	K4	CO2
16	i)Formulate with an example program to pass the list arguments to a function (ii)Write a program to perform selection sort from a list of numbers using python	K6	CO2
17	Do the Case study and perform the following operation in tuples i) Maxima ii)minima iii)sum of two tuples iv) duplicate a tuple v)slicing operator vi) obtaining a list from a tuple vii) Compare two tuples viii)printing two tuples of different data types	K5	CO2
18	 i) Formulate with an example program to find out all the values in the list that are greater than the specified number. ii) Write a program to find out the square root of two numbers 	K6	CO2

Unit -III SYLLABUS

Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays. Illustrative programs: square root, gcd, exponentiation, sum an array of numbers, linear search, binary search.

Q.No	Questions	Bloom's Category Level	Course Outcome
1	Analyze different ways to manipulate strings in python.	K4	CO3
2	Write the syntax of if and if-else statements.	K1	CO3
3	List out the applications of arrays.	K1	CO4
4	Discuss about continue and pass statements.	K2	CO3
5	What will be the output of print str[2:5] if str='hello world!'?	K1	CO3
6	Give the use of return () statement with a suitable example.	K2	CO3
7	Write a program to iterate a range using continue statement.	K1	CO3
8	Name the type of Boolean operators.	K2	CO3
9	Explain about break statement with an example.	K2	CO3
10	Where does indexing starts in python?	K1	CO3
11	Illustrate the flow chart of if-elif- else statements	K3	CO3
12	Describe various methods used on a string. (Any Four)	K3	CO3
13	What are the advantages and disadvantages of recursion function?	K3	CO4
14	Explain the significance of for loop with else in an example.	K5	CO3
15	Define array with an example.	K1	CO4
16	Differentiate for loop and while loop.	K4	CO3
17	Classify global variable with local variable	K4	CO4
18	Summarize string modules	K5	CO3

19	Justify the effects of slicing operations on an array	K6	CO3
20	How to access the elements of an array using index?	K6	CO3
	PART-B (16 MARK)		
1	(i) Write a python program to find the sum of N natural numbers.(ii) What is the use of pass statement, illustrate with an example.	K1	CO3
2	(i) Define methods in a string with an example program using at least five methods.(ii) How to access characters of a string?	K1	CO3
3	Write a program for binary search using Arrays	K1	CO4
4	What is call by value and call by reference and explain it with suitable Example	K1	CO4
5	(i). Write a python program to find the given number is odd or even (ii). Explain break and continue statement with the help of for loop in an example.	K2	CO3
6	(i). Write a python program to count the number of vowels in a string provided by the user.(ii). Explain the types of function arguments in python	K2	CO3
7	Explain the syntax and flow chart of the following loop statements (i) for loop (ii) while loop	K2	CO4 CO3
8	(i). Illustrate the flow chart and syntax of if-elif- else statements(ii). Develop a program to find the largest among three numbers	K3	CO3
9	(i). Explain recursive function. How do recursive function works? Explain with a help of a program	K3	CO4
10	(i). Create a python program to find the given year is leap or not(ii). Investigate on mutability and immutability in python	K4	CO3
11	(i) Explain the different types of the function prototype with an example (ii). Examine the program on Fibonacci series	K4	CO4
12	(i). Generate a program that uses lambda function to multiply two numbers(ii). Discuss the methods to manipulate the arrays in python	K4	CO4
13	Explain the significance of xrange() function in for loop with a help of a program	K5	CO4
14	(i). Create a program to reverse a string without using recursion(ii). Illustrate the concept of local and global variables	K6	CO4

	PART - C (16 MARK)			
1	Write a python program to design simple calculator performing arithmetic functions like addition, subtraction, multiplication and division with the input given by user	K5	CO3	
2	Create a program for linear search using Arrays	K6	CO3	
3	(i) Illustrate a program to find GCD of m and n.(ii) How to find the square root of a number using newton's method	K5	CO3	
4	(i) Write a python program to sum an array of numbersii) Create a program to print the following pattern		CO3	
	1 1 2 1 1 2 3 2 1 1 2 3 4 3 2 1	K6		

Unit -IV SYLLABUS

Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension; Illustrative programs: selection sort, insertion sort, merge sort, Histogram.

Q.No	Questions	Bloom's Category Level	Course Outcome
1	Define Python list.	K1	CO5
2	What are the list operations?	K1	CO5
3	What are the different ways to create a list?	K1	CO5
4	Illustrate negative indexing in list with an example.	K3	CO5
5	Describe list slicing with examples.	K2	CO5
6	List out the methods that are available with list object in python programming	K1	CO5

7	Show the membership operators used in list.	K3	CO5
8	Define Python tuple.	K1	CO5
9	What are the advantages of tuple over list?	K2	CO5
10	Classify the Python accessing Elements in a tuples.	K3	CO5
11	Point out the methods used in tuples.	K4	CO5
12	How a tuple is iterated? Explain with an example.	K4	CO5
13	Explain how tuples are used as return values?	K5	CO5
14	Define dictionary with an example.	K1	CO5
15	What are the properties of dictionary keys?	K2	CO5
16	Can you use the addition assignment operator, +=, with two lists? What is the result?	K5	CO5
17	Perform the bubble sort on the elements 23,78,45,8,32,56.	K6	CO5
18	Compose an example on insertion sort.	K6	CO5
19	What is the use of all(), any(), cmp() and sorted() in dictionary?	K2	CO5
20	Differentiate between tuples and dictionaries.	K4	CO5
	PART-B (16 MARK)		
1	(i) What is python List ?Describe the List usage with suitable examples(ii) Write a program to illustrate the heterogeneous list.	K1	CO5
2	Describe the following a) Creating the List b) Accessing values in the Lists c) Updating the Lists d) Deleting the list Elements	K1	CO5
3	 (i) Explain the basic List Operations in details with necessary programs (ii) Write a Python program to multiply two Matrices 	K4	CO5
4	 (i) Discuss the Python List Methods with examples (ii) Why it is necessary to have both the functions append and Extend? What is the result of the following expression that uses. Append where it probably intended to use extend? >>> lst = [1, 2, 3] >>> lst.append([4, 5, 6]) 	K2	CO5

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5	(i) Illustrate List Comprehension with suitable examples	K3	CO5
	(ii) Write a python program to concatenate two lists		CO5
	(i) What is a Python Tuple? What are the Advantages of		CO5
6	Tuple	K1	
	over List?		
	(ii) "Tuples are immutable". Explain with Examples.	· •	CO5
7		K3	CO5
	assignment with suitable programs	! !	CO5
8	What are the accessing elements in a tuple? Explain With	• K1	CO5
O	suitable Programs.		CO5
	(i) Explain the basic Tuple Operations with examples	<u>. </u>	CO5 CO5
	(ii) Write a program to check whether an element "y" and		
9	"a" belongs to the tuple My_tuple =("p", "y". "t", "h", "o", "n") and	K4	
	after Printing the regult, delete the tunle		
	Printing the result, delete the tuple.		CO5
1.0	(i) Describe the built in functions with tuples.		CO5
10	(ii) Write a program to use Max(), Min() and	K2	
	sorted() methods in tuple		CO5
	(i)Discuss		CO5
	a)Tuples as return values		
11	b)Variable Length Argument Tuples	K2	
	(ii) Write a program to illustrate the comparison operators in tuple		
			CO5
	A polygon can be represented by a list of (x, y) pairs where		CO5
	each pair is a tuple: $[(x1, y1), (x2, y2), (x3, y3), (xn, yn)].$		
	Write a		
10	Recursive function to compute the area of a polygon. This can		
12	be accomplished by "cutting off" a triangle, using the	K5	
	Exploring Python– Chapter 4 - Strings, Lists and Tuples 24 fact		
	that a triangle withcorners (x1, y1), (x2, y2), (x3, y3) has area		
	(x1y1 + x2y2 + x3y2 - y1x2 - y2x3 - y3x1) / 2.		
	(i)Explain the properties of Dictionary keys with examples		CO5
13	(ii) Illustrate the python Dictionary Comprehension with	K4	003
	(11) mastrate the python Dictionary Comprehension with		

	examples		CO5 CO5
14	Write a python program named Weather that is passed a dictionary of daily temperatures, and returns the average temperature over the Weekend for the weekly temperatures given.	K6	CO5
			CO5
15	Create a python program to perform selection sort on the elements Read from the user.	K6	CO5
16	Write a program that uses insertion sort technique to sort an array of 10 elements	K5	CO5
17	Explain in detail about (i) Creating a dictionary (ii) Accessing values in a dictionary (iii) Updating dictionary (iv) Deleting elements from dictionary	K5	CO5
18	(i) Write a Python program to create a histogram from a given list of integers.(ii) Perform merge sort on a given list of elements	K6	CO5

Unit -V

SYLLABUS

Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages; Illustrative programs: word count, copy file.

Q.No	Questions	Bloom's Category Level	Course Outcome
1	Point out different modes of file opening	K4	CO6
2	Define the access modes	K1	CO6
3	Distinguish between files and modules.	K2	CO6
4	Define read and write file.	K1	CO6
5	Describe renaming and delete.	K2	CO6
6	Discover the format operator available in files.	K3	CO6

7	Explain with example the	K4		
	need for exceptions.	K4		
8	Explain built in exceptions	K1		
9	Difference between built	K4		
	in exceptions and handling exception	K1		
10	Write a program towrite data in a file for both	K1		
	write and append modes.			
11	How to import statements?	K1		
12	Express about namespace	K1	 	
	and scoping.			
13	Difference between	K3		
	global and local.	K2		
14	Identify what are the packages in python			
15	i i	K3		
15_	Examine buffering.			

- **Discuss** File.isatty[].
 - **Discover** except Clause with Multiple Exceptions.
 - **Differentiate** mutable.
 - **Analyze** the object as return values.
 - **Describe** built in class attribute.

1	Write a Python program to demonstrate the file I/O operations	K4	CO6
			CO6
	Discuss with suitable examples		CO6
2	i) Close a File.	K2	
I	ii) Writing to a File.		CO6
	i) Write a program to catch a Divide by zero exception. Add a		CO6
	finally block	17.5	
3	too.	K5	
	ii) Write a function to print the hash of any given file in python(i) Describe in detail about Exception with Arguments	+	CO6
4		K1	200
	(ii) Describe in detail about user – defined Exceptions.		CO6
_	(i) Explain with example of closing a file	17.0	CO6
5	(ii) Discover syntax for reading from a file	K3	
	(ii) Discover symax for reading from a me		CO6
6	i). Structure Renaming a file	K6	CO6
0	ii). Explain about the Files Related Methods.	Ko	
			CO6
7	i). Describe the import Statements	K1	CO6
	ii). Describe the fromimport statements		i
8	Describe in detail locating modules	K2	CO6
			CO6
9	Identify the various methods used to delete the elements from the dictionary	K1	CO6
	dictionary		_

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10	Describe in detail exception handling with sample program	K1	CO6 CO6
11	Write a program to find the one's complement of binary number using file.	K6	CO6
12	Write a program to display a pyramid	K6	CO6 CO6
13	Write a program to find the number of instances of different digits in a given number	K1	CO6
14	Describe in detail printing to the screen.	K6	CO6 CO6
15	Generalize a case study on the getting the students mark statements		CO6
13	and analysis with exception handling	K6	CO6
16	Write a program to find n number from list using file handling	K6	CO6 CO6
17	Analyze the university result of various colleges in department wise		CO6
1,	using read and write file	K4	CO6
18	Measure to read random numbers upto 75 and display even and odd		CO6
18	numbers with two different files.	K5	