P.S.R. ENGINEERING COLLEGE

An Autonomous Institution-Affiliated to Anna University, Chennai)
Accredited by NBA and NAAC (A+ Grade)
Department of Computer Science and Engineering

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	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.	K3	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

	ii)Find Maximum in a list			flowcharts and preparing flow chart for quadratic equation
	i)**Summarize** advantage and disadvantage of flow chart			**Describe** the algorithm for finding sum and average of n numbers.
3	ii)**Summarize** the symbol used in flow chart		3	Also state the properties of a good algorithm
	Describe Build an algorithm for the following		4	**Describe** the algorithm of towers of honai problem.
4	(i) Prime number or not (ii) odd or even			
5	**Explain** the rules for pseudo code and uses of keywords			
	Explain the following programming language i). Machine language ii). Assembly language iii). High level language			
6				
7	**Neat** sketch explain the following building blocks of alg. i). Statements			
		8	**Describe** State and function in Building Block and examples.	
		9	**Draw** a flow chart print all prime number between to intervals i). **Describe** pseudo code for Fibonacci sequence using	
		10	ii). **Draw** a flow chart for factorial given number (3*3)	
		11	i). **Describe** the program to insert an element in a sorted list ii). **Draw** the flow chart sum of n numbers	
		12	i). **Summarize** the difference between algorithm, flow chart and pseudo code	
		13	(i). **Explain** algorithmic problem solving technique in detail.	
		14	**Explain** program life cycle	
		1	**What** is pseudo code? Explain how it can be designed and write benefits and limitations.	
		2	**Explain** guidelines for preparing flowcharts, benefits and limitation of	

K5 CO1

K2

K3

K1

K3

K6

K1

K2

K1

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			
PART - A			
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.	K3	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.	K3	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.	K3	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 argument ii) **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
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.

PART - A

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 CO4
7	Explain the syntax and flow chart of the following loop statements (i) for loop (ii) while loop	K2	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 numbers ii) Create a program to print the following pattern 1 1 2 1 1 2 3 2 1 1 2 3 4 3 2 1	K6	CO3

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.			
PART - A			
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

5	(i) Illustrate List Comprehension with suitable examples (ii) Write a python program to concatenate two lists	K3	CO5 CO5
6	(i) What is a Python Tuple? What are the Advantages of Tuple over List? (ii) “Tuples are immutable”. Explain with Examples.	K1	CO5 CO5
7	Illustrate the ways of creating the tuple and the tuple assignment with suitable programs	K3	CO5 CO5
8	What are the accessing elements in a tuple? Explain With suitable Programs.	K1	CO5 CO5
9	(i) Explain the basic Tuple Operations with examples (ii) Write a program to check whether an element „y" and „a" belongs to the tuple My_tuple =(„p","y"."t","h","o","n") and after Printing the result, delete the tuple.	K4	CO5 CO5
10	(i) Describe the built in functions with tuples. (ii) Write a program to use Max(), Min() and sorted() methods in tuple	K2	CO5 CO5
11	(i)Discuss a)Tuples as return values b)Variable Length Argument Tuples (ii) Write a program to illustrate the comparison operators in tuple	K2	CO5 CO5
12	A polygon can be represented by a list of (x, y) pairs where each pair is a tuple: [(x1, y1), (x2, y2), (x3, y3) , … (xn, yn)]. Write a Recursive function to compute the area of a polygon. This can be accomplished by “cutting off” a triangle, using the 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.	K5	CO5 CO5
13	(i)Explain the properties of Dictionary keys with examples (ii) Illustrate the python Dictionary Comprehension with	K4	CO5

	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.

PART - A

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 need for exceptions.	K4			
8	**Explain** built in exceptions	K4 K1			
9	**Difference** between built in exceptions and handling exception	K4 K1			
10	**Write** a program towrite a data in a file for both write and append modes.	K1			
11	**How** to import statements?	K1			
12	**Express** about namespace and scoping.	K1			
13	**Difference** between global and local.	K3			
14	**Identify** what are the packages in python	K2			
15	**Examine** buffering.	K3			
16	**Discuss** File.isatty[].				
17	**Discover** except Clause with Multiple Exceptions.				
18	**Differentiate** mutable.				
19	**Analyze** the object as return values.				
20	**Describe** built – in class attribute.				

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

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 and analysis with exception handling	K6	CO6 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 using read and write file	K4	CO6 CO6
18	**Measure** to read random numbers upto 75 and display even and odd numbers with two different files.	K5	CO6