MCA 3rd Sem
BMC301Python Programming
BMC351 Python Programming Lab
Assignments with CO Mapping

Unit I – Introduction to Python, Variables, Operators & Control Structures

S. No.	Assignment	Type	CO
1	Explain the importance of Python as a programming language compared to other languages.	Theory	CO1
2	Discuss Python coding standards and naming conventions with examples.	Theory	CO1
3	Differentiate between mutable and immutable data variables in Python with examples.	Theory	CO1
4	Write short notes on id() and type() functions with suitable examples.	Theory	CO1
5	Explain the working of if, elif, and nested if with examples.	Theory	CO1
6	Discuss the role of iteration control structures in Python.	Theory	CO1
7	Explain the differences between break, continue, and pass with examples.	Theory	CO1
8	Describe the process of setting up a Python environment and path variables.	Theory	CO1
9	Write short notes on Python operators with suitable examples.	Theory	CO1
10	Explain how to take user input in Python using input() function with examples.	Theory	CO1
11	Write a Python program to demonstrate use of id() and type() functions.	Practical	CO1
12	Write a program to check whether a number entered by the user is even or odd using if-else.	Practical	CO1
13	Write a program to input marks of a student and display grade using nested if.	Practical	CO1
14	Write a program to demonstrate the use of break in a loop.	Practical	CO1
15	Write a program to demonstrate the use of continue in a loop.	Practical	CO1
16	Write a program to demonstrate the use of pass in a loop.	Practical	CO1
17	Write a program to accept three numbers and display the largest using if-elif-else.	Practical	CO1
18	Write a program to print the sum of digits of a given number using iteration.	Practical	CO1
19	Write a program to swap two variables without using a third variable.	Practical	CO1
20	Write a program to read user details (name, age, city) and display them in a formatted way.	Practical	CO1

Unit II – Strings, Lists & Tuples

S. No.	Assignment	Type	CO
1	Explain string slicing and indexing in Python with examples.	Theory	CO2
2	Discuss various string functions and methods with examples.	Theory	CO2
3	Compare lists and tuples with respect to mutability, performance, and use cases.	Theory	CO3
4	Explain list operations like concatenation, repetition, and membership.	Theory	CO2
5	Discuss common tuple methods and their uses.	Theory	CO3
6	Differentiate between shallow copy and deep copy in lists with examples.	Theory	CO3
7	Explain how negative indexing works in lists and strings with examples.	Theory	CO3
8	Describe the role of built-in functions (len, min, max, sum) for lists and tuples.	Theory	CO3
9	Write notes on nested lists and list comprehensions with examples.	Theory	CO3
10	Explain the immutability of strings with a program.	Theory	CO2
11	Write a program to count vowels and consonants in a given string.	Practical	CO2
12	Write a program to check whether a string is a palindrome.	Practical	CO2
13	Write a program to demonstrate string slicing and concatenation.	Practical	CO2
14	Write a program to find the largest element in a list.	Practical	CO3
15	Write a program to reverse a list without using built-in functions.	Practical	CO3
16	Write a program to demonstrate tuple packing and unpacking.	Practical	CO3
17	Write a program to create a nested list and access its elements.	Practical	CO3
18	Write a program to merge two lists into a dictionary.	Practical	CO3
19	Write a program to demonstrate use of list methods like append, insert, remove.	Practical	CO3
20	Write a program to find the frequency of each character in a string.	Practical	CO2

Unit III – Dictionaries & Functions

S. No.	Assignment	Type	CO
1	Define dictionaries and explain their key properties.	Theory	CO3
2	Compare lists and dictionaries with examples.	Theory	CO3
3	Explain the concept of hashing in context of dictionaries.	Theory	CO3
4	Explain different types of function arguments in Python with examples.	Theory	CO2
5	Explain recursion with an example of factorial.	Theory	CO2
6	Discuss local vs global variables with examples.	Theory	CO2
7	Explain mutable and immutable arguments in Python with examples.	Theory	CO2
8	Write short notes on dictionary functions like keys(), values(), items().	Theory	CO3
9	Explain the scope of variables (LEGB rule) in Python.	Theory	CO2
10	Discuss the advantages of using functions in Python programming.	Theory	CO2
11	Write a program to demonstrate creation and manipulation of a dictionary.	Practical	CO3
12	Write a program to count word frequency in a paragraph using a dictionary.	Practical	CO3
13	Write a program to merge two dictionaries.	Practical	CO3
14	Write a function to calculate factorial of a number using recursion.	Practical	CO2
15	Write a program to demonstrate default and keyword arguments in functions.	Practical	CO2
16	Write a program to illustrate local and global variables.	Practical	CO2
17	Write a program to check whether a key exists in a dictionary.	Practical	CO3
18	Write a function to find Fibonacci numbers using recursion.	Practical	CO2
19	Write a program to demonstrate mutable vs immutable arguments.	Practical	CO2
20	Write a program to copy contents of one dictionary into another.	Practical	CO3

Unit IV – Modules, Packages, Regex & File Handling

S. No.	Assignment	Type	CO
1	Explain the difference between a module and a package.	Theory	CO4
2	Discuss the use of standard libraries in Python with examples.	Theory	CO4
3	Explain the importance of sys and math modules with examples.	Theory	CO4
4	Discuss the use of Regular Expressions in string processing.	Theory	CO2
5	Explain file modes in Python with examples.	Theory	CO4
6	Explain the concept of binary files and their applications.	Theory	CO4
7	Discuss file pointer methods (seek, tell) with examples.	Theory	CO4
8	Write short notes on Python's datetime module with examples.	Theory	CO4
9	Explain the process of creating user-defined modules with an example.	Theory	CO4
10	Discuss the use of numpy and scipy in scientific computing.	Theory	CO4
11	Write a program to import a user-defined module and use its function.	Practical	CO4
12	Write a program to generate random numbers using random module.	Practical	CO4
13	Write a program to demonstrate mathematical operations using math module.	Practical	CO4
14	Write a regex program to validate an email ID.	Practical	CO2
15	Write a regex program to search and replace a substring in a text.	Practical	CO2
16	Write a program to read contents of a text file and count number of lines.	Practical	CO4
17	Write a program to copy contents of one file into another.	Practical	CO4
18	Write a program to demonstrate use of binary file operations.	Practical	CO4
19	Write a program to display current date and time using datetime module.	Practical	CO4
20	Write a program to demonstrate seek and tell file pointer operations.	Practical	CO4

Unit V – Exception Handling & Data Analysis

S. No.	Assignment	Type	CO
1	Define exceptions and explain their importance in programming.	Theory	CO4
2	Explain the working of try-except block with examples.	Theory	CO4
3	Discuss the role of finally block with suitable examples.	Theory	CO4
4	Differentiate between built-in and user-defined exceptions.	Theory	CO4
5	Explain the importance of exception handling in robust software design.	Theory	CO4
6	Discuss steps to create and raise user-defined exceptions in Python.	Theory	CO4
7	Explain the role of Python in data analysis and its advantages.	Theory	CO5
8	Explain the concept of Series in pandas with examples.	Theory	CO5
9	Discuss the concept of DataFrame in pandas with examples.	Theory	CO5
10	Compare pandas with NumPy in context of data analysis.	Theory	CO4
11	Write a program to demonstrate try-except for division by zero.	Practical	CO4
12	Write a program to demonstrate multiple except blocks.	Practical	CO4
13	Write a program to illustrate the working of finally block.	Practical	CO4
14	Write a program to create a user-defined exception for invalid age.	Practical	CO4
15	Write a program to demonstrate raising and handling exceptions.	Practical	CO4
16	Write a pandas program to create a Series from a list.	Practical	CO5
17	Write a pandas program to create a DataFrame from a dictionary.	Practical	CO5
18	Write a pandas program to access rows and columns in a DataFrame.	Practical	CO5
19	Write a pandas program to calculate mean and sum of a Series.	Practical	CO5
20	Write a pandas program to filter data from a DataFrame.	Practical	CO5