MACHINE LEARNING ASSIGNMENTS

MODULE-1: CORE PYTHON CONCEPTS

INTRODUCTION OF PYTHON, IF, IF- ELSE, NESTED IF-ELSE, WHILE, FOR-LOOP

1. What is Python, name some of the features of Python.
2. Write a Python program to get the Python version you are using?
3. Is python the right choice for Web based Programming?
4. Why was the language called as Python?
5. Write a Python program to check if a number is positive, negative or zero.
6. What is the language from which Python has got its features or derived its features?
7. Write a Python program to check if variable is of integer or string.
8. Does python support switch or case statement in Python? If not what is the reason for the same?
9. How Python is interpreted?
10. Write a Python program to get the Factorial number of given number
11. Write a Python program to get the Fibonacci series of given range.
12. How memory is managed in Python?
13. What is namespace in Python?
14. What is the purpose of continue statement in python?
15. Write python program that swap two number with temp variable and without temp variable
16. Write a Python program to find whether a given number is even or odd, print out an appropriate message to the user.
17. Write a Python program that compute the area of following:
    1) Triangle (accepts base and height)2) Circle (accept radius)
18. Write a Python program to test whether a passed letter is a vowel or not.
19. Write a Python program to compute the value of a specified principal amount, rate of interest, and several years.
20. What are the tools that help to find bugs or perform static analysis?
21. What are Python decorators?
22. What is PEP 8?
23. Write a Python program to sort three integers without using conditional statements and loops.
24. Write a Python program that accepts an integer (n) and computes the value of n+nn+nnn.
25. Write a Python program to sum of three given integers. However, if two values are equal sum will be zero.
26. Write a Python program that will return true if the two given integer values are equal or their sum or difference is 5.
27. Write a python program to sum of the first n positive integers.

ACCESSING STRING, BASIC OPERATION, STRING SLICE, FUNCTION AND METHOD

28. Write a Python program to calculate the length of a string.
29. Write a Python program to count the number of characters (character frequency) in a string
30. What are negative indexes and why are they used?

31. Explain split(), sub(), subn() methods of “re” module in Python.
32. How do you perform pattern matching in Python? Explain
33. Write a Python program to count occurrences of a substring in a string
34. Write a Python program to count the occurrences of each word in a given sentence
35. 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.
36. 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
37. Write a Python program to find the first appearance of the substring 'not' and 'poor' from a given string, if 'not' follows the 'poor', replace the whole 'not'...'poor' substring with 'good'. Return the resulting string.
38. Write a Python function that takes a list of words and returns the length of the longest one.
39. Write a Python function to reverses a string if it's length is a multiple of 4.

MODULE-2: COLLECTIONS

LIST

40. What is List? How will you reverse a list?
41. How will you remove last object from a list?
42. Suppose list1 is [2, 33, 222, 14, 25], What is list1[-1]?
43. Differentiate between append() and extend() methods.? B5. Write a Python function to get the largest number, smallest num and sum of all from a list.
44. How will you compare two lists?
45. 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.
46. Write a Python program to remove duplicates from a list.
47. Write a Python program to check a list is empty or not.
48. Write a Python function that takes two lists and returns True if the y has at least one common member.
49. Write a Python program to generate and print a list of first and last 5 elements where the values are square of numbers between 1 and 30.
50. Write a Python function that takes a list and returns a new list with unique elements of the first list l7. Write a Python program to convert a list of characters into a string.
51. Write a Python program to select an item randomly from a list.
52. Write a Python program to find the second smallest number in a list.
53. Write a Python program to get unique values from a list.
54. Write a Python program to check whether a list contains a sublist.
55. Write a Python program to split a list into different variables.

TUPLE

56. What is tuple? Difference between list and tuple.
57. Write a Python program to create a tuple with different data types.
58. Write a Python program to create a tuple with numbers.
59. Write a Python program to convert a tuple to a string.
60. Write a Python program to check whether an element exists within a tuple.

61. Write a Python program to find the length of a tuple.
62. Write a Python program to convert a list to a tuple.
63. Write a Python program to reverse a tuple.
64. Write a Python program to replace last value of tuples in a list.
65. Write a Python program to find the repeated items of a tuple.
66. Write a Python program to remove an empty tuple(s) from a list of tuples.
67. Write a Python program to unzip a list of tuples into individual lists.
68. Write a Python program to convert a list of tuples into a dictionary.

DICTIONARIES

69. What is Dictionaries?
70. How will you create a dictionary in python? How will you get all the keys from the dictionary?
71. How will you get all the values from the dictionary?
72. How will you create a dictionary using tuples in python?
73. Write a Python script to sort (ascending and descending) a dictionary by value
74. Write a Python script to concatenate following dictionaries to create a new one.
75. Write a Python script to check if a given key already exists in a dictionary.
76. How do you traverse through a dictionary object in Python?
77. How do you check the presence of a key in a dictionary?
78. Write a Python script to print a dictionary where the keys are numbers between 1 and 15 (bot Sample Dictionary.
79. {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}
80. Write a Python program to check multiple keys exists in a dictionary
81. Write a Python script to merge two Python dictionaries
82. Write a Python program to map two lists into a dictionary
83. Write a Python program to combine two dictionary adding values for common keys.

d1 = {'a': 100, 'b': 200, 'c':300} d2 = {'a': 300, 'b': 200, 'd':400}
Sample output: Counter({'a': 400, 'b': 400, 'd': 400, 'c': 300})

84. Write a Python program to print all unique values in a dictionary.
85. Why do you use the zip() method in Python?
86. Write a Python program to create and display all combinations of letters, selecting each letter from a different key in a dictionary.

Sample data : {'1':['a', 'b'], '2':['c', 'd']}
Expected Output: ac ad bc bd.

87. Write a Python program to find the highest 3 values in a dictionary
88. Write a Python program to combine values in python list of dictionaries.

Sample data: [{'item': 'item1', 'amount': 400}, {'item': 'item2', 'amount': 300},
{'item': 'item1', 'amount': 750}]
Expected Output: Counter({'item1': 1150, 'item2': 300})

MODULE-3: FUNCTIONS

FUNCTION

89. Write a Python function to calculate the factorial of a number (a non-negative integer)

90. Write a Python function to check whether a number is in a given range.
91. Write a Python function to check whether a number is perfect or not.
92. Write a Python function that checks whether a passed string is palindrome or not
93. How do you perform pattern matching in Python? Explain
94. What is lambda function in python? What we call a function which is incomplete version of a function?
95. How many basic types of functions are available in Python?
96. Write a Python program to access a function inside a function.
97. Write a Python program to detect the number of local variables declared in a function.
98. What is map function in Python?
99. Does Python have a main() method?
100. What does the *args do in Python? What does the **kwargs do in Python?
101. What does the __ Name __ do in Python? What Is the purpose of “end” in Python?
102. What does the len() function do in Python? What does the ord() function do in Python?
103. Name few methods that are used to implement Functionally Oriented Programming in Python?
104. Write a program in Python to reverse a string without using inbuilt function reverse string?

MODULE-4: MODULES

IMPORTING MODULE, MATH MODULE, RANDOM MODULE, PACKAGES

105. How can you pick a random item from a list or tuple?
106. How can you pick a random item from a range?
107. How can you get a random number in python?
108. How will you set the starting value in generating random numbers?
109. How will you randomizes the items of a list in place?
110. Write a Python program to read a random line from a file.
111. Write a Python program to convert degree to radian
112. Write a Python program to calculate the area of a trapezoid
113. Write a Python program to calculate the area of a parallelogram
114. Write a Python program to calculate surface volume and area of a cylinder
115. Write a Python program to returns sum of all divisors of a number
116. Write a Python program to find the maximum and minimum numbers from the specified decimal numbers.
117. Write a Python program to find the sum of the following decimal numbers and display the numbers in sorted order
    Decimal numbers: 2.45, 2.69, 2.45, 3.45, 2.00, 0.04, 7.25
    Expected Output:
    Sum: 20.33
118. Sorted order: [Decimal('0.04'), Decimal('2.00'), Decimal('2.45'), Decimal('2.45'), Decimal('2.69'), Decimal('3.45'), Decimal('7.25')]
119. Write a Python program to get the square root and exponential of a given decimal number
120. Write a Python program to add, subtract, multiply and divide two fractions.
    Expected Output:

2/3 + 3/7 = 23/21
2/3 - 3/7 = 5/21
2/3 * 3/7 = 2/7
2/3 / 3/7 = 14/9

MODULE-5: INPUT - OUTPUT

INPUT-OUTPUT

121. What is File function in python? What is keywords to create and write file.
122. Write a Python program to read an entire text file.
123. Write a Python program to append text to a file and display the text. B4. Write a Python program to read first n lines of a file.
124. Write a Python program to read last n lines of a file.
125. Write a Python program to read a file line by line and store it into a list.
126. Write a Python program to read a file line by line store it into a variable.
127. Write a python program to find the longest words.
128. Write a Python program to count the number of lines in a text file.
129. Write a Python program to count the frequency of words in a file.
130. Write a Python program to write a list to a file.
131. Write a Python program to copy the contents of a file to another file.
132. Write a Python program to read a random line from a file.
133. Write a Python program to assess if a file is closed or not.
134. Write a Python program to remove newline characters from a file.

MODULE-6: EXCEPTION HANDLING

EXCEPTION HANDLING

135. Explain Exception handling? What is an Error in Python?
136. How many except statements can a try-except block have? Name Some built-in exception classes.
137. When will the else part of try-except-else be executed?
138. Can one block of except statements handle multiple exception?
139. When is the finally block executed?
140. What happens when '1' == 1 is executed?
141. How do you handle exceptions with try/except/finally in Python? Explain with coding snippets.
142. Write python program that user to enter only odd numbers, else will raise an exception.
143. Write program for Catching Specific Exceptions in Python
144. Write python program for file operations to makes sure the file is closed even if an exception occurs.
145. Explain Python Errors and Built-in Exceptions with coding snippets
146. Explain User-Defined Exception in Python
147. Write program that will ask the user to enter a number until they guess a stored number correctly.

148. What is Assertions in Python? Write function that converts a temperature from degrees Kelvin to degrees Fahrenheit.
149. Write program that except Clause with No Exceptions.
150. What is Argument of an Exception? Explain with coding snippets

MODULE-7: OOPS CONCEPTS

CLASS, OBJECT, ATTRIBUTES, INHERITANCE, OVERLOADING

151. What are oops concepts? Is multiple inheritance supported in java.
152. How to define a class in Python? What is self? Give an example of a Python class.
153. Write a Python class named Rectangle constructed by a length and width and a method which will compute the area of a rectangle.
154. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.
155. Write a Python class named Circle constructed by a radius and two methods which will compute the area and the perimeter of a circle.
156. Explain Inheritance in Python with an example?
157. What Is __init__? Or What Is a Constructor in Python?
158. What is Instantiation in terms of OOP terminology?
159. What is used to check whether an object o is an instance of class A?
160. What relationship is appropriate for Course and Faculty?
161. What relationship is appropriate for Student and Person?
162. Which function overloads the + operator? Which operator is overloaded by __invert__()?
163. Which function overloads the >> operator?
164. Create a class called Numbers, which has a single class attribute called MULTIPLIER, and a constructor which takes the parameters x and y (these should all be numbers).
165. Write a Python class to implement pow(x, n).

MODULE-8: FRAMEWORKS (PACKAGES)

NUMPY:

1. Write a program to find and manipulate the shape of ndarray.
2. Write a program to divide a range into 5 equal parts.
3. Write a program to find the logarithmic value of numbers from 31 to 40.
4. Write a program to create a 3x2 matrix containing zeros and another matrix containing one only.
5. Write a program to convert regular array into an ndarray.
6. Write a program to create an ndarray containing characters of a string.
7. Explain slicing in Numpy.
8. How can we use conditions in Numpy within an array?
9. Write a program to find transpose of two metrics and then perform addition on them.
10. How to convert an ndarray into a 1D array?
11. How to remove or add a new dimension in ndarray?
12. How to append, insert and delete new elements in ndarray?
13. Write a program to explain various string manipulation methods on Numpy arrays.

14. Write a program to perform various arithmetic functions on Numpy arrays.
15. Write a program to explain matrix manipulation using ndarrays.
16. How to perform I/O operations on ndarrays?

PANDAS:

17. Explain Series, DataFrame and Panel in Pandas.
18. Write a program to concat two DataFrames.
19. Write a program to perform custom addition function on a DataFrame.
20. Write a program to group a DataFrame by various categories.
21. Explain indexing in Dataframe.
22. Write a program to merge two DataFrames.
23. Write a program to handle missing data from DataFrame.
24. Write program to create bar chart, box chart, area plot, scatter plot and pie chart from a DataFrame.
25. What is the difference between rand() and randn() methods.
26. Explain reindexing in Pandas.
27. How to perform sorting on DataFrames.
28. How to perform SQL commands like DDL & DML using Pandas.
29. Explain string manipulation in Pandas.

SCIPY:

30. How to perform algebra operations using Scipy?
31. Write a program to perform Fourier transformation.
32. Write a program to perform image processing using Scipy.
33. How to find integration and interpolation using Scipy?
34. Explain I/O operations using Scipy.

MATPLOTLIB:

35. Explain different properties of plot() method.
36. Write a program to create a line graph using Matplotlib.
37. Write a program to create a scatter plot using Matplotlib.
38. Write a program to create a bar chart using Matplotlib.
39. Write a program to create a histogram using Matplotlib.
40. Write a program to create a pie chart using Matplotlib.
41. Write a program to plot categorical data using Matplotlib.
42. Write a program to add a pinpoint in a graph using Matplotlib.
43. Write a program to add extra text into a graph using Matplotlib.
44. Write a program to create multiple graph within a graph using Matplotlib.

MODULE-9: DATA PREPROCESSING

INTRODUCTION:

1. What is Machine Learning? Explain the applications of Machine Learning.
2. Why do we need Machine Learning?
3. Why do we need to preprocess the data in Machine Learning?
4. Explain types of variables in Machine Learning.

5. Explain different types of methods to handle missing data.
6. How to handle categorical variables in Machine Learning.
7. What is feature scaling? Why do need to scale the data?
8. Explain two feature scaling methods.
9. What is the necessity of splitting the dataset into training and testing set?
10. Explain different types of learning in Machine Learning.
11. Write a program to handle conditional data in Machine Learning.
12. Write a program to scale the data for better accuracy.
13. Write a program to handle missing data.

MODULE-10: REGRESSION

REGRESSION:

14. What is Regression? List down types of Regression.
15. Explain Simple Linear Regression.
16. Explain Multiple Linear Regression.
17. What are dummy variables?
18. What is multicollinearity in Regression?
19. What is dummy variable trap?
20. Explain null hypothesis and p-value in statistics.
21. List down different methods of feature selection. Explain each in brief.
22. Explain Polynomial Regression.
23. What is Support Vector Regressor? Explain Kernel, Hyperplane, Boundary Lines and Support Vectors in SVR.
24. Difference between SVR and Simple Linear Regressor.
25. What is Regression Tree? Explain in detail.
26. What is entropy and information gain in Regression Tree.
27. How to split a decision tree using entropy and information gain.
28. Explain Random Forest Regression.
29. What is ensemble learning?
30. What is the significance of R-squared and adjusted R-squared in feature selection?
31. In Regression, how to interpret coefficient to improve the accuracy of the model.
32. Compare pros and cons of Linear Regression, Polynomial Regression, SVR, Decision Tree Regression and Random Forest Regression.
33. What is overfitting?
34. How to ensure that you are not overfitting the model?
35. Write a program to predict Salary of a person based on their experience using Simple Linear Regression.
36. Write a program to predict profit of startups based on their expenses like R&D, Administration, Marketing using Multiple Linear Regression.
37. Write a program to predict salary of employee based on their position in the organization using Polynomial Regression.
38. Write a program to predict salary of employee based on their position in the organization using Support Vector Regression.
39. Write a program to predict salary of employee based on their position in the organization using Decision Tree Regression.

40. Write a program to predict salary of employee based on their position in the organization using Random Forest Regression.

MODULE-11: CLASSIFICATION

CLASSIFICATION:

41. What is ensemble learning?
42. Explain Logistic Regression to classify binary class data.
43. Why Logistic Regression is called Linear Classifier?
44. Explain K-Nearest Neighbor Classifier.
45. What is Support Vector Classifier? Explain in brief.
46. Why SVC is different than other classifiers?
47. What is linearly separable and linearly non-separable data?
48. Explain Gaussian Radial Basis Function Kernel in SVC.
49. List down different types of kernels in SVC.
50. What is Bayes Theorem? Explain with example.
51. What is Naïve Bayes Theorem? Explain with example.
52. Why Naïve Bayes theorem is called Naïve?
53. How a Decision Tree Classifier creates a tree to classify anonymous data?
54. How is decision tree pruned?
55. Explain Random Forest Classifier in brief. Also, explain the difference between Random Forest Regressor and Random Forest Classifier.
56. What is false positive and false negative?
57. Explain Confusion Matrix in Classification.
58. Explain Accuracy Paradox.
59. What is CAP curve?
60. When should you use classification over regression?
61. Write a program to classify whether a user will buy a certain product based their Gender, Age and Salary using Logistic Regression.
62. Write a program to classify whether a user will buy a certain product based their Gender, Age and Salary using k-NN Classifier.
63. Write a program to classify whether a user will buy a certain product based their Gender, Age and Salary using Support Vector Classifier.
64. Write a program to classify whether a user will buy a certain product based their Gender, Age and Salary using kernel SVM.
65. Write a program to classify whether a user will buy a certain product based their Gender, Age and Salary using Naïve Bayes Classifier.
66. Write a program to classify whether a user will buy a certain product based their Gender, Age and Salary using Decision Tree Classifier.
67. Write a program to classify whether a user will buy a certain product based their Gender, Age and Salary using Random Forest Classifier.

MODULE-12: CLUSTERING

CLUSTERING:

68. List down different types of clustering algorithms.
69. Explain K-Means Clustering in brief.
70. What is Random Initialization Trap in K-Means Clustering?
71. Explain Hierarchical Clustering.
72. What is Dendrogram? Explain their use in Hierarchical Clustering.

MODULE-13,14,15,16,17,18: ASSOCIATION RULE LEARNING, REINFORCEMENT LEARNING, DEEP LEARNING, DIMENSIONALITY REDUCTION AND MODEL BOOSTING

ASSOCIATION RULE LEARNING, REINFORCEMENT LEARNING, DEEP LEARNING, DIMENSIONALITY REDUCTION AND MODEL BOOSTING:

73. Explain Apriori algorithm in Association Rule Learning.
74. What is the significance of Upper Confidence bound in Reinforcement Learning?
75. Explain Thompson Sampling in detail.
76. What is the difference between Machine Learning and Deep Learning?
77. What is Deep Learning and how does it contrast with other Machine Learning Algorithms?
78. What is the significance of neural networks in Deep Learning?
79. Explain Artificial Neural Network and Convolutional Neural Network.
80. Explain in detail the methods of Dimensionality Reduction.
81. Explain XGBoost in detail.
82. What is cross validation technique?
83. What is more important, model accuracy or model performance?