Kaadn
UT2028011

Mid Term Examination
Advanced Programming Language – Python
IIIT Lucknow
Max Marks: 100 All Questions Compulsory.

1. Explain the differences between Interpreted and Compiled Lanaguages. Which one has less number of stages. Compare both in terms of advantages and disadvantages. (10 marks)

2. Lists:
   Given the list: fruits = ['apple', 'banana', 'cherry'] (6 marks)

   Question: How would you in sequence :

   a. Get length of the list
   b. Append the element 'orange' to the list?
   c. Delete apple
   d. Get length
   e. Reverse the list
   f. Get the third element in the reversed list

3. Lists:
   Given the list: numbers = [1, 2, 3, 4, 5] (6 marks)

Question: How do you

   a. Retrieve the element 4 using negative indexing?
   b. Using : how do we retrieve 2,3, 4
   c. Update the third element to 7
   d. Append the element 1 to the end of the list
   e. Find the position of occurrence of 1
   f. Return the descending order of the list

4. Tuples: (6 marks)
   Given the tuple: dimensions = (1, 2, 3, 4, [5,8,2])

   a. Retrieve the element 4 using negative indexing?
   b. Find the maximum element
   c. Return the tuple with the list element so that elements inside the list are descending order
   d. Return a tuple dimreverse which is reverse order of dimensions tuple

Question: Why can't you modify any element of this tuple? Illustrate your explanation with an example.

5. Dictionaries:
   Given the dictionary: scores = {'Alice': 90, 'Bob': 85, 'Charlie': 92}

Question: How do you (6 marks)

   A. retrieve Bob's score from the dictionary?
   B. Update Bobs score to 99
   C. Form a series from the dictionary
   D. Run a vectorized operation of doubling every number in the series

6. A = {1, 2, 3}

   B = {3, 4, 5}

Question: How do you [6 marks]

   a. find the intersection and union of sets A and B?
   b. find the symmetric difference of sets A and B?
   c. find at least three subsets of A
   d. Show A symmetric difference B is same as (A U B) difference (A Int B)

7. Pandas Series:[6 marks]

   a. Using pandas, create a Series from the list [10, 20, 30, 40] and display the element at index 2.

   b. How do you create a Series with custom index labels ['a', 'b', 'c'] for the list [100, 200, 300]?

   c. Create a series with numpy log of all elements in the series

   d. Add this series with another series of same dimensions

8. Given a long paragraph of 120 words, return a paragraph with only unique non repetitive words among the words. (6 marks)
9. Given a number n return the list of all composite (non prime numbers) till n.(6 marks)
10. Given a list of numbers return a list of all even multiples of 3 (6 marks)
11. Given a list of numbers return a list of squares of all the unique numbers in the list(6 marks)
12. Create a numpy array of dimension 2 X 2 X 2 (10 marks)
    a. Find the no of dimensions
    b. Find the shape
    c. Find the maximum element
    d. Find the sum of all elements
    e. Return an array of True or False given if it is less than 2 or not
13. Given a dataframe as below (20 marks)

    data = { 'EmployeeID': [101, 102, 103, 104, 105], 'Name': ['Alice', 'Bob', 'Charlie', 'Diana', 'Ethan'], 'Age': [28, 34, 25, 29, 32], 'Department': ['HR', 'Finance', 'IT', 'Marketing', 'Sales'], 'Salary': [55000, 65000, 60000, 58000, 63000] }

    12.1 Find the shape of the dataframe. Suggest discrete and continuous columns

    12.2 For the discrete columns do the complete descriptive analysis

    12.3 For the continuous columns do the complete descriptive analysis with measures of central tendency and dispersion

    12.4 Return a slice with third and fourth row, and second and third column

    12.5 Return the columns name and age for the dataframe where salary < 60000

    12.6 Add a column Height with example data to the dataframe

    12.7 Add a new row with example data

    12.8 Delete the new column Height. Then return the shape