NUMPY INTERVIEW QUESTIONS

SECTION A

1. **What Is NumPy**
2. **How do I create a NumPy array?**
3. **What are the main features of NumPy?**
4. **How do you calculate the dot product of two NumPy arrays?**
5. **How do I access elements in a NumPy array?**
6. **What is the difference between a shallow copy and a deep copy in NumPy?**
7. **How do you reshape a NumPy array?**
8. **How to perform element-wise operations on NumPy arrays?**
9. **Define the var function in NumPy.**
10. **Define the min and max function in NumPy.**
11. **How to generate random numbers with NumPy?**
12. **What is the purpose of NumPy in Python?**
13. **How can you create a NumPy array from a Python list?**
14. **How can you access elements in a NumPy array based on specific conditions?**
15. **What are some common data types supported by NumPy?**
16. **How can you concatenate two NumPy arrays vertically?**
17. **What is the significance of the random module in NumPy?**
18. **How can you generate random numbers following a normal distribution using NumPy?**
19. **What is Matrix Inversion in NumPy?**
20. **Define the mean function in NumPy.**
21. **Convert a multidimensional array to 1D array.**
22. **Write a NumPy code snippet to create an array of zeros.**
23. **How can you identify outliers in a NumPy array?**
24. **How do you remove missing or null values from a NumPy array?**
25. **What is the difference between slicing and indexing in NumPy?**
26. **How do you compute the Fourier transform of a signal using NumPy?**

27. **How can you create an array with the same values?**
28. **How can you modify the data type of a NumPy array?**
29. **What is a masked array in NumPy?**
30. **What are some of the limitations of NumPy?**
31. **How do you sort a NumPy array in ascending or descending order?**
32. **How to use NumPy with Matplotlib?**
33. **What is the use of diag() square matrix?**
34. **How are NumPy Arrays better than Lists in Python?**
35. **What is negative indexing in NumPy arrays?**
36. **Can you create a plot in NumPy?**
37. **Discuss uses of vstack() and hstack() functions?**
38. **How does NumPy handle numerical exceptions?**
39. **How to get the eigenvalues of a matrix?**
40. **How to calculate the determinant of a matrix using NumPy?**
41. **Find a matrix or vector norm using NumPy.**
42. **How to compare two NumPy arrays?**
43. **Calculate the QR decomposition of a given matrix using NumPy.**
44. **How to filter out integers from a float NumPy array?**
45. **Define a polynomial function.**
46. **What are ndarrays in NumPy?**
47. **What are the main features that make NumPy unique?**
48. **What is the difference between shape and size attributes of a NumPy array?**
49. **What are some important differences between the standard Python sequences and NumPy arrays?**
50. **What are Universal functions in NumPy?**
51. **What are the differences between ndarray and array in NumPy?**
52. **How would you convert a pandas dataframe into a NumPy array?**
53. **Explain vectorization in NumPy.**
54. **How would you reverse a NumPy array?**
55. **How do you remove missing or null values from a NumPy array?**
56. **What is the difference between slicing and indexing in NumPy?**

57. **How do you create a masked array in NumPy, and what is its purpose?**
58. **What are some common techniques for normalizing data in a NumPy array?**
59. **How do you remove missing or null values from a NumPy array?**
60. **Create a two 2-D array. Plot it using matplotlib.**
61. **What is the difference between NumPy and Pandas?**
62. **Why is NumPy faster than a list?**
63. **How do you check for an empty (zero element) array?**
64. **What is the procedure to count the number of times a given value appears in an array of integers?**
65. **How can you sort an array in NumPy?**
66. **How can you find the maximum or minimum value of an array in NumPy?**
67. **How can slicing and indexing be used for data cleaning?**
68. **What is the difference between using the shape and size attributes of a NumPy array?**
69. **What is a NumPy array and how is it different from a NumPy matrix?**
70. **How can you find the unique elements in an array in NumPy?**

SECTION B

B.1 What is NumPy? Why should we use it?

B. 2. How do you convert Pandas DataFrame to a NumPy array?

B.3. **How do you concatenate 2 NumPy arrays?**

B.4. **How do you multiply 2 NumPy array matrices?**

B.5. **How is arr[:,0] different from arr[:[0]]**

B.6. **How do we check for an empty array (or zero elements array)?**

B.7. **How do you count the frequency of a given positive value appearing in the NumPy array?**

B.8. **How is np.mean() different from np.average() in NumPy?**

B.9. **How can you reverse a NumPy array?**

B.10. **How do you find the data type of the elements stored in the NumPy arrays?**

B. 11. What are ways of creating 1D, 2D and 3D arrays in NumPy?

B. 12. What are ndarrays in NumPy?

B. 13. How are NumPy arrays better than Python's lists?

B. 14. Why is NumPy preferred over Matlab, Octave, Idl or Yorick?

B. 15. How is vstack() different from hstack() in NumPy?

B.16. **How is fliplr different from flipud methods in NumPy?**

B.17. **How will you implement the moving average for the 1D array in NumPy?**

B.18. **What happens when we use the arrays_split() method for splitting the NumPy array?**

B.19. **What happens when the split() method is used for splitting NumPy arrays?**

B.20. **How is Vectorization related to Broadcasting in NumPy?**

B.21. **How do you find the local peaks (or maxima) in a 1-D NumPy Array?**

B.22. **What do you understand by Vectorization in NumPy?**

B.23. **Write a program for interchanging two axes of the NumPy array.**

B.24. **Write a program for changing the dimension of a NumPy array.**

B.25. **3. Write a program to add a border of zeros around the existing array.**

B.26. **Write a program for creating an integer array with values belonging to the range 10 and 60**

B.27. **Write a program to repeat each of the elements five times for a given array.**

B.28. **Write a program for inserting space between characters of all elements in a NumPy array.**

B.29. **Write a program to transform elements of a given string to a numeric string of 10 digits by making all the elements of a given string to a numeric string of 8 digits with zeros on the left.**

B.30. **Write a program to convert a string element to uppercase, lowercase, capitalise the first letter, title-case and swapcase of a given NumPy array.**

SECTION C

Commonly Asked Interview Questions on NumPy

C.1 **: What is NumPy, and why is it popular in the field of scientific computing?**

C.2 **: How does NumPy differ from Python lists, and what advantages does NumPy offer?**

C.3 **: Explain the concept of broadcasting in NumPy?**

C.4 **: What is the purpose of the np.arange() function in NumPy?**

C. 5: How can you find the dimensions and shape of a NumPy array?

C.6 **: What is the purpose of the np.zeros() and np.ones() functions in NumPy?**

C.7 **: How can you perform element-wise multiplication of two NumPy arrays?**

C.8 **: Explain the concept of NumPy's universal functions (ufuncs).**

C.9 **: How can you concatenate two NumPy arrays horizontally and vertically?**

C.10 **: What is the purpose of the np.linalg.inv() function in NumPy?**

Technical Questions Asked in NumPy Interviews

C.11 **: Explain the difference between np.array and np.matrix in NumPy. When would you prefer one over the other?**

C.12 **: Discuss the purpose of the np.reshape() function in NumPy. Provide an example.**

C.13 **: What is the purpose of the np.newaxis keyword in NumPy, and how does it affect array dimensions?**

C.14 **: Explain the concept of NumPy broadcasting rules. When do broadcasting rules apply, and how can they be beneficial?**

C.15 **: Discuss the purpose of the np.linspace() function in NumPy and provide an example.**

C.16 **: What is the role of the np.random module in NumPy? Provide an example of generating random numbers.**

C.17 **: How can you calculate the dot product of two arrays using NumPy? What is the significance of the dot product in linear algebra?**

C.18: Explain the purpose of the np.save() and np.load() functions in NumPy. How can these functions be used to save and load arrays?

C.19: Discuss the use of the np.vectorize() function in NumPy. Provide an example.

Conceptual Interview Questions

C.20: Explain the concept of a NumPy universal function (ufunc). Provide examples of ufuncs and their significance.

C.21: Describe the advantages of using NumPy arrays over Python lists for numerical computations?

C.22: What is the purpose of the NumPy dtype attribute? How does it influence array memory allocation?

C.23: Explain the difference between a shallow copy and a deep copy of a NumPy array.

C.24: Discuss the purpose of the NumPy axis parameter in array operations. Provide examples of operations where the axis parameter is applicable?

C.25: What is the role of the NumPy ufunc.reduce() method? Provide an example.

C.26: Discuss the concept of NumPy slicing. How does slicing differ from indexing?

C.27: Explain the purpose of the NumPy np.meshgrid() function. Provide an example.

C.28: Describe the concept of NumPy broadcasting rules. Provide an example where broadcasting is applied.

C.29: Explain the purpose of the NumPy np.concatenate() function. How does it differ from np.vstack() and np.hstack()?

In-depth Interview Questions on NumPy

C.30: Explain the concept of memory layout in NumPy arrays. What is the significance of the order parameter in array creation functions like np.array()?

C.31: Discuss the concept of NumPy's broadcasting rules in detail. How does NumPy automatically align dimensions during operations?

C.32: Explain the purpose of NumPy's np.vectorize() function. How does it differ from using standard Python loops for element-wise operations?

C.33: Discuss the role of the NumPy np.meshgrid() function in generating coordinate matrices. Provide a practical example where np.meshgrid() is beneficial.

C.34: Explain the significance of NumPy's np.linalg module. How does it contribute to linear algebra operations?

C.35: Discuss the concept of NumPy's structured arrays. How are structured arrays different from regular arrays, and in what scenarios are they useful?

C.36: Explain the purpose of NumPy's np.ma module. How does it handle masked arrays, and in what scenarios are masked arrays beneficial?

C.37: Discuss the concept of NumPy's np.fromiter() function. How is it different from using np.array() for array creation?

C.38: Explain how NumPy handles broadcasting in more complex scenarios, such as when combining arrays with different dimensions. Provide examples.

C.39: Explain the role of the np.ufunc.at() method in NumPy. Provide a practical example where np.ufunc.at() is useful.

Situational Interview Questions

C.40: Imagine you are working on a project that involves handling a large dataset with missing values. How would you use NumPy to address and manage missing data efficiently?

C.41: You are tasked with optimizing the memory usage of a NumPy array that contains a large number of elements. What strategies would you employ to reduce the memory footprint while preserving data accuracy?

C.42: You are working on a machine learning project and need to preprocess a dataset stored in a NumPy array. How would you handle feature scaling to ensure that all features contribute equally to the model?

C.43: You are working on a scientific computing project where numerical stability is crucial. How would you address potential issues related to precision and stability in numerical computations using NumPy?

C.44: You are building a data processing pipeline, and you need to efficiently apply a custom function to each element of a NumPy array. How would you achieve this in a way that maximizes performance?

SECTION D

1. **What is NumPy?**
2. **Why is NumPy favored over other programming languages and tools like IDL, Matlab, Octave, or Yorick?**
3. **How do you count the number of times a particular value appears in an array of integers?**
4. **The input NumPy array is shown below. Column two should be removed and replaced with the new column listed below.**
5. **What Is The Distinction Between Numpy & Scipy?**
6. **Is it possible to use eye() function to generate diagonal values?**
7. **Is Python 3.x supported by Numpy and Scipy?**
8. **Is it possible to use diag() to create a square matrix?**
9. **What are the benefits of NumPy Arrays over (nested) Python lists?**
10. **Is SIMD used by NumPy?**
11. **In NumPy, how do I change the data type of an array?**
12. **In NumPy, what is the difference between copy and view?**
13. **Why not just have a Matrix Multiplication Operator?**
14. **What is the meaning of ndarray in NumPy, and How is it different from standard python sequence?**
15. **Make a 3 * 3 matrix with values from 1 to 9.**
16. **In NumPy, what is the difference between ndarray and array?**
17. **Is Numpy/scipy Compatible With Jython?**
18. **Describe the concept of vectorization in NumPy.**

19. **What Numpy/scipy tools are used to create plots?**
20. **Print a range of four integers at random between 1-15.**
21. **How to reverse a NumPy array?**
22. **Is Numpy/scipy compatible with Ironpython(.net)?**
23. **How can I make a 2D array?**
24. **How do I make a 3D or ND array?**
25. **Describe the operations that NumPy can execute.**

SECTION E

1: What is NumPy?

2: What are the uses of NumPy?

3: Why is NumPy preferred to other programming tools such as IDL, Matlab, Octave, Or Yorick?

4: What are the various features of NumPy?

5: How can you Install NumPy on Windows? Question 6. List the advantages NumPy Arrays have over (nested) Python lists?

7: List the steps to create a 1D array and 2D array

8: How do you create a 3D array?

9: What are the steps to use shape for a 1D array, 2D array and 3D/ND array respectively?

10: How can you identify the datatype of a given NumPy array?

11. **What is the procedure to count the number of times a given value appears in an array of integers?**

12. **How do you check for an empty (zero Element) array?**

13: What is the procedure to find the indices of an array on NumPy where some condition is true?

14: Shown below is the input NumPy array. Delete column two and replace it with the new column given below.

15: Create a two 2-D array. Plot it using matplotlib

SECTION F

1. **Differentiate between NumPy arrays and Python lists.**
2. **How to create NumPy arrays? Explain with an example.**
3. **How can you reverse a NumPy array?**
4. **Discuss the importance of broadcasting in NumPy.**
5. **Explain the concept of universal functions (ufuncs) in NumPy.**
6. **What is the difference between np.dot() and np.matmul() functions.**
7. **What distinguishes np.mean() from np.average() in NumPy?**
8. **How do you perform matrix multiplication on two NumPy arrays?**
9. **How do you count the frequency of a specified positive value within a NumPy array?**
10. **How do you check whether an array is empty or contains zero elements?**

❖ Python NumPy Interview Questions and Answers for Intermediates

11. **How can you determine the data type of the elements stored in a given NumPy array?**
12. **How can you find peak or local maxima in a 1D array?**
13. **How to convert a Pandas DataFrame into a NumPy array?**
14. **How can you randomly shuffle the elements of a NumPy array?**
15. **Explain the difference between np.copy() and the assignment operator (=) when creating a copy of a NumPy array.**
16. **Explain the difference between shallow copy and deep copy in the context of NumPy arrays.**
17. **How can you compute the cross-product of two vectors in NumPy?**
18. **Explain the concept of memory layout in NumPy arrays and the difference between C-order and F-order.**
19. **How do you calculate the mean and standard deviation of a NumPy array?**
20. **Discuss the purpose of the np.random module in NumPy.**

❖ Advanced NumPy Interview Questions and Answers

21. **Discuss the importance of vectorization in NumPy.**
22. **What is the difference between hstack() and vstack() in NumPy.**
23. **How does NumPy integrate with popular machine learning libraries?**
24. **Discuss the role of NumPy in feature engineering for machine learning.**
25. **Describe the implementation of moving average for a 1D array in NumPy.**
26. **Perform broadcasting operations on a 2D array and a scalar value.**
27. **Write a program that filters elements from a NumPy array based on a given boolean condition.**
28. **Write a program to reshape a 1D NumPy array into a 2D array with a specified number of rows.**
29. **Write a NumPy program to extract a subarray from a larger array based on given slicing parameters.**
30. **Find the eigenvalues and eigenvectors of a matrix using NumPy.**
31. **Generate a 2D array F of shape (5, 5) with random integer values between 1 and 100. Compute the mean and standard deviation for each row and each column separately using NumPy functions.**
32. **How do you Extract the diagonal elements of a square 2D NumPy array matrix.**

Most Popular Python Interview Questions

1. **What is the Difference Between a Shallow Copy and Deep Copy?**
2. **How is Multithreading Achieved in Python?**
3. **Discuss Django Architecture?**
4. **What Advantages Does the Numpy Array Have over a Nested List**
5. **What are pickling and Unpickling?**
6. **How memory is managed in Python?**
7. **Are Arguments in python passed by value or by reference?**
8. **How Would You generate Random Numbers in Python?**
9. **What does the // Operator Do?**
10. **What does "is" Operator Do?**
11. **What is the purpose of pass statement?**
12. **How will you check if all the character in a string are alphanumeric?**
13. **How will you merge Elements in a sequence?**
14. **How Would You Remove All Leading Whitespace in a String?**
15. **How Would You Replace All Occurrences of a Substring with a New String?**
16. **What Is the Difference Between Del and Remove() on Lists?**
17. **How Do You Display the Contents of a Text File in Reverse Order?**
18. **Differentiate Between append() and extend().**
19. **What Is the Output of the below Code? Justify Your Answer.**
20. **What Is the Difference Between a List and a Tuple?**
21. **What Is Docstring in Python?**
22. **How Do You Use Print() Without the Newline?**
23. **How Do You Use the Split() Function in Python?**
24. **Is Python Object-oriented or Functional Programming?**
25. **Write a Function Prototype That Takes a Variable Number of Arguments.**

26. **What Are *args and *kwargs?**

27. **“in Python, Functions Are First-class Objects.” What Do You Infer from This?**

28. **What Is the Output Of: Print(_____name___)? Justify Your Answer.**

29. **What Is a Numpy Array?**

30. **What Is the Difference Between Matrices and Arrays?**

31. **How Do You Get Indices of N Maximum Values in a Numpy Array?**

32. **How Would You Obtain the Res_set from the Train_set and the Test_set from Below?**

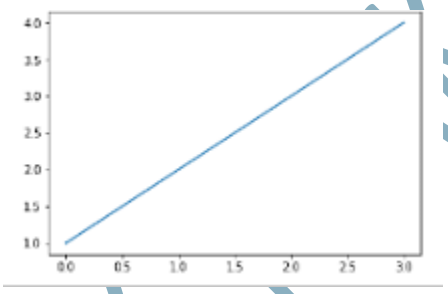
33. **How Would You Import a Decision Tree Classifier in Sklearn? Choose the Correct Option.**

34. **You Have Uploaded the Dataset in Csv Format on Google Spreadsheet and Shared It Publicly. How Can You Access This in Python?**

35. **What Is the Difference Between the Two Data Series given Below?**

36. **You Get the Error “temp.Csv” While Trying to Read a File Using Pandas. Which of the Following Could Correct It?**

37. **How Do You Set a Line Width in the Plot given Below?**



38. **How Would You Reset the Index of a Dataframe to a given List? Choose the Correct Option.**

39. **How Can You Copy Objects in Python?**

40. **What Is the Difference Between range() and xrange() Functions in Python?**

41. **How Can You Check Whether a Pandas Dataframe Is Empty or Not?**

42. **Write a Code to Sort an Array in Numpy by the (N-1)Th Column.**

43. **How Do You Create a Series from a List, Numpy Array, and Dictionary?**

44. **How Do You Get the Items Not Common to Both Series a and Series B?**

45. **How Do You Keep Only the Top Two Most Frequent Values as It Is and Replace Everything Else as 'other' in a Series?**

46. **How Do You Find the Positions of Numbers That Are Multiples of Three from a Series?**

47. **How Do You Compute the Euclidean Distance Between Two Series?**

48. **How Do You Reverse the Rows of a Data Frame?**

49. **If You Split Your Data into Train/Test Splits, Is It Possible to over Fit Your Model?**

50. **Which Python Library Is Built on Top of Matplotlib and Pandas to Ease Data Plotting?**

51. **What are the important features of Python?**

52. **What type of language is Python?**

53. **Explain how Python is an interpreted language.**

54. **What is PEP 8?**

55. **Explain Python namespace.**

56. **What are decorators in Python?**

57. **How to use decorators in Python?**

58. **Differentiate between .pyc and .py.**
59. **What is slicing in Python?**
60. **How to use the slicing operator in Python?**
61. **What are keywords in python?**
62. **How to combine dataframes in Pandas?**
63. **What are the key features of the Python 3.9.0.0 version?**
64. **In Python, how is memory managed?**
65. **Explain PYTHONPATH.**
66. **Explain global variables and local variables in Python.**
67. **Is Python case sensitive?**
68. **How to install Python on Windows and set path variables?**
69. **Is it necessary to indent in Python?**
70. **On Unix, how do you make a Python script executable?**
71. **What is the use of self in Python?**
72. **What are the literals in Python?**
73. **What are the types of literals in Python?**
74. **What are Python modules? Name a few Python built-in modules that are often used.**
75. **What is _init_?**
76. **What is the Lambda function?**
77. **Why Lambda is used in Python?**
78. **How does continue, break, and pass work?**
79. **What are Python iterators?**
80. **Differentiate between range and xrange.**
81. **What are unpickling and pickling?**

82. **What are generators in Python?**

83. **How do you copy an object in Python?**

84. **In Python, are arguments provided by value or reference?**

85. **How to delete a file in Python?**

86. **Explain join() and split() functions in Python.**

87. **Explain **kwargs and *args.**

88. **What are negative indexes and why are they used?**

89. **How will you capitalize the first letter of string?**

90. **What method will you use to convert a string to all lowercase?**

91. **In Python, how do you remark numerous lines?**

92. **What are docstrings?**

93. **What is the purpose of 'not', 'is', and 'in' operators?**

94. **What are the functions help() and dir() used for in Python?**

95. **Why isn't all the memory de-allocated when Python exits?**

96. **What is a dictionary in Python?**

97. **In Python, how do you utilize ternary operators?**

98. **Explain the split(), sub(), and subn() methods of the Python "re" module.**

99. **What are negative indexes and why do we utilize them?**

100. **Explain Python packages.**