Name: Jadhav Ramesha Adhikrao. Batch : D9

college Name : DACOE karad.

Page No.

Date

26/30

Q.1 Explain the concept of broadcasting in Numpy provide an example?

→

Broadcasting in Numpy is a powerful mechanism that allow Numpy to perform operations on array of different shapes & sizes without the need for explicit looping. The smaller array is "broadcast" across the larger array so that they have compatible shapes for element-wise operations.

1) IF the array have, a different no. of dimensions, pad the smaller array's shape with ones on its left side.

2) compare the sizes of corresponding dimensions.

eg.

```
import numpy as np.
 # creating a 3x3 array.
  arr-a = np.array ([[1,2,3]
                     [,4,5,6]
                     [7,8,9]])
# creating a 1x3 array.
  arr-b = np. array ([10,20,30])
# Broadcasting arr_b to the shape of arr-a.
  result = arr-a + arr-b
# Displaying result
 print (result.)
```

performs

In this example, 'arr-a' is 3x3 array & 'arr-b' is 1x3 array. we can add these arrays dieectly. and Numpy will automatically broadcast 'arr-b' to the shape of 'arr-a' before performing the addition operation.

The result will be :

```
[[11, 22, 33],
 [14, 25, 36],
 [17, 28, 39]]
```

Numpy automatically broadcast the smaller array 'arr-b' across the larger array 'arr-a' so that the shape becomes compatible for element - wise addition.

Q.2 Describe the difference bet^n np.dot () & np.matmul () in numpy, when wowld you use each function ?

→ Both 'np.dot()' & 'np. matmul()' f^n in Numpy are used for matrix multiplication.

1) 'NP. dot ()' :-

i) 'NP. dot (a,b)' computes the dot product of two arrays.

ii) for 2-D arrays, if performs matrix multiplication , & for 1-D arrays , it performs inner product (dot product)

eg

```
import numpy as np

A = np. array ([[1,2] ,[3,4]])
B = np. array ([[5,6], [7,8]])

result_dot = np. dot (A,B)
print (result_dot)
```

9

2) 'np. matmul ()' :-

i) 'np. matmul (a,b)' also performs matrix multiplication, & it has the same behavior as 'np. dot ()'

eg.

```
import numpy as np
A = np. array ([[1,2] [3,4]])
B = np. array ([[5,6] [7,8]])

result-matmul = np. matmul (A,B)
Print (result -matmul)
```

- when to use each function

i) use 'np. dot ()' when working with 1-D arrays, as it computes the dot product for them.

ii) Use 'np. matul ()' when you want to be explici about matrix multiplication and for better radability.

Page No.
Date

Q.3

```
——→a] import pandas as Pd.
      first-a-rows = saler -data. head ()
      print (first_a_rows)

   b] data_types : Sales - data. dtypes
1/2   print (data - types)
```

Q.4

```
c]  Import pandas as Pd.
    Sales - data ['price_per-unit] = 10
    Sales - data ['Total _ sales']
          = Sales- data ['Quantity_sold']*
            sales - data ['price_per_unit]
   Print (sales - data)

d] sales- data ["Transaction_Date'] = Pd. to_dateme
                          (sales_data['Transaction_Date'])
   print (sales_data)
```

Q.5)

```
——→ import pandas as Pd

average - quantity- per - product = Sales - data. groupby
              ('product-ID') ('Quantity-sold'
                  mean().
```

Q.6) a) Numerical python

Q.7) b) arr= numpy_array ([1,2,3])

Q.8) a) create an array filled with zeros.

Q.9) a) A two-dimensional labelled data structure

Q.10) c) df ['column-name']

Q.11) b) students_data ['Age']

Q.12) b) sum(sales-data['Price'] * Sales-data ['Quantity Sold'])

Q.13) a) Numpy is primarily used for data manipulat
& mathematical operation on homogeneous arrays.
while pandas provides high-level data
structures & function to manipulate &
analyze structured data like Dataframes.

Q.14) a) df. iloc [:3]

Q.15) a) Drops all rows with missing values.

Q.16) a) df. apply ()

Q.17) a) df. sort_values ('column_name')

Q.18) b) Returns the largest n values in a specific
column.

Q.19) c) df. to - csv ('Output. csv')
1

Q.20) b) converts a'')column to datatime format
1

Q.20) a) df. fillna ()
1