**ASSIGNMENT – 8**

1. Write a NumPy program to test whether none of the elements of a given array is zero.
2. Write a NumPy program to test whether any of the elements of a given array is non-zero.
3. Write a NumPy program to test a given array element-wise for finiteness (not infinity or not a Number).
4. Write a NumPy program to test whether two arrays are element-wise equal within a tolerance.
5. Write a NumPy program to create an element-wise comparison (greater, greater\_equal, less and less\_equal) of two given arrays.
6. Write a NumPy program to create an array of the integers from 30 to70
7. Write a NumPy program to create a 3x3 identity matrix.
8. Write a NumPy program to generate a random number between 0 and 1.
9. Write a NumPy program to find the number of rows and columns of a given matrix.
10. Write a NumPy program to create a 3x3 identity matrix, i.e. diagonal elements are 1, the rest are 0.
11. Write a NumPy program to concatenate element-wise two arrays of string.  
    Expected Output:  
    Array1:  
    ['Python' 'PHP']  
    Array2:  
    [' Java' ' C++']  
    new array:  
    ['Python Java' 'PHP C++']
12. Write a NumPy program to capitalize the first letter, lowercase, uppercase, swapcase, title-case of all the elements of a given array.   
    Expected Output:  
    Original Array:  
    ['python' 'PHP' 'java' 'C++']  
    Capitalized: ['Python' 'Php' 'Java' 'C++']  
    Lowered: ['python' 'php' 'java' 'c++']  
    Uppered: ['PYTHON' 'PHP' 'JAVA' 'C++']  
    Swapcased: ['PYTHON' 'php' 'JAVA' 'c++']  
    Titlecased: ['Python' 'Php' 'Java' 'C++']
13. Write a NumPy program to display all the dates for the month of March, 2017.
14. Write a NumPy program to get the dates of yesterday, today and tomorrow.
15. Write a NumPy program to count the number of days of specific month.
16. Write a NumPy program to convert a list of numeric value into a one-dimensional NumPy array.   
    Expected Output:  
    Original List: [12.23, 13.32, 100, 36.32]  
    One-dimensional NumPy array: [ 12.23 13.32 100. 36.32]
17. Write a NumPy program to create a 3x3 matrix with values ranging from 2 to 10.    
    Expected Output:  
    [[ 2 3 4]  
    [ 5 6 7]  
    [ 8 9 10]]
18. Write a NumPy program to reverse an array (first element becomes last).    
    Original array:  
    [12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37]  
    Reverse array:  
    [37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12]
19. Write a NumPy program to find common values between two arrays.    
    Expected Output:  
    Array1: [ 0 10 20 40 60]  
    Array2: [10, 30, 40]  
    Common values between two arrays:  
    [10 40]
20. Write a NumPy program to get the unique elements of an array.

Expected Output:  
Original array:  
[10 10 20 20 30 30]  
Unique elements of the above array:  
[10 20 30]  
Original array:  
[[1 1]  
[2 3]]  
Unique elements of the above array:  
[1 2 3]

1. Write a NumPy program compare two given arrays.

Array a: [1 2]  
Array b: [4 5]  
a > b  
[False False]  
a >= b  
[False False]  
a < b  
[ True True]  
a <= b  
[ True True]

1. Write a Pandas program to get the powers of an array values element-wise.   
   Note: First array elements raised to powers from second array  
   Sample data: {'X':[78,85,96,80,86], 'Y':[84,94,89,83,86],'Z':[86,97,96,72,83]}  
   Expected Output:  
   X Y Z  
   0 78 84 86  
   1 85 94 97  
   2 96 89 96  
   3 80 83 72  
   4 86 86 83
2. Write a Pandas program to get the first 3 rows of a given DataFrame.   
   Sample Python dictionary data and list labels:  
   exam\_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
   'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
   'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
   'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
   labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']  
   Expected Output:  
   First three rows of the data frame:  
   attempts name qualify score  
   a 1 Anastasia yes 12.5  
   b 3 Dima no 9.0  
   c 2 Katherine yes 16.5
3. Write a Pandas program to count the number of rows and columns of a DataFrame.   
   Sample Python dictionary data and list labels:  
   exam\_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
   'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
   'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
   'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
   labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']  
   Expected Output:  
   Number of Rows: 10  
   Number of Columns: 4
4. Write a Pandas program to select the rows the score is between 15 and 20 (inclusive).   
   Sample Python dictionary data and list labels:  
   exam\_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
   'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
   'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
   'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
   labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']  
   Expected Output:  
   Rows where score between 15 and 20 (inclusive):  
   attempts name qualify score  
   c 2 Katherine yes 16.5  
   f 3 Michael yes 20.0  
   j 1 Jonas yes 19.0
5. Write a Pandas program to calculate the sum of the examination attempts by the students.  
   Sample Python dictionary data and list labels:  
   exam\_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
   'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
   'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
   'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
   labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']  
   Expected Output:  
   Sum of the examination attempts by the students:  
   19
6. Write a Pandas program to calculate the mean score for each different student in DataFrame.    
   Sample Python dictionary data and list labels:  
   exam\_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
   'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
   'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
   'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
   labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']  
   Expected Output:  
   Mean score for each different student in data frame:  
   13.5625
7. Write a Pandas program to change the name 'James' to 'Suresh' in name column of the DataFrame.   
   Sample Python dictionary data and list labels:  
   exam\_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
   'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
   'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
   'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
   labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']  
   Expected Output:  
   Change the name 'James' to \?Suresh\?:  
   attempts name qualify score  
   a 1 Anastasia yes 12.5  
   b 3 Dima no 9.0  
   .......  
   i 2 Kevin no 8.0  
   j 1 Jonas yes 19.0
8. Write a Pandas program to delete the 'attempts' column from the DataFrame.    
   Sample Python dictionary data and list labels:  
   exam\_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
   'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
   'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
   'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
   labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']  
   Expected Output:  
   Delete the 'attempts' column from the data frame:  
   name qualify score  
   a Anastasia yes 12.5  
   b Dima no 9.0  
   .....  
   i Kevin no 8.0  
   j Jonas yes 19.0
9. Write a Pandas program to insert a new column in existing DataFrame.    
   Sample Python dictionary data and list labels:  
   exam\_data = {'name': ['Anastasia', 'Dima', 'Katherine', 'James', 'Emily', 'Michael', 'Matthew', 'Laura', 'Kevin', 'Jonas'],  
   'score': [12.5, 9, 16.5, np.nan, 9, 20, 14.5, np.nan, 8, 19],  
   'attempts': [1, 3, 2, 3, 2, 3, 1, 1, 2, 1],  
   'qualify': ['yes', 'no', 'yes', 'no', 'no', 'yes', 'yes', 'no', 'no', 'yes']}  
   labels = ['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h', 'i', 'j']  
   Expected Output:  
   New DataFrame after inserting the 'color' column  
   attempts name qualify score color  
   a 1 Anastasia yes 12.5 Red  
   b 3 Dima no 9.0 Blue  
   .......  
   i 2 Kevin no 8.0 Green  
   j 1 Jonas yes 19.0 Red
10. Write a Pandas program to rename columns of a given DataFrame.   
    Sample data:  
    Original DataFrame  
    col1 col2 col3  
    0 1 4 7  
    1 2 5 8  
    2 3 6 9  
    New DataFrame after renaming columns:  
    Column1 Column2 Column3  
    0 1 4 7  
    1 2 5 8  
    2 3 6 9
11. Write a Pandas program to select rows from a given DataFrame based on values in some columns.    
    Sample data:  
    Original DataFrame  
    col1 col2 col3  
    0 1 4 7  
    1 4 5 8  
    2 3 6 9  
    3 4 7 0  
    4 5 8 1  
    Rows for colum1 value == 4  
    col1 col2 col3  
    1 4 5 8  
    3 4 7 0
12. Write a Pandas program to count city wise number of people from a given of data set (city, name of the person).    
    Sample data:  
    city Number of people  
    0 California 4  
    1 Georgia 2  
    2 Los Angeles 4
13. Write a Pandas program to add, subtract, multiple and divide two Pandas Series.   
    Sample Series: [2, 4, 6, 8, 10], [1, 3, 5, 7, 9]
14. Write a Pandas program to compare the elements of the two Pandas Series.   
    Sample Series: [2, 4, 6, 8, 10], [1, 3, 5, 7, 10]
15. Write a Pandas program to convert a dictionary to a Pandas series.    
    Sample Series:  
    Original dictionary:  
    {'a': 100, 'b': 200, 'c': 300, 'd': 400, 'e': 800}  
    Converted series:  
    a 100  
    b 200  
    c 300  
    d 400  
    e 800  
    dtype: int64
16. Write a Pandas program to convert a NumPy array to a Pandas series.    
    Sample Series:  
    NumPy array:  
    [10 20 30 40 50]  
    Converted Pandas series:  
    0 10  
    1 20  
    2 30  
    3 40  
    4 50  
    dtype: int64
17. Write a Pandas program to convert all the string values to upper, lower cases in a given pandas series. Also find the length of the string values.
18. Write a Pandas program to remove whitespaces, left sided whitespaces and right sided whitespaces of the string values of a given pandas series.
19. Write a Pandas program to find the index of a substring of DataFrame with beginning and end position.
20. Write a Pandas program to check whether alpha numeric values present in a given column of a DataFrame.
21. Write a Pandas program to check whether only numeric values present in a given column of a DataFrame.
22. Write a Pandas program to check whether only lower case or upper case is present in a given column of a DataFrame.
23. Write a Pandas program to check whether only space is present in a given column of a DataFrame.
24. Write a Pandas program to get the length of the string present of a given column in a DataFrame.
25. Write a Pandas program to get the length of the integer of a given column in a DataFrame.
26. Write a Pandas program to convert a specified character column in upper/lower cases in a given DataFrame.
27. Write a Pandas program to split a string of a column of a given DataFrame into multiple columns.