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1) Perform all matrix operations

```python
import numpy as np

a = np.array([[1,2,3],[4,5,6],[7,8,9]])
b = np.array([[11,12,13],[14,15,16],[17,18,19]])

print("Addition of matrix: \n",np.add(a,b))

print("Subtraction of  matrix: \n",np.subtract(a,b))

print("Multiplication of  matrix: \n",np.multiply(a,b))

print("Division of  matrix: \n",np.divide(a,b))

print("Mod of matrix : \n",np.mod(a,b))

print("Transpose of matrix : \n",np.transpose(a))

print("Dot of matrix : \n",np.dot(a,b))
```

```
Addition of matrix:
 [[12 14 16]
 [18 20 22]
 [24 26 28]]
Subtraction of  matrix:
 [[-10 -10 -10]
 [-10 -10 -10]
 [-10 -10 -10]]
Multiplication of  matrix:
 [[ 11  24  39]
 [ 56  75  96]
 [119 144 171]]
Division of  matrix:
 [[0.09090909 0.16666667 0.23076923]
 [0.28571429 0.33333333 0.375     ]
 [0.41176471 0.44444444 0.47368421]]
Mod of matrix :
 [[1 2 3]
 [4 5 6]
 [7 8 9]]
Transpose of matrix :
 [[1 4 7]
 [2 5 8]
 [3 6 9]]
Dot of matrix :
 [[ 90  96 102]
 [216 231 246]
 [342 366 390]]
```

2) Horizontal and vertical stacking

```
import numpy as np
print("Horizontal Stacking :")
print(np.hstack((a,b)))

print("Vertical Stacking :")
print(np.vstack((a,b)))
```

```
Horizontal Stacking :
[[ 1  2  3 11 12 13]
 [ 4  5  6 14 15 16]
 [ 7  8  9 17 18 19]]
Vertical Stacking :
[[ 1  2  3]
 [ 4  5  6]
 [ 7  8  9]
 [11 12 13]
 [14 15 16]
 [17 18 19]]
```

3) Custom sequence generation

Custom sequence generation

```
import numpy as np

# Generate a sequence from 0 to 9 (exclusive)
A = np.arange(10)

# Generate 5 equally spaced values from 0 to 1
B = np.linspace(0, 1, 5)

# Generate 10 logarithmically spaced values from 1 to 100
C = np.logspace(0, 2, 10)

# Print the results
print("arange:")
print(A)

print("\n\nlinspace:")
print(B)

print("\n\nlogspace:")
print(C)
```

```
arange:
[0 1 2 3 4 5 6 7 8 9]

linspace:
[0.   0.25 0.5  0.75 1.  ]

logspace:
[  1.          1.66810054   2.7825594    4.64158883   7.74263683
  12.91549665 21.5443469  35.93813664 59.94842503 100.        ]
```

4) Arithmetic and static operators,Mathematical operators, bit wise operators

Arithmetic and Statistical Operations, Mathematical Operations, Bitwise Operators

```python
import numpy as np

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

# Addition
C = A + B

# Subtraction
D = A - B

# Statistical operations
E = np.mean(A)  # Mean
F = np.max(B)  # Maximum value

# Mathematical operations
G = np.sqrt(A)  # Square root

# Bitwise operators
H = np.bitwise_and(A, B)  # Bitwise AND

# Print the results
print("Addition:")
print(C)

print("\n\nSubtraction:")
print(D)

print("\n\nMean:")
print(E)

print("\n\nMaximum value:")
print(F)

print("\n\nSquare root:")
print(G)

print("\n\nBitwise AND:")
print(H)
```

```
Addition:
[ 6  8 10 12]


Subtraction:
[-4 -4 -4 -4]


Mean:
2.5


Maximum value:
8


Square root:
[1.         1.41421356 1.73205081 2.        ]


Bitwise AND:
[1 2 3 0]
```

5) copying and veiwing arrays

```python
import numpy as np

# Create an array
A = np.array([1, 2, 3, 4, 5])

# Copy the array
B = np.copy(A)
# Alternatively: B = A.copy()

# Create a view of the array
C = A[1:4]
# Alternatively: C = A.view()

# Print the results
print("Copied array:")
print(B)

print("\n\nView of the array:")
print(C)
```

```
Copied array:
[1 2 3 4 5]


View of the array:
[2 3 4]
```

6) data stacking, searching,sorting,counting,broadcasting

```python
import numpy as np
array3= np.loadtxt("stud2.csv",delimiter=",",dtype=str,skiprows=1)
print(array3)

math = []
reading = []
writing = []
group = []
gender = []
level = []
course = []
total = []

for i in array3:
    gender.append(i[0])
    group.append(i[1])
    level.append(i[2])
    course.append(i[3])
    math.append(int(i[4]))
    reading.append(int(i[5]))
    writing.append(int(i[5]))
    total.append([int(i[4]),int(i[5]),int(i[6])])
gender_array = np.array(gender)
group_array = np.array(group)
level_array = np.array(level)
course_array= np.array(course)
math_array = np.array(math)
reading_array = np.array(reading)
writing_array = np.array(writing)
total_array = np.array(total)
```

```
[['female' 'group B' "bachelor's degree" 'none' '72' '72' '74']
 ['female' 'group C' 'some college' 'completed' '69' '90' '88']
 ['female' 'group B' "master's degree" 'none' '90' '95' '93']
 ['male' 'group A' "associate's degree" 'none' '47' '57' '44']
 ['male' 'group C' 'some college' 'none' '76' '78' '75']
 ['female' 'group B' "associate's degree" 'none' '71' '83' '78']
 ['female' 'group B' 'some college' 'completed' '88' '95' '92']
 ['male' 'group B' 'some college' 'none' '40' '43' '39']
 ['male' 'group D' 'high school' 'completed' '64' '64' '67']
 ['female' 'group B' 'high school' 'none' '38' '60' '50']
 ['male' 'group C' "associate's degree" 'none' '58' '54' '52']
 ['male' 'group D' "associate's degree" 'none' '40' '52' '43']
 ['female' 'group B' 'high school' 'none' '65' '81' '73']
 ['male' 'group A' 'some college' 'completed' '78' '72' '70']
 ['female' 'group A' "master's degree" 'none' '50' '53' '58']
 ['female' 'group C' 'some high school' 'none' '69' '75' '78']
 ['male' 'group C' 'high school' 'none' '88' '89' '86']
 ['female' 'group B' 'some high school' 'none' '18' '32' '28']
 ['male' 'group C' "master's degree" 'completed' '46' '42' '46']
 ['female' 'group C' "associate's degree" 'none' '54' '58' '61']
 ['male' 'group D' 'high school' 'none' '66' '69' '63']
 ['female' 'group B' 'some college' 'completed' '65' '75' '70']
 ['male' 'group D' 'some college' 'none' '44' '54' '53']
 ['female' 'group C' 'some high school' 'none' '69' '73' '73']
 ['male' 'group D' "bachelor's degree" 'completed' '74' '71' '80']
 ['male' 'group A' "master's degree" 'none' '73' '74' '72']]
```

1) Average score of female candadtes in maths

```python
#Using Searching Method we can find index
x = np.array(np.where(gender_array == 'female'))
#using Average Method
y= np.average(math_array[x])
#using Sum/Len   method
z = np.sum(math_array[x])/(x.size)

print("Average score of feamale candidates is :\n",y,"(Using Average Method)\n",z,"(Using Sum/len methode)" )
```

```
Average score of feamale candidates is :
 62.92307692307692 (Using Average Method)
 62.92307692307692 (Using Sum/len methode)
```

Difference Between Highest Score in reading from Male and Female Candidate

```python
[32] #searching
     x = np.array(np.where(gender_array == 'male' ))

     y = np.array(np.where(gender_array == 'female'))
     # by using max function finding max and getting difference
     z= np.max(reading_array[y])-np.max(reading_array[x])

     print("Difference Between Highest Score in reading from Male and Female Candidate is :",z)

     Difference Between Highest Score in reading from Male and Female Candidate is : 6
```

Total marks of all students

```python
# by addition of arrays

z = math_array + reading_array + writing_array

print("Total marks of students are",z)
```

```
Total marks of students are [216 249 280 161 232 237 278 126 192 158 166 144 227 222 156 219 266  82
 130 170 204 215 152 215 216 221]
```

What is lowest and Highest average of all subject

```python
# by using we creat array of average

x = np.array([np.average(math_array),np.average(reading_array),np.average(writing_array)])

print("Lowest average is",np.min(x),"of","\nHighest average=",np.max(x))
```

```
Lowest average is 62.0 of
Highest average= 67.73076923076923
```

What is median marks of every subject

```python
x = np.median(math_array)
y = np.median(reading_array)
z = np.median(writing_array)
print("Median marks of math:",x,"\nMedian marks of reading:",y,"\nMedian marks of writing:",z)
```

```
Median marks of math: 65.5
Median marks of reading: 71.5
Median marks of writing: 71.5
```

Dataset
https://drive.google.com/file/d/17R3QZl6RwVU_udz_IZaoX_A7-ooZygim/view?usp=drive_link