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DS Lab3  
Roll No 23

1)

```
num = int(input('Enter number whose factors have to be found '))
for x in range(1,num):
    if (num % x)==0:
        print (x)
```

```
rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/19090515exercises/ex1.py$ python3 ex1.py
Enter number whose factors have to be found 24
1
2
3
4
6
8
12
rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS$
```

2)

```
import numpy as np
mat=np.array([[1,2,3],[4,5,6],[7,8,9]])
colsum=np.sum(mat, axis=0)    ### column-wise sums
rowsum=np.sum(mat, axis=1)    ### row-wise sums
print(colsum)
print(rowsum)
```

```
rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS/Lab3/exercises$ python3 ex2.py
[12 15 18]
[ 6 15 24]
rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS/Lab3/exercises$
```

Ln 6, Col 14 Sp

3)

```
import numpy as np
# Create ndarray from a list
npArray = np.array([1,2,3,4,5,6,7,8,9])
print('Contents of the ndarray : ')
print(npArray)
# Create ndarray from a tuple
npArray = np.array( (11,22,33,44,55,66,77,88) )
print('Contents of the ndarray : ')
print(npArray)
```

```

#create 3x4 array with 0
z=np.zeros((3,4))
print(z)
# sequence from 0 to 20 with steps of 5
print(list(range(0,21,5)))
# reshape matrix
a = np.array([[1,2,3,10], [4,5,6,9], [1,2,3,4]])
print("a=")
print(a)
print(a.shape)
print("b=")
b = np.reshape(a, (2,2,3))
print(b)
print(b.shape)
# min max sum of matrix
mat=np.array([[1,2,3],[4,5,6],[7,8,9]])
# 1 2 3
# 4 5 6
# 7 8 9
i=0
for x in mat:
    print(i," row =")
    print("sum=",np.sum(x))
    print("min=",x.min())
    print("max=",x.max())
    i+=1

colsumarr=np.sum(mat,axis=0)
colmaxarr=np.max(mat,axis=0)
colminarr=np.min(mat,axis=0)
i=0
for x in range(0,len(colsumarr)):
    print("col idx =",i)
    print("sum=",colsumarr[x])
    print("min=",colminarr[x])
    print("max=",colmaxarr[x])
    i+=1

```

```
sum= 18
min= 9
max= 3
rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS/Lab3/exercises$ python3 ex3.py
Contents of the ndarray :
[1 2 3 4 5 6 7 8 9]
Contents of the ndarray :
[[11 22 33 44 55 66 77 88]
 [0. 0. 0. 0.]
 [0. 0. 0. 0.]
 [0. 0. 0. 0.]]
[0. 5, 10, 15, 20]
a=
[[[ 1  2  3 10]
  [ 4  5  6  9]
  [ 1  2  3  4]]]
(3, 4)
b=
[[[ 1  2  3]
  [10  4  5]]]
([ 6  9  1]
 [ 2  3  4]])
(2, 2, 3)
0 row =
sum= 6
min= 1
max= 3
1 row =
sum= 15
min= 4
max= 6
2 row =
sum= 24
min= 7
max= 9
col idx = 0
sum= 12
min= 1
max= 7
col idx = 1
sum= 15
min= 2
max= 8
col idx = 2
```

4)

```
x = [[12,72],
     [4 ,15],
     [33 ,28]]

result = [[0,0,0],
          [0,0,0]]

for i in range(len(X)):
    for j in range(len(X[0])):
        result[j][i] = X[i][j]

for r in result:
    print(r)

rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS/Lab3/exercises$ python3 ex4.py
[12, 4, 33]
[72, 15, 28]
rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS/Lab3/exercises$
```

5)

```
x = [[12,72],
     [4 ,15],
     [33 ,28]]
```

```

Y = [[12,72],
      [4 ,15],
      [33 ,28]]
Z = [[0,0],
      [0,0],
      [0,0]]
for i in range(0,len(X)):
    for j in range(0,len(X[0])):
        Z[i][j]=X[i][j]+Y[i][j]
for i in range(0,len(X)):
    for j in range(0,len(X[0])):
        print(Z[i][j],end=" ")
    print('\n')

```

TypeError: list object cannot be interpreted as an integer

```

rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS/Lab3/exercises$ python3 ex5.py
24,144,
8,30,
66,56,
rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS/Lab3/exercises$ 

```

6)

```

import numpy as np
X = [[1,2],
      [4 ,5],
      [3 ,2]]
Y = [[1,2,3,4],
      [1,6,5,2]]
m=len(X)
n=len(X[0])
p=len(Y)
q=len(Y[0])
if n!=p:
    print("Cannot multiply the matrices")
else:
    Z=np.zeros( (m,q) )
    # m*n X p*q = m*q where n=p

```

```
# all n * all p and put in
for a in range(0,m):
    for b in range (0,q):
        sum=0
        for i in range(0,n):
            sum+=X[a][i]*Y[i][b]
            i+=1
        print(sum,end=",")
    print('\n')
```

```
rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS/Lab3/exercises$ python3 ex6.py
3,14,13,8,
9,38,37,26,
5,18,19,16,
rhea@rhea-Lenovo-IdeaPad-S145-15IWL:~/data/190905156_DS/Lab3/exercises$
```