

EN2550_Exercise1._190621M

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0.0.1 Exercise-01

0.0.2 Index No - 190621M

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```
[ ]: #Question 1
for i in range(1,6):
    print(i, ': ', i**2)
```

```
1 : 1
2 : 4
3 : 9
4 : 16
5 : 25
```

```
[ ]: #Question 2
import sympy
for i in range(1,6):
    if not sympy.isprime(i):
        print(i, ': ', i**2)
```

```
1 : 1
4 : 16
```

```
[ ]: #Question 3
squares = [i**2 for i in range(1,6)]
for i in enumerate(squares):
    print(i[0], ': ', i[1])
```

```
0 : 1
1 : 4
2 : 9
3 : 16
4 : 25
```

```
[ ]: #Question 4
squares = [i**2 for i in range(1,6) if not sympy.isprime(i)]
squares
```

```
[ ]: [1, 16]
```

```
[ ]: #Question 5 a
import numpy as np
A = np.array([[1,2],[3,4],[5,6]])
B = np.array([[7,8,9,1],[1,2,3,4]])
print(np.dot(A,B))
print(np.matmul(A,B))
print(A@B)
```

```
[[ 9 12 15  9]
 [25 32 39 19]
 [41 52 63 29]]
[[ 9 12 15  9]
 [25 32 39 19]
 [41 52 63 29]]
[[ 9 12 15  9]
 [25 32 39 19]
 [41 52 63 29]]
```

```
[ ]: #Question 5 b
A = np.array([[1,2],[3,4],[5,6]])
B = np.array([[3,2],[5,4],[3,1]])
print(A*B)
```

```
[[ 3  4]
 [15 16]
 [15  6]]
```

```
[ ]: #Question 6
A = np.random.randint(11, size = (5,7))
B = A[1:4, 0:1]
C = A[:,0:2]
print("B = ")
print(B)
print("C = ")
print(C)
```

```
B =
[[ 2]
 [ 5]
 [10]]
C =
[[ 5  4]
 [ 2  7]
 [ 5  2]
 [10  5]
 [ 0  8]]
```

```
[ ]: #Question 7
#Example 1
import numpy as np
A = np.array([[1,2,3],[14,15,6],[27,28,29]])
B = np.array([10,11,12])
C = A+B
print(C)
```

```
[[11 13 15]
 [24 26 18]
 [37 39 41]]
```

```
[ ]: #Question 7
#Example 2
import numpy as np
C = np.zeros_like(A)
for i in range(3):
    C[i:] = A[i:] + B
print(C)
```

```
[[11 13 15]
 [24 26 18]
 [37 39 41]]
```

```
[ ]: #Question 7
#Example 3
E = np.tile(B, (3,1))
C = A + E
print(C)
```

```
[[11 13 15]
 [24 26 18]
 [37 39 41]]
```

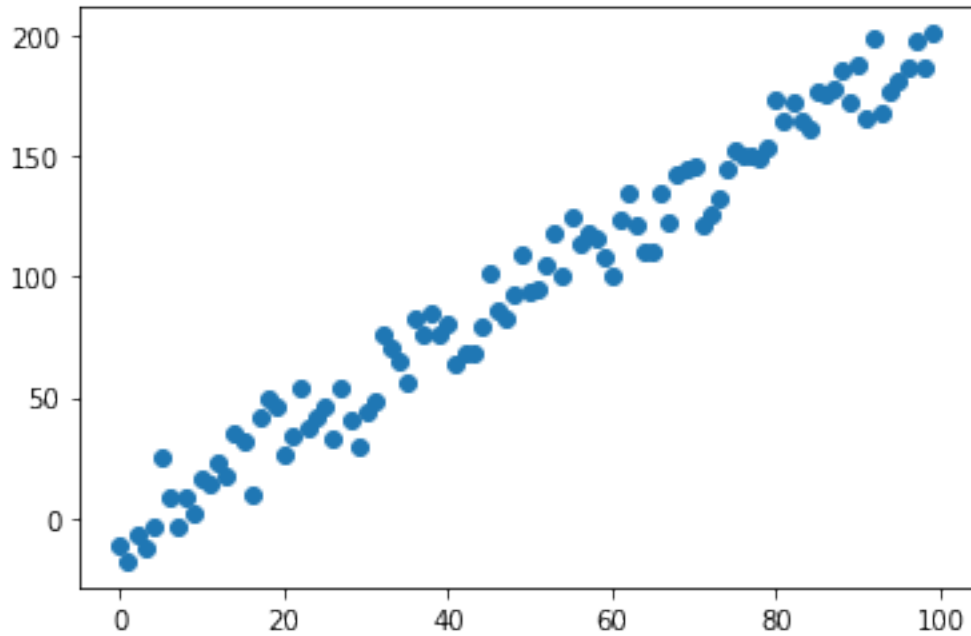
```
[ ]: #Question 8
import numpy as np
from numpy import linalg
import matplotlib.pyplot as plt

m, c = 2 , -4
N = 100
x = np.linspace (0 , N-1, N).reshape (N, 1 )
sigma = 10
y = m*x + c + np . random . normal (0 , sigma , (N, 1 ) )
plt = plt.scatter(x,y)

X = np.append(np.ones((N,1)), x, axis = 1)
W = linalg.inv((X.T@X)@(X.T@y
```

```
print(W)
```

```
[[-6.70079775]  
 [ 2.05998911]]
```



```
[ ]: #Question 10  
import cv2 as cv  
  
im = cv.imread(r'gal_gaussian.png')  
assert im is not None  
  
blur = cv.GaussianBlur(im, (5,5),0)  
  
cv.namedWindow('Image', cv.WINDOW_AUTOSIZE)  
cv.imshow('Image', im)  
cv.waitKey(0)  
cv.imshow('Image', blur)  
cv.waitKey(0)  
cv.destroyAllWindows()
```

```
[ ]: #Question 11  
import cv2 as cv  
  
im = cv.imread(r'gal_sandp.png')  
assert im is not None
```

```

median_im = cv.medianBlur(im,5)
cv.namedWindow('Image', cv.WINDOW_AUTOSIZE)
cv.imshow('Image', median_im)
cv.waitKey(0)
cv.destroyAllWindows()

```

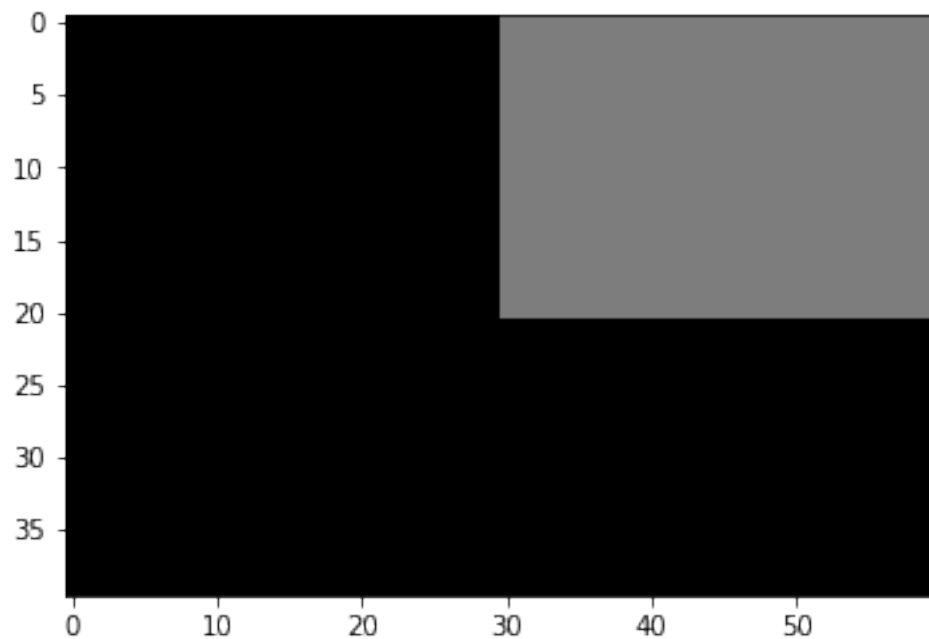
```

[ ]: #Question 12
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt

im = np.zeros((40,60), dtype=np.uint8)
im[0:21, 30:61] = 125

fig,ax = plt.subplots()
ax.imshow(im, cmap='gray', vmin=0,vmax=255)
plt.show()

```



```

[ ]: #Question 13
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt

im = np.zeros((40,60,3), dtype=np.uint8)
im[:] = (0,124,255)

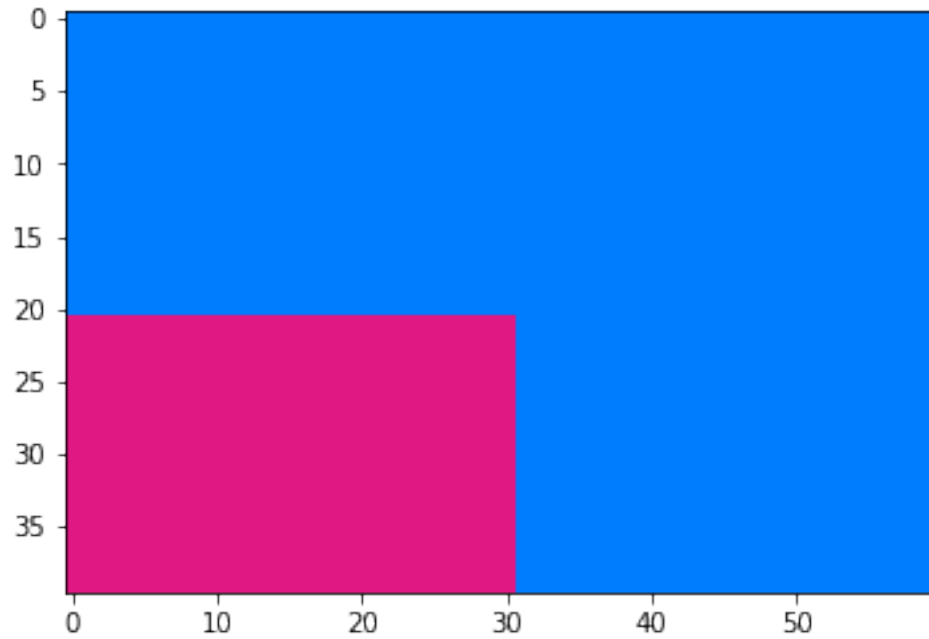
```

```

im[21:41, 0:31] = (224,24,132)

fig,ax = plt.subplots()
ax.imshow(im, cmap='pink', vmin=0,vmax=255)
plt.show()

```



```

[ ]: #Question 14
import cv2 as cv

im = cv.imread(r'tom_dark.jpg')
assert im is not None
im +=20

cv.namedWindow('Image', cv.WINDOW_AUTOSIZE)
cv.imshow('Image', im)
cv.waitKey(0)
cv.destroyAllWindows()

```