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Index : 190144D

```
In [ ]: for i in range(1,6):  
        print(i, ":", i**2)
```

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

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

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

```
In [ ]: squares = [i**2 for i in range(1,6)]  
        for i, g in enumerate(squares):  
            print (i+1, ":", g)
```

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

```
In [ ]: squares = [i**2 for i in range(1,6)]  
        for i, g in enumerate(squares):  
            if not sympy.isprime(i+1):  
                print(i+1, ":", g)
```

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

```
In [ ]: 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.matmul(a,b))
```

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

```
In [ ]: c= np.array ( [[3, 2],[5, 4],[3,1]])  
print(np.multiply(a,c))
```

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

```
In [ ]: d=np.random.randint(11, size=(5, 7))
        print(d)
```

```
[[ 7  7 10  5  1  7  8]
 [ 7  6  9  0  0  2  3]
 [ 8 10  7  4  0  1  3]
 [ 3  0  7  8 10  3  7]
 [ 4  5  9  1  6  5  2]]
```

```
In [ ]: e=d[1:4, :2]
        print(e)
```

```
[[ 7  6]
 [ 8 10]
 [ 3  0]]
```

```
In [ ]: x = np.array([[1,2,3], [4,5,6], [7,8,9]])
        print(x*3)
```

```
[[ 3  6  9]
 [12 15 18]
 [21 24 27]]
```

```
In [ ]: v = np.array([2, 4, 6])
        print(x+v)
```

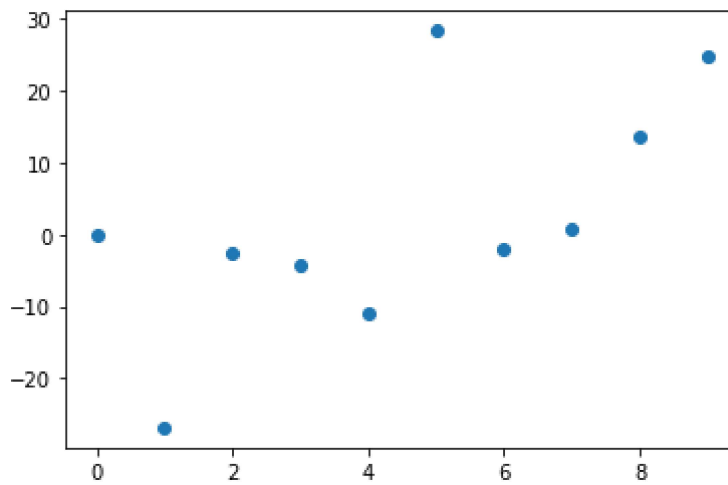
```
[[ 3  6  9]
 [ 6  9 12]
 [ 9 12 15]]
```

```
In [ ]: w = np.array([4,5])
        print(np.reshape(v, (3, 1)) * w)
```

```
[[ 8 10]
 [16 20]
 [24 30]]
```

```
In [ ]: import matplotlib.pyplot as plt
        from numpy import linalg
        m, c = 2, -4
        N = 10
        x = np.linspace(0, N-1, N).reshape(N, 1)
        sigma = 10
        y = m*x + c + np.random.normal(0, sigma, (N, 1))
        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)
```

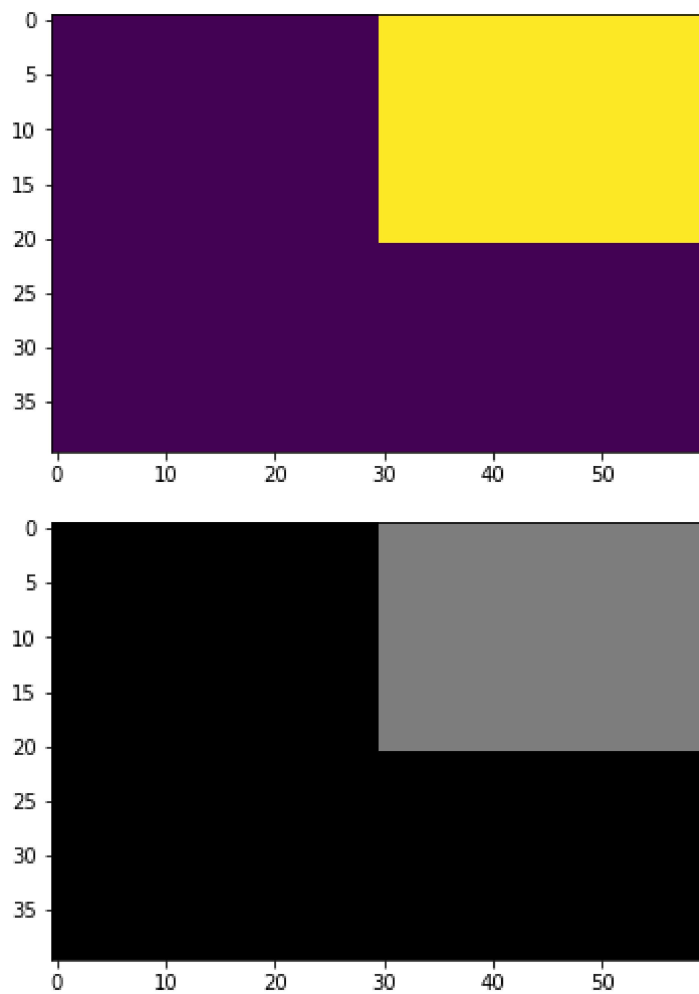
```
[[ -13.39767475]
 [  3.44279996]]
```



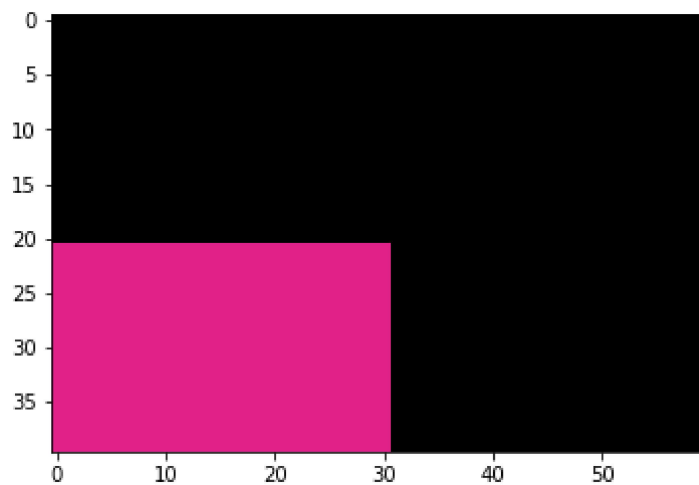
```
In [ ]: import cv2 as cv
im=cv.imread(r'gal_gaussian.png')
blur=cv.GaussianBlur(im,(5,5),0)
cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image',im)
cv.waitKey(0)
cv.imshow('Image',blur)
cv.waitKey(0)
cv.destroyAllWindows()
```

```
In [ ]: im=cv.imread(r'gal_sandp.png')
median = cv.medianBlur(im,5)
cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image',im)
cv.waitKey(0)
cv.imshow('Image',median)
cv.waitKey(0)
cv.destroyAllWindows()
```

```
In [ ]: img = np.zeros((40,60), dtype=np.uint8)
img[0:21, 30:61] = 125
fig, ax = plt.subplots()
ax.imshow(img)
plt.show()
img = np.zeros((40,60), dtype=np.uint8)
img[0:21, 30:61] = 125
fig, ax = plt.subplots()
ax.imshow(img, cmap = 'gray', vmin = 0, vmax = 255)
plt.show()
```



```
In [ ]: img = np.zeros((40,60,3), dtype=np.uint8)
img[21:41, 0:31] = [224, 33, 138]
fig, ax = plt.subplots()
ax.imshow(img)
plt.show()
```



```
In [ ]: img = cv.imread(r'tom_dark.jpg')
value = 80
hsv = cv.cvtColor(img, cv.COLOR_BGR2HSV)
h, s, v = cv.split(hsv)
```

```
lim = 255 - value
v[v > lim] = 255
v[v <= lim] += value
final_hsv = cv.merge((h, s, v))
img2 = cv.cvtColor(final_hsv, cv.COLOR_HSV2BGR)
cv.namedWindow('Image', cv.WINDOW_AUTOSIZE)
cv.imshow('Image', img)
cv.waitKey(0)
cv.imshow('Image', img2)
cv.waitKey(0)
cv.destroyAllWindows()
```