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Index no - 190095C

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

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

In [ ]:
```python
import sympy
```

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

```
1
16
```

In [ ]:
```python
square = [i**2 for i in range(1,6)]
for item in square:
    print(item)
```

```
1
4
9
16
25
```

In [ ]:
```python
unprime_square = [i**2 for i in range(1,6) if not sympy.isprime(i) ]
for item in unprime_square:
    print(item)
```

```
1
16
```

In [ ]:
```python
import numpy as np
```

In [ ]:
```python
matA = np.array([[1,2],[3,4],[5,6]])
matB = np.array([[7,8,9,1],[1,2,3,4]])
matC = np.dot(matA,matB)
print(matC)
```

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

In [ ]:
```python
matA = np.array([[1,2],[3,4],[5,6]])
matB = np.array([[3,2],[5,4],[3,1]])
matC = np.multiply(matA,matB)
print(matC)
```

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

In [ ]:
```python
array1 = np.random.randint(11, size=(5,7))
print(array1)
```

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

In [ ]:
```python
array2 = array1[2:5,0:2]
print(array2)
print(np.size(array2))
```

```
[[2 0]
 [8 8]
 [4 4]]
6
```

In [ ]:
```python
x = np.array([[1,2,3], [4,5,6], [7,8,9], [10, 11, 12]])
v = np.array([1, 0, 1])
vv = np.tile(v, (4, 1))
print(vv)
y = x + vv
print(y)
```

```
[[1 0 1]
 [1 0 1]
 [1 0 1]
 [1 0 1]]
[[ 2  2  4]
 [ 5  5  7]
 [ 8  8 10]
 [11 11 13]]
```

In [ ]:
```python
x = np.array([[1,2,3], [4,5,6], [7,8,9], [10, 11, 12]])
v = np.array([1, 0, 1])
y = x + v
print(y)
```

```
[[ 2  2  4]
 [ 5  5  7]
 [ 8  8 10]
 [11 11 13]]
```

In [ ]:
```python
v = np.array([1,2,3])
w = np.array([4,5])

print(np.reshape(v, (3, 1)) * w)


x = np.array([[1,2,3], [4,5,6]])

print(x + v)


print((x.T + w).T)

print(x + np.reshape(w, (2, 1)))


print(x * 2)
```
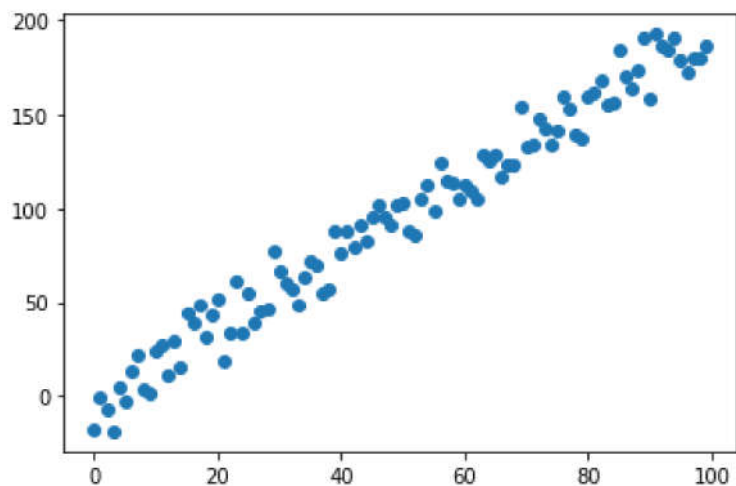
```
[[ 4  5]
 [ 8 10]
 [12 15]]
[[2 4 6]
 [5 7 9]]
[[ 5  6  7]
 [ 9 10 11]]
[[ 5  6  7]
 [ 9 10 11]]
[[ 2  4  6]
 [ 8 10 12]]
```

In [ ]:
```python
import matplotlib.pyplot as plt
from numpy import linalg
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.scatter(x,y)
# print(x)
X = np.append(np.ones((N,1)),x , axis=1)
w = linalg.inv(X.T @ X) @ X.T @ y
w
```

Out[ ]:
```
array([[-2.88867993],
       [ 1.9810694 ]])
```


In [ ]:
```python
import cv2 as cv
im = cv.imread(r'./gal_gaussian.png')

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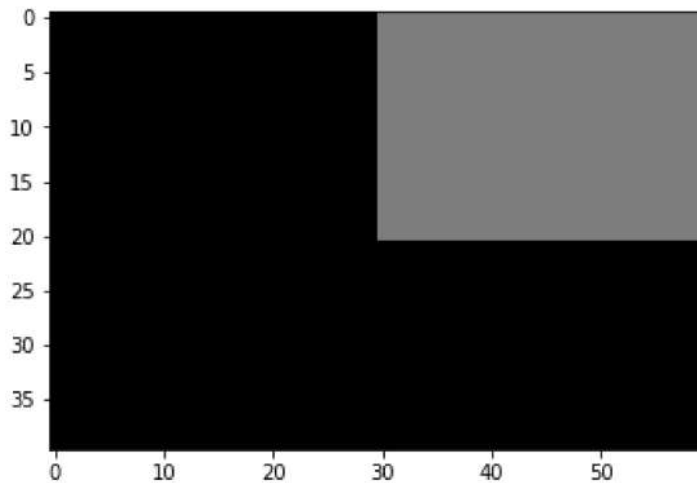
In [ ]:
```python
import cv2 as cv
im = cv.imread(r'./gal_gaussian.png')
blur = cv.GaussianBlur(im,(5,5),0)
cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image',blur)
cv.waitKey(0)
cv.destroyAllWindows()
```

In [ ]:
```python
import cv2 as cv
im = cv.imread(r'./gal_sandp.png')
median_blur= cv.medianBlur(im,3)
cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
```
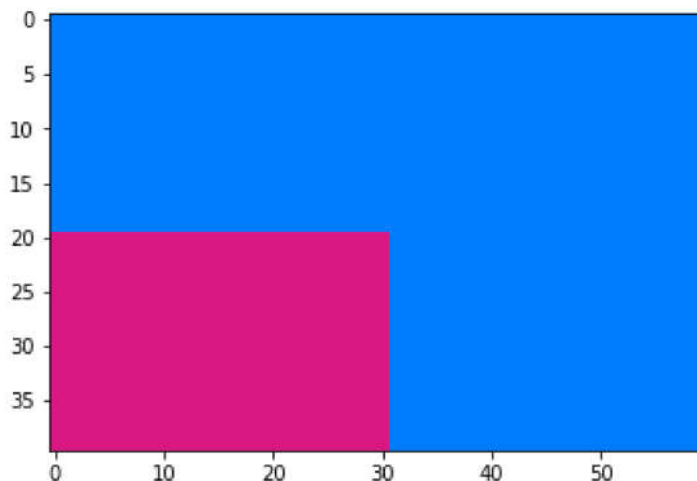
```python
cv.imshow('Image',median_blur)
cv.waitKey(0)
cv.destroyAllWindows()
```

In [ ]:
```python
import numpy as np
import matplotlib.pyplot as plt
im = np.zeros((40,60),dtype=np.uint8)
im[0:21, 30:61]=125
cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image',im)
cv.waitKey(0)
cv.destroyAllWindows()
```

In [ ]:
```python
import numpy as np
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()
```


In [ ]:
```python
import numpy as np
import matplotlib.pyplot as plt
im = np.zeros((40,60,3),dtype=np.uint8)
im[:]=(0,124,255)
im[20:41, 0:31]=(218,24,132)
fig,ax= plt.subplots()
ax.imshow(im)
plt.show()
```

```python
import cv2 as cv
im = cv.imread(r'./tom_dark.jpg')
bim=cv.convertScaleAbs(im, alpha=2, beta=40)
cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)

cv.imshow('Image',bim)
cv.waitKey(0)
cv.destroyAllWindows()
```

```python
import cv2 as cv
im = cv.imread(r'./tom_dark.jpg')
bim=cv.convertScaleAbs(im, alpha=2, beta=40)
cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)

cv.imshow('Image',bim)
cv.waitKey(0)
cv.destroyAllWindows()
```