Name : W. A. D. K. De Silva

Index : 190128H

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)
```

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

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

```
[[ 1  2]
 [ 8  6]
 [10  6]]
```

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

```
[[ 2  4  6]
 [ 5  7  9]
 [ 8 10 12]
 [11 13 15]]
```

In [ ]:
```
print(x*3)
```

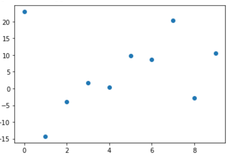
```
[[ 3  6  9]
 [12 15 18]
 [21 24 27]
 [30 33 36]]
```

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

```
[[ 4  5]
 [ 8 10]
 [12 15]]
```

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)
```

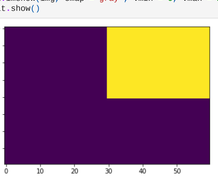
```
[[2.03228328]
 [0.73018785]]
```

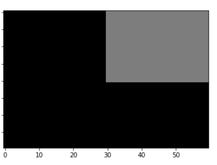


In [ ]:
```
import cv2 as cv
im=cv.imread(r'gal.png')

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()
```

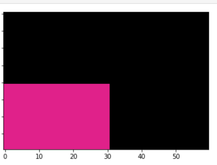
In [ ]:
```
median = cv.medianBlur(im,5)
im=cv.imread(r'gal_sandp.png')
cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image',im)
cv.waitKey(0)
cv.imshow('Image',median)
cv.waitKey(0)
cv.destroyAllWindows()
```

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()
```