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In [ ]:
```
import sympy as sp
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt
```

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

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

In [ ]:
```
for i in range(1,6):
    if sp.isprime(i) == 0:
      print(i,": ",i**2)
```

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

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

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

In [ ]:
```
squares = [i**2 for i in range(1,6)]
for ind, i in enumerate(squares):
  if sp.isprime(ind + 1) == 0:
    print(ind+1, ": ", i)
```

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

In [ ]:
```
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)) # np.dot, @
```

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

In [ ]:
```
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]]
```

In [ ]:
```
ran_arr = np.random.randint(10,size=(5,7))
print(ran_arr[2:5,1:3])
```

```
[[4 0]
 [2 8]
 [1 6]]
```

In [ ]:
```
x = np.array([[1,2,3], [4,5,6], [7,8,9], [10, 11, 12]])
v = np.array([1, 1, 1])
y = np.empty_like(x)   # Create an empty matrix with the same shape as x

for i in range(4):
    y[i, :] = x[i, :] + v

print(y)
```

```
[[ 2  3  4]
 [ 5  6  7]
 [ 8  9 10]
 [11 12 13]]
```

In [ ]:
```
x = np.array([[1,2,3], [4,5,6], [7,8,9], [10, 11, 12]])
v = np.array([2, 1, 1])
y = np.empty_like(x)   # Create an empty matrix with the same shape as x

for i in range(4):
    y[i, :] = x[i, :] + v

print(y)
```

```
[[ 3  3  4]
 [ 6  6  7]
 [ 9  9 10]
 [12 12 13]]
```

In [ ]:
```
x = np.array([[1,2,3], [4,5,6], [7,8,9], [10, 11, 12]])
v = np.array([3, 1, 3])
y = np.empty_like(x)   # Create an empty matrix with the same shape as x

for i in range(4):
    y[i, :] = x[i, :] + v

print(y)
```

```
[[ 4  3  6]
 [ 7  6  9]
 [10  9 12]
 [13 12 15]]
```

In [ ]:
```
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))
X = np.append(np.ones((N,1)) , x, axis=1)
print(X)
```

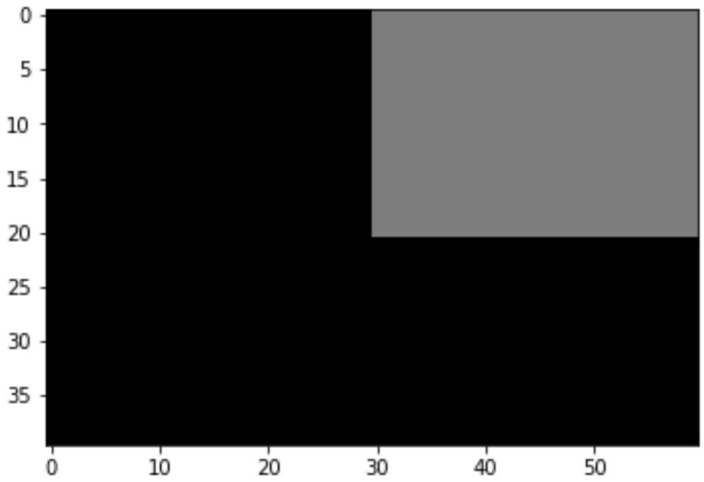
```
[[1. 0.]
 [1. 1.]
 [1. 2.]
 [1. 3.]
 [1. 4.]
 [1. 5.]
 [1. 6.]
 [1. 7.]
 [1. 8.]
 [1. 9.]]
```

In [ ]:
```
W = np.linalg.inv(X.T@X)@X.T@y
W
```

Out[ ]:
```
array([[-7.11043575],
       [ 1.96321205]])
```

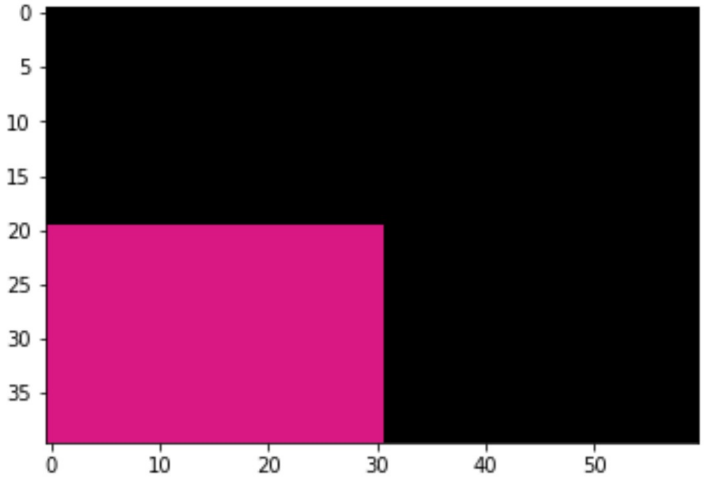
In [ ]:
```
im = cv.imread('C:/Users/User/Downloads/gal_gaussian.png')
im2 = cv.imread('C:/Users/User/Downloads/gal_sandp.png')

blur = cv.GaussianBlur(im,(5,5),0)
median = cv.medianBlur(im2,5)

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

In [ ]:
```
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 [ ]:

```
im = np.zeros((40,60,3), dtype=np.uint8)

fig, ax = plt.subplots()
im[20:41, 0:31] = (218, 24, 132)
ax.imshow(im)
plt.show()
```



In [ ]:

```
im = cv.imread('C:/Users/User/Downloads/Documents/ACA/Sem 4/EN2550 Machine Vis

# Method 1
im1 = im + 60

cv.namedWindow('Image', cv.WINDOW_AUTOSIZE)
cv.imshow('Image',im)
cv.waitKey(0)
cv.imshow('Image', im1)
cv.waitKey(0)
cv.destroyAllWindows()

# Method 2
isv = cv.cvtColor(im, cv.COLOR_BGR2HSV)
increase = 60
isv[:,:,2] += increase
bri_im = cv.cvtColor(isv, cv.COLOR_HSV2BGR)

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