import libraries

In [2]:
```
!pip install opencv-python
```

```
Requirement already satisfied: opencv-python in c:\users\yousr\anaconda3\lib\site-pac
kages (4.7.0.68)
Requirement already satisfied: numpy>=1.19.3 in c:\users\yousr\anaconda3\lib\site-pac
kages (from opencv-python) (1.21.5)
```

In [11]:
```
import cv2
```

cv2.imread(), cv2.imshow(), cv2.imwrite().

In [15]:
```
# Load an color image
#image=cv2.imread('800.jpg')
imgcolor = cv2.imread('800.jpg',cv2.IMREAD_COLOR)
imgGray = cv2.imread('800.jpg',cv2.IMREAD_GRAYSCALE)
imgunchange = cv2.imread('800.jpg',cv2.IMREAD_UNCHANGED)

'''
imgColor = cv2.imread('800.jpg',1)
imgGray = cv2.imread('800.jpg',0)
imgUnchange = cv2.imread('800.jpg',-1)
print(imgGray)

'''

# show image
cv2.imshow('RGB Image',imgcolor)
cv2.imshow('Gray Image',imgGray)
cv2.imshow('unchanged',imgunchange )


cv2.waitKey()
cv2.destroyAllWindows()
```

In [16]:
```
image = cv2.imread('800.jpg')

gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

cv2.imshow('Original Image', image)
cv2.imshow('Grayscale Image', gray_image)
cv2.waitKey()
cv2.destroyAllWindows()
```

Resize Image

In [17]:
```
img = cv2.imread('200.jpg')

#percent by which the image is resized
#scale_percent = 70
```

```
#calculate the 50 percent of original dimensions
width = int(img.shape[1] * 50 / 100)
height = int(img.shape[0] * 80 / 100)

# dsize
dsize = (width, height)
# resize image
output = cv2.resize(img, dsize)

cv2.imshow('original image',img)
cv2.imshow('resized image',output)

cv2.waitKey()
cv2.destroyAllWindows()
```

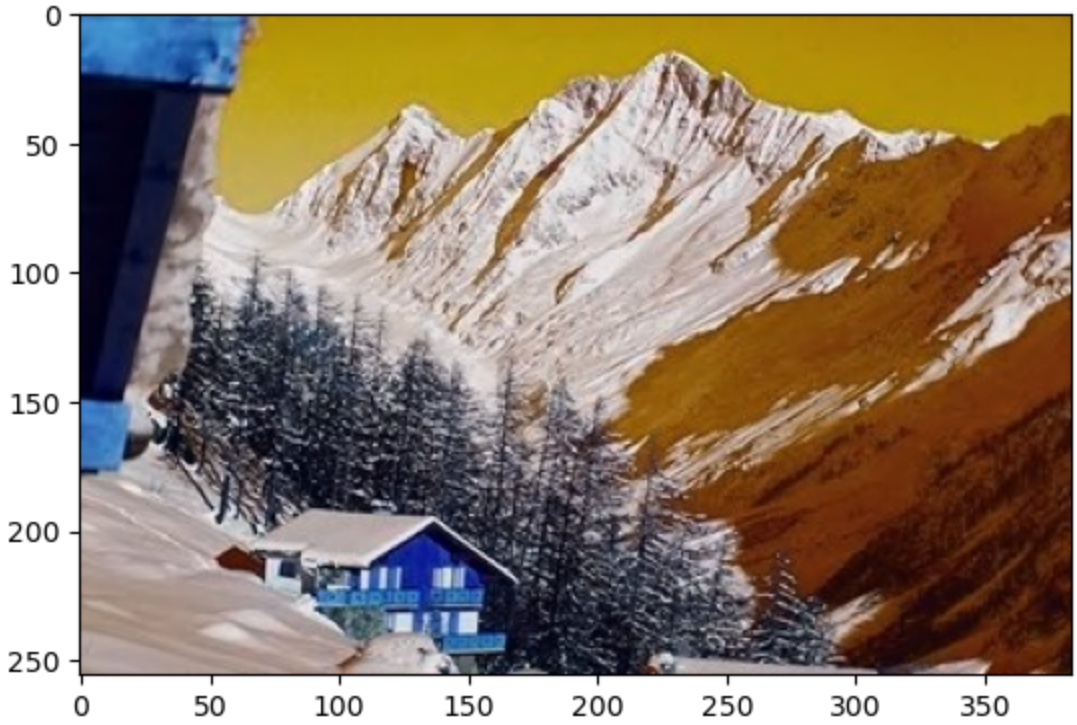
How to display multiple images in one window

In [18]:
```
import numpy as np
img = cv2.imread('800.jpg',-1)
img2= cv2.imread('200.jpg',-1)

img_resize=cv2.resize(img,(200,200))
img_resize2=cv2.resize(img2,(200,200))

#concatanate image Horizontally
img_concate_Hori=np.concatenate((img_resize,img_resize2),axis=1)
#concatanate image Vertically
img_concate_Verti=np.concatenate((img_resize,img_resize2),axis=0)

cv2.imshow('concatenated_Hori',img_concate_Hori)
cv2.imshow('concatenated_Verti',img_concate_Verti)

cv2.waitKey()
cv2.destroyAllWindows()
```

Using Matplotlib

In [6]:
```
import numpy as np
import cv2
from matplotlib import pyplot as plt       # OR  # import matplotlib.pyplot as plt

img = cv2.imread('800.jpg',-1)
plt.imshow(img)
```

Out[6]:
```
<matplotlib.image.AxesImage at 0x1bb292abaf0>
```



Access image matrix

In [7]:
```
#To Acccess any pixel in matrix
#shape of matrix
print('shape of image',img.shape)
#size of matrix
print('size=',img.size)

values=img[100,250]
print("Value of pixel= ",values)
```

```
shape of image (256, 384, 3)
size= 294912
Value of pixel=  [187 168 160]
```

program loads an image in grayscale, displays it, saves the image if you press ‘s’ and exit, or simply exit without saving if you press ESC key.

In [19]:
```
import cv2

img = cv2.imread('800.jpg',0)
cv2.imshow('image',img)
k = cv2.waitKey()
if k == 27:         # wait for ESC key to exit
    cv2.destroyAllWindows()
elif k == ord('s'): # wait for 's' key to save and exit
```

```
    cv2.imwrite('saved202444.png',img)
    cv2.destroyAllWindows()
```

Playing Video from camera or file

In [23]:
```
#Capture Video from Camera and convert to grayscale
import numpy as np
import cv2
cap = cv2.VideoCapture(0)
while(cap.isOpened()):
    ret, frame = cap.read()
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
    cv2.imshow('frame',gray)
    if cv2.waitKey(30)== 27:    #& 0xFF
        break
cap.release()
cv2.destroyAllWindows()
```

In [22]:
```
#Playing Video from file and convert to grayscale
import cv2
cap = cv2.VideoCapture('C:/Users/YOUSR/Documents/vision/security&tracking.mp4')
while(cap.isOpened()):
    ret, frame = cap.read()
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
    cv2.imshow('frame',gray)
    if cv2.waitKey(30)== 27:
        break
cap.release()
cv2.destroyAllWindows()
```