```
#Numpy+PIL(Python image library)+MQTPLOTLIB+OPENCV
```

Project-1(image analysis using Numpy Library)

```
#numpy Nd array,matplotlib-Visulization and pil-python image library

#images are broken down from 1 to 255

#  0 means black
#255 Drak color

import numpy as np

ones_array=np.ones((5,5),dtype=int)
ones_array
```

```
array([[1, 1, 1, 1, 1],
       [1, 1, 1, 1, 1],
       [1, 1, 1, 1, 1],
       [1, 1, 1, 1, 1],
       [1, 1, 1, 1, 1]])
```

```
ones_array*255
```

```
array([[255, 255, 255, 255, 255],
       [255, 255, 255, 255, 255],
       [255, 255, 255, 255, 255],
       [255, 255, 255, 255, 255],
       [255, 255, 255, 255, 255]])
```

```
import matplotlib.pyplot as plt

matplotlib inline  #all the graph should keep inside the box
```

```
UsageError: unrecognized arguments: #all the graph should keep inside
the box
```

```
from PIL import Image #python image library

horse_image=Image.open(r'C:\Users\Swarup\OneDrive\Desktop\abc.jpg')

Image.open(r'C:\Users\Swarup\OneDrive\Desktop\abc.jpg')
```

```
horse_image
```

```
type(horse_image)# Data Type
```

```
PIL.JpegImagePlugin.JpegImageFile
```

```
horse_array = np.asarray(horse_image)
```

```
horse_array = np.asarray(horse_image)

horse_array
```

```
array([[[  9,  32,  22],
        [ 13,  34,  25],
        [ 19,  36,  28],
        ...,
        [ 19,  19,  19],
        [ 22,  22,  24],
        [ 23,  23,  25]],

       [[ 16,  38,  26],
        [ 20,  40,  29],
        [ 25,  42,  34],
        ...,
        [ 33,  33,  33],
        [ 30,  30,  32],
        [ 28,  28,  30]],

       [[ 19,  39,  28],
        [ 22,  39,  29],
        [ 26,  41,  34],
        ...,
        [ 37,  37,  37],
        [ 35,  35,  37],
        [ 33,  33,  35]],

       ...,

       [[103,  69,  59],
        [114,  83,  63],
        [122,  93,  61],
        ...,
        [108,  59,  45],
        [116,  60,  43],
        [118,  61,  41]],

       [[106,  73,  64],
        [107,  79,  58],
        [110,  84,  51],
        ...,
        [108,  61,  45],
        [113,  61,  40],
        [115,  59,  36]],

       [[106,  76,  66],
        [103,  74,  56],
        [103,  79,  45],
        ...,
```

```
        [110,  63,  47],
        [111,  59,  37],
        [109,  55,  31]]], dtype=uint8)
```

```
type(horse_array)
```

```
numpy.ndarray
```

```
plt.imshow(horse_array)#Show the image
```

```
<matplotlib.image.AxesImage at 0x2338080aed0>
```

```
plt.show(horse_array)
```


```
---------------------------------------------------------------------------
-----
ValueError                                Traceback (most recent call
last)
Cell In[60], line 1
----> 1 plt.show(horse_array)

File ~\anaconda3\Lib\site-packages\matplotlib\pyplot.py:612, in
show(*args, **kwargs)
    568 """
    569 Display all open figures.
    570
   (...)
    609 explicitly there.
    610 """
    611 _warn_if_gui_out_of_main_thread()
--> 612 return _get_backend_mod().show(*args, **kwargs)
```

```
File ~\anaconda3\Lib\site-packages\matplotlib_inline\
backend_inline.py:98, in show(close, block)
     95 show._to_draw = []
     96 # only call close('all') if any to close
     97 # close triggers gc.collect, which can be slow
---> 98 if close and Gcf.get_all_fig_managers():
     99     matplotlib.pyplot.close('all')

ValueError: The truth value of an array with more than one element is
ambiguous. Use a.any() or a.all()
```

```
horse_array.shape  #(Hight,width and 3 channel)
```

```
(2160, 3840, 3)
```

```
#2D- black and white
#3D- Red, Green and Blue
```

```
horse_red=horse_array.copy()
```

```
horse_red
```

```
array([[[  9,  32,  22],
        [ 13,  34,  25],
        [ 19,  36,  28],
        ...,
        [ 19,  19,  19],
        [ 22,  22,  24],
        [ 23,  23,  25]],

       [[ 16,  38,  26],
        [ 20,  40,  29],
        [ 25,  42,  34],
        ...,
        [ 33,  33,  33],
        [ 30,  30,  32],
        [ 28,  28,  30]],

       [[ 19,  39,  28],
        [ 22,  39,  29],
        [ 26,  41,  34],
        ...,
        [ 37,  37,  37],
        [ 35,  35,  37],
        [ 33,  33,  35]],

       ...,

       [[103,  69,  59],
        [114,  83,  63],
```

```
        [122,  93,  61],
        ...,
        [108,  59,  45],
        [116,  60,  43],
        [118,  61,  41]],

       [[106,  73,  64],
        [107,  79,  58],
        [110,  84,  51],
        ...,
        [108,  61,  45],
        [113,  61,  40],
        [115,  59,  36]],

       [[106,  76,  66],
        [103,  74,  56],
        [103,  79,  45],
        ...,
        [110,  63,  47],
        [111,  59,  37],
        [109,  55,  31]]], dtype=uint8)
```

```
horse_array==horse_red
```

```
array([[[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       ...,
```

```
       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]],

       [[ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True],
        ...,
        [ True,  True,  True],
        [ True,  True,  True],
        [ True,  True,  True]]])
```

```
plt.show(horse_red)
```

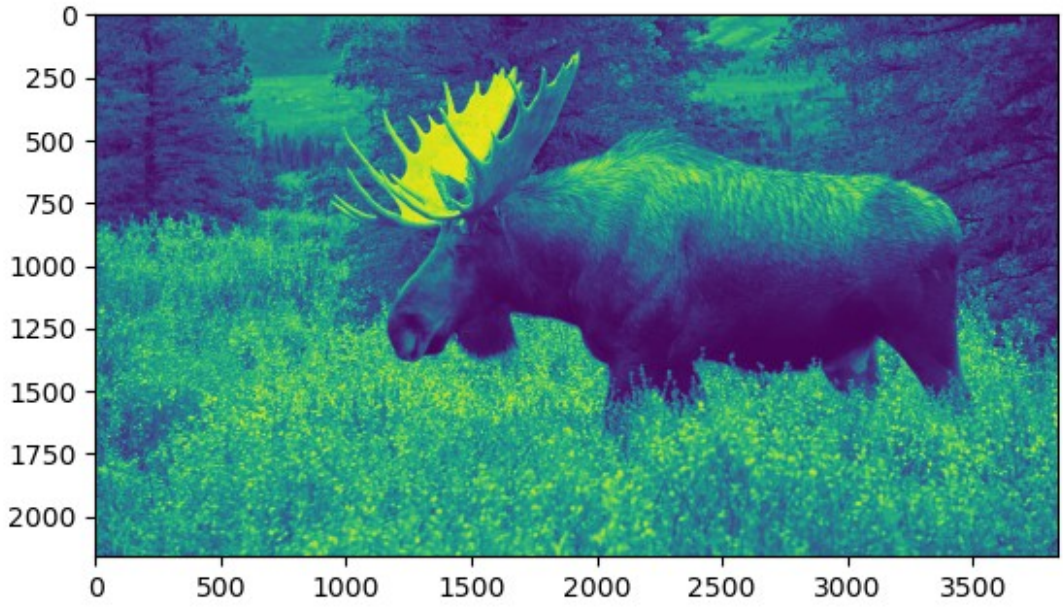

```
---------------------------------------------------------------------------
ValueError                                Traceback (most recent call
last)
```

```
Cell In[67], line 1
----> 1 plt.show(horse_red)

File ~\anaconda3\Lib\site-packages\matplotlib\pyplot.py:612, in
show(*args, **kwargs)
    568 """
    569 Display all open figures.
    570
   (...)
    609 explicitly there.
    610 """
    611 _warn_if_gui_out_of_main_thread()
--> 612 return _get_backend_mod().show(*args, **kwargs)

File ~\anaconda3\Lib\site-packages\matplotlib_inline\
backend_inline.py:98, in show(close, block)
     95 show._to_draw = []
     96 # only call close('all') if any to close
     97 # close triggers gc.collect, which can be slow
---> 98 if close and Gcf.get_all_fig_managers():
     99     matplotlib.pyplot.close('all')

ValueError: The truth value of an array with more than one element is
ambiguous. Use a.any() or a.all()
```

```
np.shape(horse_red)
```

```
(2160, 3840, 3)
```

```
#R  G  B


plt.show(horse_red[:,:,0])
```




```
---------------------------------------------------------------------------
-----
ValueError                                Traceback (most recent call
last)
Cell In[73], line 1
----> 1 plt.show(horse_red[:,:,0])

File ~\anaconda3\Lib\site-packages\matplotlib\pyplot.py:612, in
show(*args, **kwargs)
    568 """
    569 Display all open figures.
    570
   (...)
    609 explicitly there.
    610 """
    611 _warn_if_gui_out_of_main_thread()
--> 612 return _get_backend_mod().show(*args, **kwargs)

File ~\anaconda3\Lib\site-packages\matplotlib_inline\
backend_inline.py:98, in show(close, block)
     95 show._to_draw = []
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---> 98 if close and Gcf.get_all_fig_managers():
     99     matplotlib.pyplot.close('all')

ValueError: The truth value of an array with more than one element is
ambiguous. Use a.any() or a.all()

horse_red[:,:,0]
```
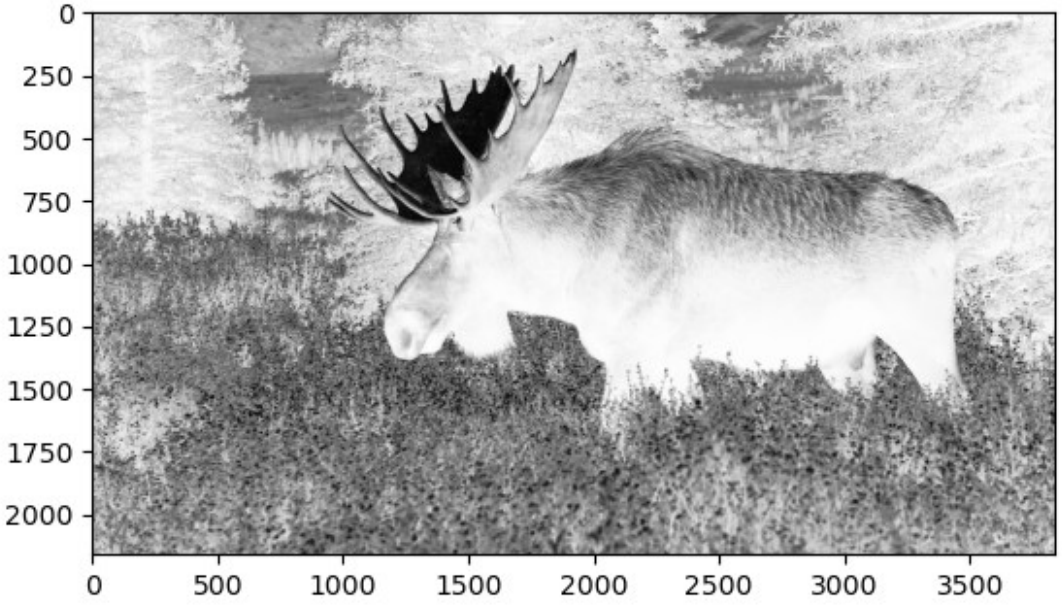

```
array([[  9,  13,  19, ...,  19,  22,  23],
       [ 16,  20,  25, ...,  33,  30,  28],
       [ 19,  22,  26, ...,  37,  35,  33],
       ...,
       [103, 114, 122, ..., 108, 116, 118],
       [106, 107, 110, ..., 108, 113, 115],
       [106, 103, 103, ..., 110, 111, 109]], dtype=uint8)
```

```
plt.imshow(horse_red[:,:,0],cmap='Greys')
```

```
<matplotlib.image.AxesImage at 0x23384c92720>
```

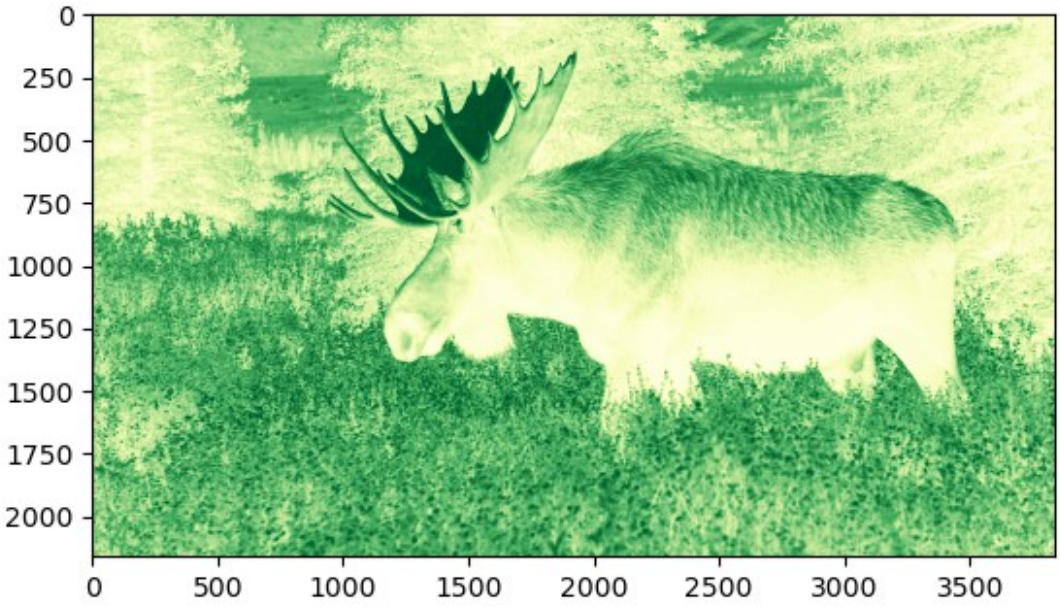
```
plt.show()
```




```
plt.imshow(horse_red[:,:,0],cmap='YlGn')
```

```
<matplotlib.image.AxesImage at 0x23397e8a870>
```

```
plt.show()
```




```
plt.imshow(horse_red[:,:,0], cmap='Reds')
```

```
<matplotlib.image.AxesImage at 0x23397ed0a70>
```