

```
In [1]: import numpy as np,matplotlib.pyplot as plt,PIL.Image  
from PIL import Image
```

```
In [2]: np.__version__
```

```
Out[2]: '1.26.4'
```

```
In [3]: import sys  
sys.version
```

```
Out[3]: '3.11.7 | packaged by Anaconda, Inc. | (main, Dec 15 2023, 18:05:47) [MSC v.191  
6 64 bit (AMD64)]'
```

- Image read using PIL (python image library)

```
In [5]: tiger = Image.open(r"D:\prakash senapati\notes\feb\5th - Numpy - 2nd part\photo-1  
tiger
```

```
Out[5]:
```



```
In [6]: tiger.size
```

```
Out[6]: (3000, 1393)
```

```
In [7]: print(type(tiger))
```

```
<class 'PIL.JpegImagePlugin.JpegImageFile'>
```

```
In [8]: tiger_arr = np.asarray(tiger)  
print(tiger_arr)  
  
print("Dimension of the array", tiger_arr.ndim)  
print("shape of the array", tiger_arr.shape)  
print("size of the array", tiger_arr.size)  
print("size of the array in bytes", tiger_arr.nbytes)
```

```
[[[ 58  63  56]
  [ 60  67  59]
  [ 59  69  58]
  ...
  [123 123  69]
  [121 124  71]
  [121 124  71]]]

[[ 64  70  60]
 [ 65  73  62]
 [ 62  72  61]
 ...
 [126 126  72]
 [125 128  75]
 [126 129  76]]]

[[ 60  68  57]
 [ 61  69  58]
 [ 56  67  53]
 ...
 [126 126  72]
 [128 128  76]
 [128 131  78]]]

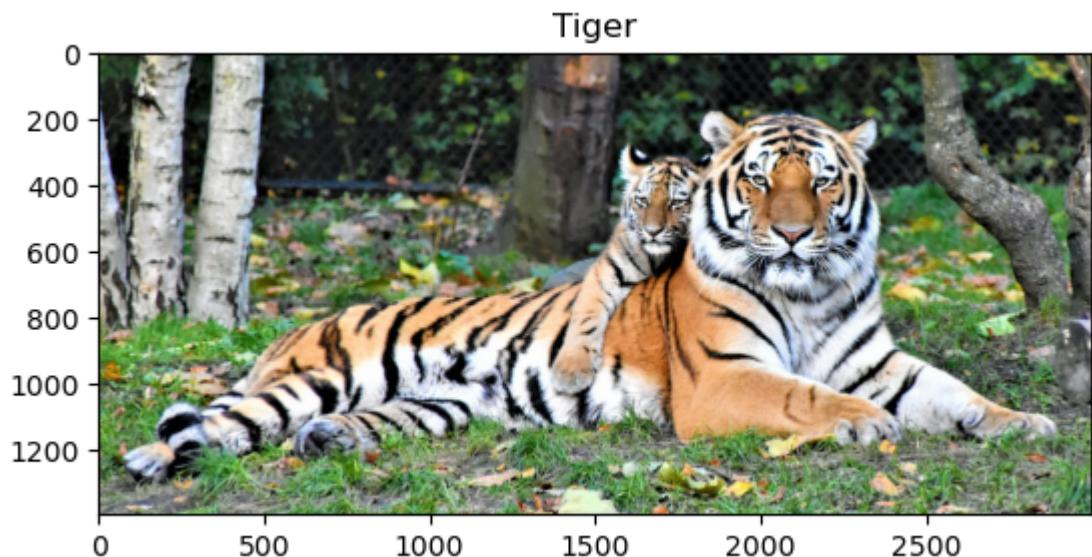
...
[[121 134 116]
 [122 135 118]
 [125 136 120]
 ...
 [ 59 124  81]
 [ 62 130  83]
 [ 67 135  86]]]

[[123 136 118]
 [133 146 129]
 [139 150 134]
 ...
 [ 56 121  78]
 [ 70 138  91]
 [ 75 143  96]]]

[[146 149 138]
 [149 152 141]
 [147 150 141]
 ...
 [ 93 162 118]
 [ 82 151 107]
 [ 83 150 107]]]

Dimension of the array 3
shape of the array (1393, 3000, 3)
size of the array 12537000
size of the array in bytes 12537000
```

```
In [9]: plt.title("Tiger")
plt.imshow(tiger_arr)
plt.show()
```



```
In [10]: tiger_red = tiger_arr.copy()  
tiger_red
```

```
Out[10]: array([[[ 58,  63,  56],
   [ 60,  67,  59],
   [ 59,  69,  58],
   ...,
   [123, 123,  69],
   [121, 124,  71],
   [121, 124,  71]],

   [[ 64,  70,  60],
   [ 65,  73,  62],
   [ 62,  72,  61],
   ...,
   [126, 126,  72],
   [125, 128,  75],
   [126, 129,  76]],

   [[ 60,  68,  57],
   [ 61,  69,  58],
   [ 56,  67,  53],
   ...,
   [126, 126,  72],
   [128, 128,  76],
   [128, 131,  78]],

   ...,

   [[121, 134, 116],
   [122, 135, 118],
   [125, 136, 120],
   ...,
   [ 59, 124,  81],
   [ 62, 130,  83],
   [ 67, 135,  86]],

   [[123, 136, 118],
   [133, 146, 129],
   [139, 150, 134],
   ...,
   [ 56, 121,  78],
   [ 70, 138,  91],
   [ 75, 143,  96]],

   [[146, 149, 138],
   [149, 152, 141],
   [147, 150, 141],
   ...,
   [ 93, 162, 118],
   [ 82, 151, 107],
   [ 83, 150, 107]]], dtype=uint8)
```

```
In [11]: tiger_arr == tiger_red
```

```
Out[11]: 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]],

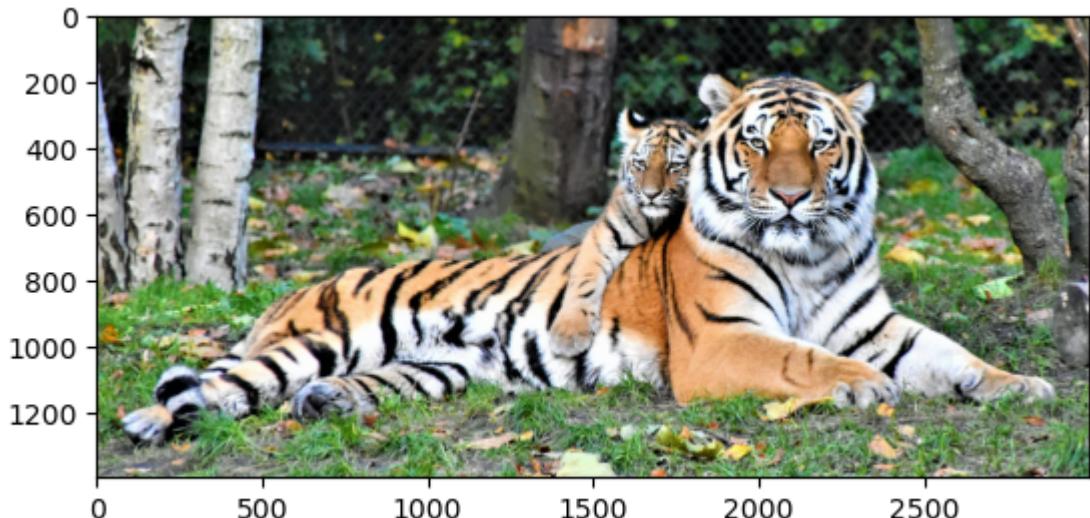
[[ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True],
   ...,
   [ True,  True,  True],
   [ True,  True,  True],
   [ True,  True,  True]],

[[ 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]]])
```

```
In [12]: plt.imshow(tiger_red)
```

```
Out[12]: <matplotlib.image.AxesImage at 0x1c4fc0a4ed0>
```

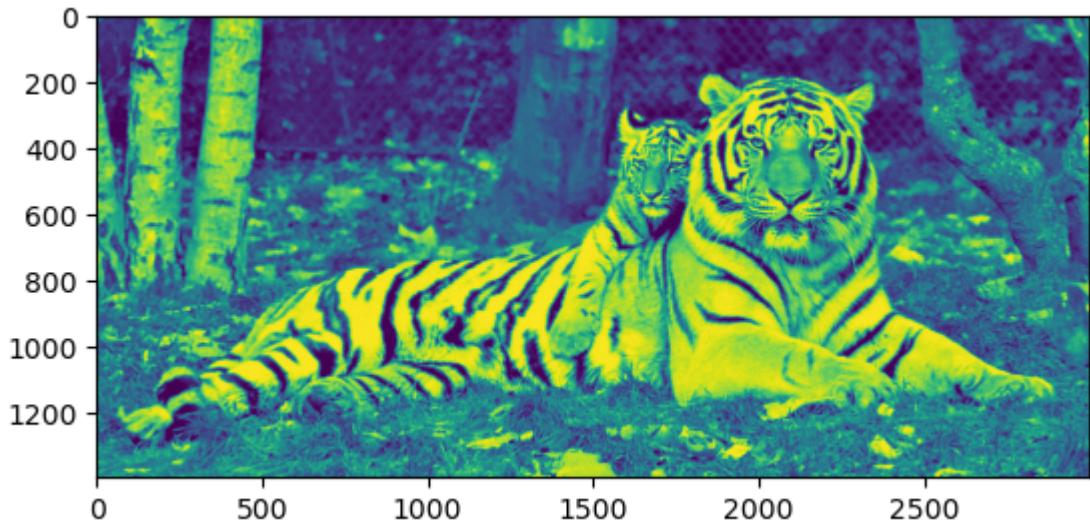


```
In [13]: tiger_red.shape
```

```
Out[13]: (1393, 3000, 3)
```

```
In [14]: plt.imshow(tiger_red[:, :, 0])
```

```
Out[14]: <matplotlib.image.AxesImage at 0x1c4fc0a7f90>
```

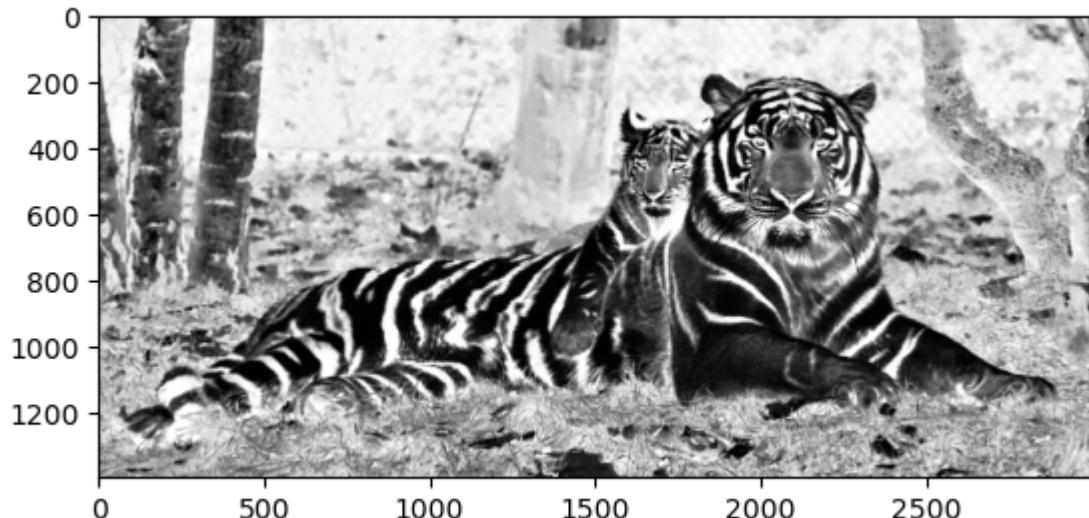


```
In [15]: tiger_red[:, :, 0]
```

```
Out[15]: array([[ 58,  60,  59, ..., 123, 121, 121],
   [ 64,  65,  62, ..., 126, 125, 126],
   [ 60,  61,  56, ..., 126, 128, 128],
   ...,
   [121, 122, 125, ..., 59, 62, 67],
   [123, 133, 139, ..., 56, 70, 75],
   [146, 149, 147, ..., 93, 82, 83]], dtype=uint8)
```

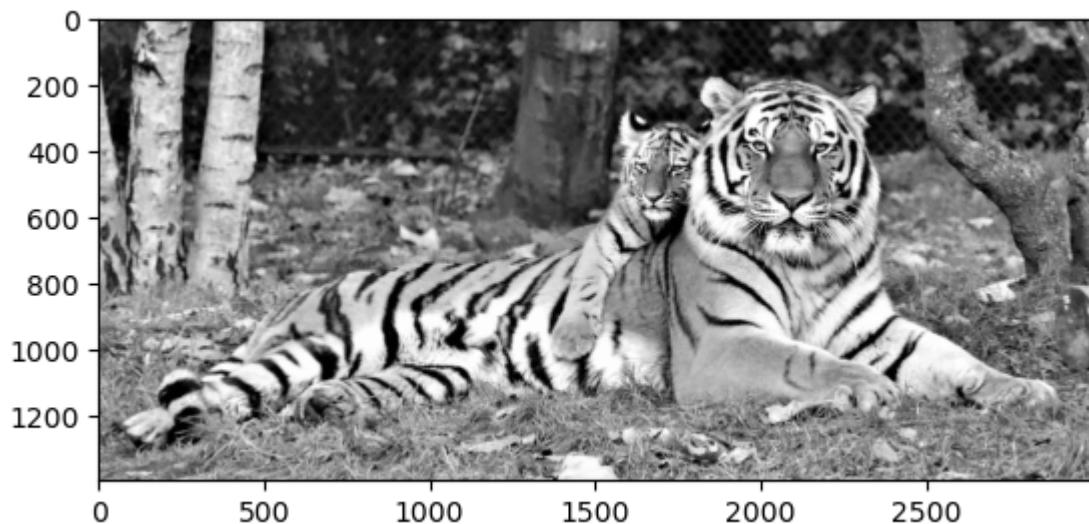
```
In [16]: plt.imshow(tiger_red[:, :, 0], cmap = "Greys")
```

```
Out[16]: <matplotlib.image.AxesImage at 0x1c480dfb2d0>
```



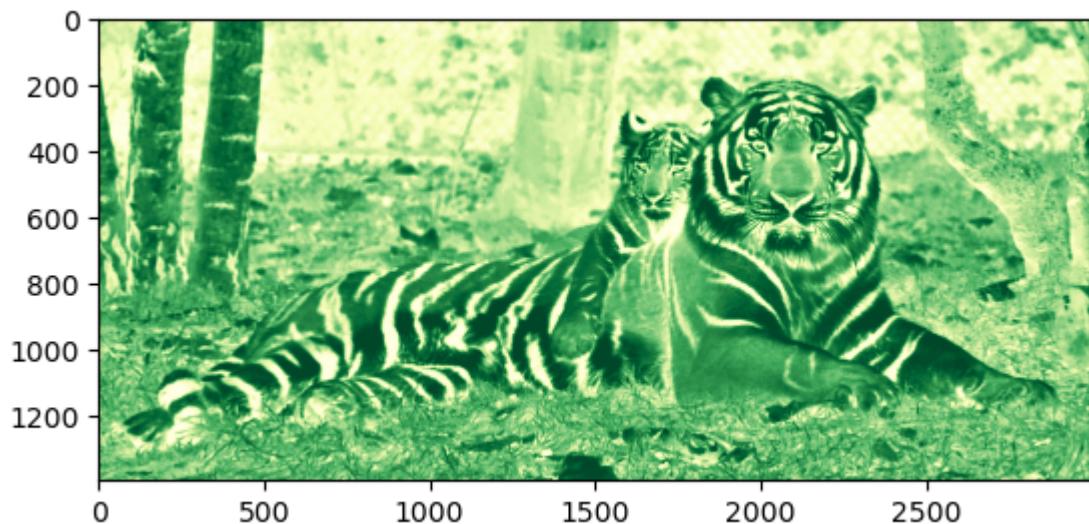
```
In [17]: plt.imshow(tiger_red[:, :, 1], cmap = "grey")
```

```
Out[17]: <matplotlib.image.AxesImage at 0x1c480e0ced0>
```



```
In [18]: plt.imshow(tiger_arr[:, :, 1], cmap = "YlGn")
```

```
Out[18]: <matplotlib.image.AxesImage at 0x1c480824ed0>
```

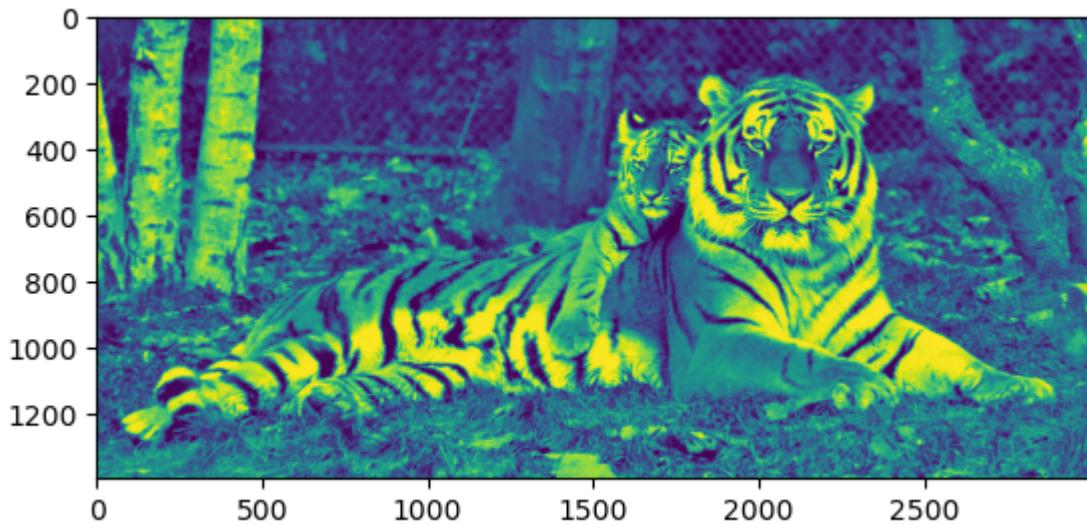


```
In [19]: tiger_red[:, :, 2]
```

```
Out[19]: array([[ 56,  59,  58, ...,  69,  71,  71],
   [ 60,  62,  61, ...,  72,  75,  76],
   [ 57,  58,  53, ...,  72,  76,  78],
   ...,
   [116, 118, 120, ...,  81,  83,  86],
   [118, 129, 134, ...,  78,  91,  96],
   [138, 141, 141, ..., 118, 107, 107]], dtype=uint8)
```

```
In [20]: plt.imshow(tiger_red[:, :, 2])
```

```
Out[20]: <matplotlib.image.AxesImage at 0x1c4809167d0>
```



```
In [21]: tiger_red[:, :, 1] = 0
```

```
In [22]: tiger_red[:, :, 1]
```

```
Out[22]: array([[0, 0, 0, ..., 0, 0, 0],
   [0, 0, 0, ..., 0, 0, 0],
   [0, 0, 0, ..., 0, 0, 0],
   ...,
   [0, 0, 0, ..., 0, 0, 0],
   [0, 0, 0, ..., 0, 0, 0],
   [0, 0, 0, ..., 0, 0, 0]], dtype=uint8)
```

```
In [23]: tiger_arr.shape
```

```
Out[23]: (1393, 3000, 3)
```

```
In [24]: plt.imshow(tiger_arr)
```

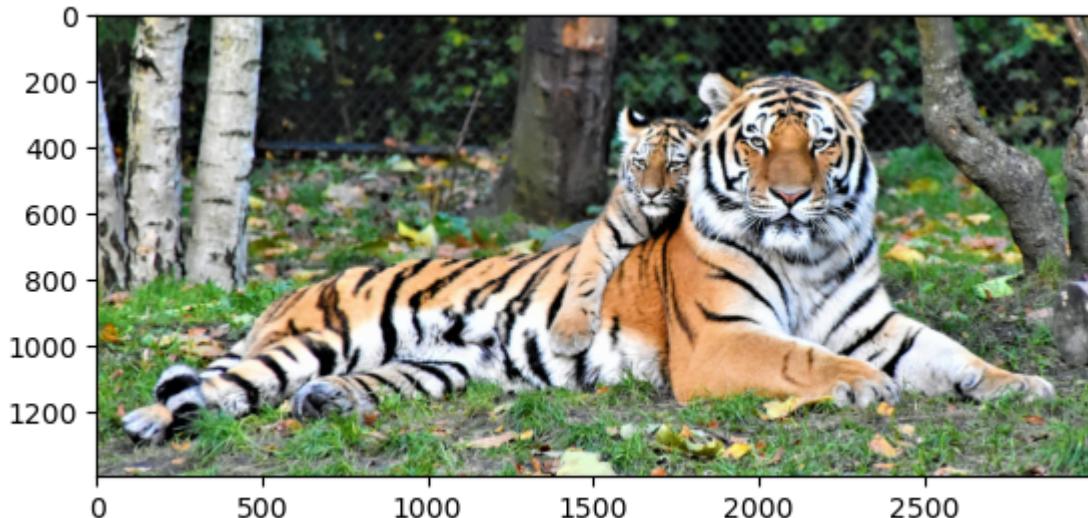
```
Out[24]: <matplotlib.image.AxesImage at 0x1c4836c7410>
```



```
In [25]: arr1 = np.asarray(tiger)
type(arr1)
print(arr1.shape)
plt.imshow(arr1)
```

(1393, 3000, 3)

Out[25]: <matplotlib.image.AxesImage at 0x1c485353190>



```
In [26]: tiger_img1 = arr1.copy()
```

```
In [27]: tiger_img1[:, :, 0] = 0
```

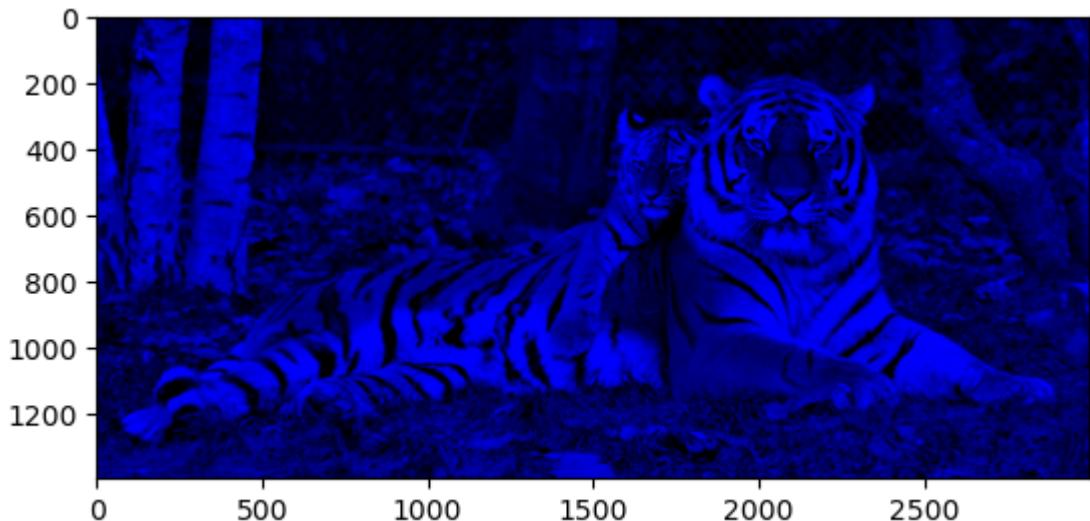
```
In [28]: plt.imshow(tiger_img1)
```

Out[28]: <matplotlib.image.AxesImage at 0x1c4853cec50>



```
In [29]: tiger_img1[:, :, 1] = 0  
plt.imshow(tiger_img1)
```

```
Out[29]: <matplotlib.image.AxesImage at 0x1c485436ad0>
```



```
In [ ]:
```

- **Image reading using open cv**

```
In [31]: import cv2  
image = cv2.imread(r"D:\prakash senapati\notes\feb\5th - Numpy - 2nd part\output.  
cv2.imshow('horse',image)  
cv2.waitKey(0)  
cv2.destroyAllWindows()
```

```
In [ ]:
```

```
In [32]: import matplotlib.pyplot as plt  
horse = cv2.imread(r"D:\prakash senapati\notes\feb\5th - Numpy - 2nd part\horse.p
```

```
In [33]: plt.imshow(horse)  
plt.show()
```



```
In [34]: horse_rgb = cv2.cvtColor(horse , cv2.COLOR_BGR2RGB)

plt.imshow(horse_rgb)

plt.axis("off")

plt.show()
```



```
In [35]: gray_horse = cv2.cvtColor(horse , cv2.COLOR_BGR2GRAY)

plt.imshow(gray_horse)

plt.show()
```

