In [ ]:
```
# Images Analysis using NumPy
```

In [2]:
```
import numpy as np
```

In [3]:
```
ones_arr = np.ones((5,5),dtype=int)
```

In [4]:
```
ones_arr
```

Out[4]:
```
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]])
```

In [5]:
```
ones_arr * 255
```

Out[5]:
```
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]])
```

In [6]:
```
import matplotlib.pyplot as plt
```

In [7]:
```
matplotlib inline
```

In [8]:
```
from  PIL import Image
```

In [9]:
```
horse_img = Image.open(r'D:\veda\Horse image.JPG')
```

In [10]:
```
horse_img
```

Out[10]:

In [11]:
```
type(horse_img)
```

Out[11]:
```
PIL.JpegImagePlugin.JpegImageFile
```

In [13]:
```
horse_arr = np.asarray(horse_img)
horse_arr
```

Out[13]:
```
array([[[ 19,  19,  31],
        [ 18,  18,  30],
        [ 18,  18,  30],
        ...,
        [ 26,  36,  35],
        [ 26,  36,  35],
        [ 26,  36,  35]],

       [[ 19,  19,  31],
        [ 19,  19,  31],
        [ 18,  18,  30],
        ...,
        [ 20,  30,  29],
        [ 20,  30,  29],
        [ 20,  30,  29]],

       [[ 19,  19,  31],
        [ 19,  19,  31],
        [ 18,  18,  30],
        ...,
        [ 14,  24,  23],
        [ 14,  24,  23],
        [ 14,  24,  23]],

       ...,

       [[ 67,  53,  40],
        [ 87,  73,  60],
        [100,  86,  75],
        ...,
        [ 31,  36,  30],
        [ 33,  38,  32],
        [ 36,  41,  35]],

       [[ 75,  56,  42],
        [ 77,  59,  45],
        [ 80,  62,  48],
        ...,
        [ 19,  28,  25],
        [ 21,  30,  27],
        [ 24,  33,  30]],

       [[ 79,  60,  45],
        [ 84,  65,  50],
        [ 92,  73,  58],
        ...,
        [ 19,  31,  29],
        [ 21,  33,  31],
        [ 24,  36,  34]]], dtype=uint8)
```

In [14]:
```
type(horse_arr)
```

Out[14]:
```
numpy.ndarray
```

In [15]:
```
plt.imshow(horse_arr)
```

Out[15]:
```
<matplotlib.image.AxesImage at 0x134679e8b60>
```

In [16]:
```
horse_arr.shape
```

Out[16]: (183, 275, 3)

In [17]:
```
horse_red = horse_arr.copy()
```

In [18]:
```
horse_red
```

Out[18]:
```
array([[[ 19,  19,  31],
        [ 18,  18,  30],
        [ 18,  18,  30],
        ...,
        [ 26,  36,  35],
        [ 26,  36,  35],
        [ 26,  36,  35]],

       [[ 19,  19,  31],
        [ 19,  19,  31],
        [ 18,  18,  30],
        ...,
        [ 20,  30,  29],
        [ 20,  30,  29],
        [ 20,  30,  29]],

       [[ 19,  19,  31],
        [ 19,  19,  31],
        [ 18,  18,  30],
        ...,
        [ 14,  24,  23],
        [ 14,  24,  23],
        [ 14,  24,  23]],

       ...,

       [[ 67,  53,  40],
        [ 87,  73,  60],
        [100,  86,  75],
        ...,
        [ 31,  36,  30],
        [ 33,  38,  32],
        [ 36,  41,  35]],

       [[ 75,  56,  42],
        [ 77,  59,  45],
        [ 80,  62,  48],
        ...,
        [ 19,  28,  25],
        [ 21,  30,  27],
        [ 24,  33,  30]],

       [[ 79,  60,  45],
        [ 84,  65,  50],
        [ 92,  73,  58],
        ...,
        [ 19,  31,  29],
        [ 21,  33,  31],
        [ 24,  36,  34]]], dtype=uint8)
```

In [19]:
```
horse_arr == horse_red
```

Out[19]:
```
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]]])
```

In [20]:
```
plt.imshow(horse_red)
```

Out[20]:
```
<matplotlib.image.AxesImage at 0x13468af08c0>
```

In [21]:
```
horse_red.shape
```

Out[21]:
```
(183, 275, 3)
```

In [22]:
```
plt.imshow(horse_red[:,:,0]) # R G B
```

Out[22]:
```
<matplotlib.image.AxesImage at 0x13468b3a0f0>
```

In [23]:
```
horse_red[:,:,0]
```

Out[23]:
```
array([[ 19,  18,  18, ...,  26,  26,  26],
       [ 19,  19,  18, ...,  20,  20,  20],
       [ 19,  19,  18, ...,  14,  14,  14],
       ...,
       [ 67,  87, 100, ...,  31,  33,  36],
       [ 75,  77,  80, ...,  19,  21,  24],
       [ 79,  84,  92, ...,  19,  21,  24]], dtype=uint8)
```

In [24]:
```
plt.imshow(horse_red[:,:,0],cmap='Greys')
```

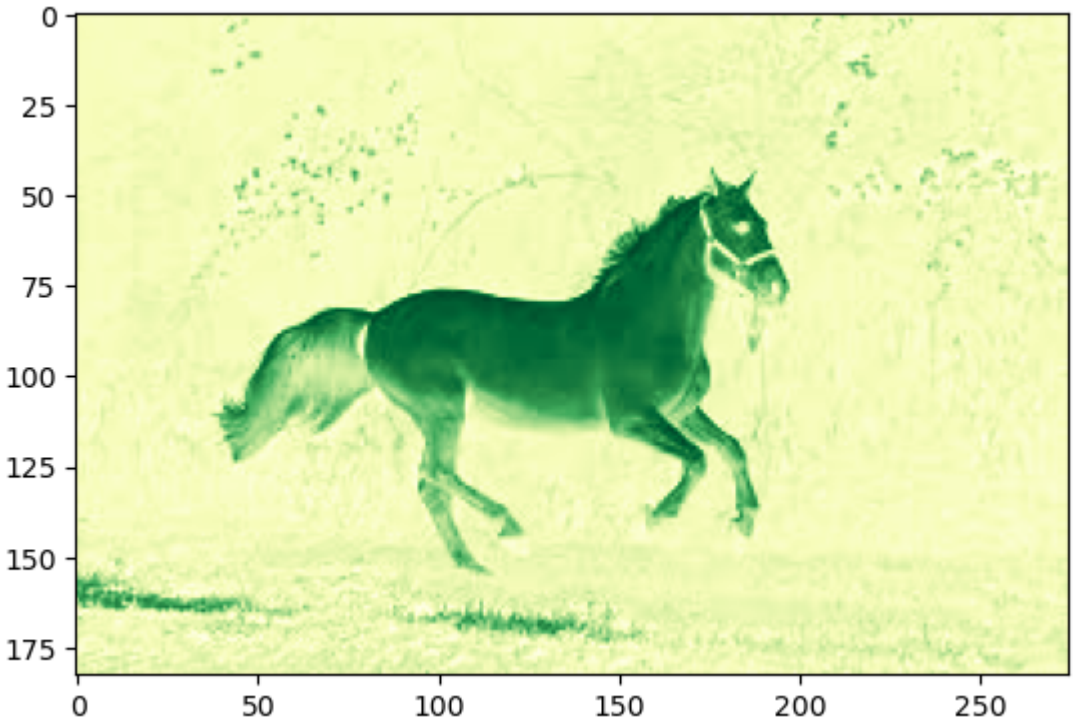
Out[24]:
```
<matplotlib.image.AxesImage at 0x13468abe5a0>
```

In [25]:
```
plt.imshow(horse_red[:,:,1], cmap='grey')
```

Out[25]:
```
<matplotlib.image.AxesImage at 0x13468c4bcb0>
```

In [26]:
```
plt.imshow(horse_red[:,:,-1], cmap='YlGn')
```

Out[26]:
```
<matplotlib.image.AxesImage at 0x13468c49070>
```



In [27]:
```
horse_red[:,:,0]
```

Out[27]:
```
array([[ 19,  18,  18, ...,  26,  26,  26],
       [ 19,  19,  18, ...,  20,  20,  20],
       [ 19,  19,  18, ...,  14,  14,  14],
       ...,
       [ 67,  87, 100, ...,  31,  33,  36],
       [ 75,  77,  80, ...,  19,  21,  24],
       [ 79,  84,  92, ...,  19,  21,  24]], dtype=uint8)
```

In [28]:
```
horse_red[:,:,1]
```

Out[28]:
```
array([[19, 18, 18, ..., 36, 36, 36],
       [19, 19, 18, ..., 30, 30, 30],
       [19, 19, 18, ..., 24, 24, 24],
       ...,
       [53, 73, 86, ..., 36, 38, 41],
       [56, 59, 62, ..., 28, 30, 33],
       [60, 65, 73, ..., 31, 33, 36]], dtype=uint8)
```

In [29]:
```
horse_red[:,:,2]
```

Out[29]:
```
array([[31, 30, 30, ..., 35, 35, 35],
       [31, 31, 30, ..., 29, 29, 29],
       [31, 31, 30, ..., 23, 23, 23],
       ...,
       [40, 60, 75, ..., 30, 32, 35],
       [42, 45, 48, ..., 25, 27, 30],
       [45, 50, 58, ..., 29, 31, 34]], dtype=uint8)
```

In [30]:
```
horse_red[:,:,1] = 0
```

In [31]:
```
horse_red[:,:,1]
```

Out[31]:
```
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 [32]:
```
plt.imshow(horse_red)
```

Out[32]:
```
<matplotlib.image.AxesImage at 0x134695154c0>
```

In [33]:
```
horse_red[:,:,2]
```

Out[33]:
```
array([[31, 30, 30, ..., 35, 35, 35],
       [31, 31, 30, ..., 29, 29, 29],
       [31, 31, 30, ..., 23, 23, 23],
       ...,
       [40, 60, 75, ..., 30, 32, 35],
       [42, 45, 48, ..., 25, 27, 30],
       [45, 50, 58, ..., 29, 31, 34]], dtype=uint8)
```

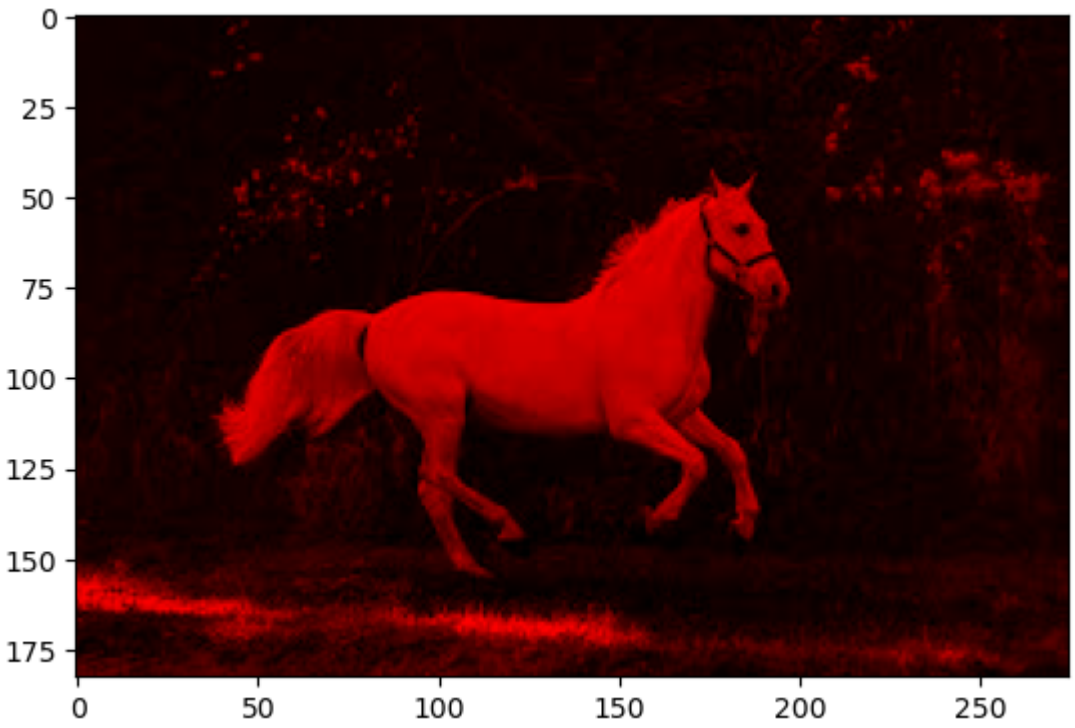
In [34]:
```
horse_red[:,:,2] = 0
```

In [35]:
```
horse_red[:,:,2]
```

Out[35]:
```
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 [36]:
```
plt.imshow(horse_red)
```

Out[36]:
```
<matplotlib.image.AxesImage at 0x13468c738f0>
```



In [37]:
```
horse_arr
```

Out[37]:
```
array([[[ 19,  19,  31],
        [ 18,  18,  30],
        [ 18,  18,  30],
        ...,
        [ 26,  36,  35],
        [ 26,  36,  35],
        [ 26,  36,  35]],

       [[ 19,  19,  31],
        [ 19,  19,  31],
        [ 18,  18,  30],
        ...,
        [ 20,  30,  29],
        [ 20,  30,  29],
        [ 20,  30,  29]],

       [[ 19,  19,  31],
        [ 19,  19,  31],
        [ 18,  18,  30],
        ...,
        [ 14,  24,  23],
        [ 14,  24,  23],
        [ 14,  24,  23]],

       ...,

       [[ 67,  53,  40],
        [ 87,  73,  60],
        [100,  86,  75],
        ...,
        [ 31,  36,  30],
        [ 33,  38,  32],
        [ 36,  41,  35]],

       [[ 75,  56,  42],
        [ 77,  59,  45],
        [ 80,  62,  48],
        ...,
        [ 19,  28,  25],
        [ 21,  30,  27],
        [ 24,  33,  30]],

       [[ 79,  60,  45],
        [ 84,  65,  50],
        [ 92,  73,  58],
        ...,
        [ 19,  31,  29],
        [ 21,  33,  31],
        [ 24,  36,  34]]], dtype=uint8)
```

In [38]:
```
horse_red
```

Out[38]:
```
array([[[ 19,   0,   0],
        [ 18,   0,   0],
        [ 18,   0,   0],
        ...,
        [ 26,   0,   0],
        [ 26,   0,   0],
        [ 26,   0,   0]],

       [[ 19,   0,   0],
        [ 19,   0,   0],
        [ 18,   0,   0],
        ...,
        [ 20,   0,   0],
        [ 20,   0,   0],
        [ 20,   0,   0]],

       [[ 19,   0,   0],
        [ 19,   0,   0],
        [ 18,   0,   0],
        ...,
        [ 14,   0,   0],
        [ 14,   0,   0],
        [ 14,   0,   0]],

       ...,

       [[ 67,   0,   0],
        [ 87,   0,   0],
        [100,   0,   0],
        ...,
        [ 31,   0,   0],
        [ 33,   0,   0],
        [ 36,   0,   0]],

       [[ 75,   0,   0],
        [ 77,   0,   0],
        [ 80,   0,   0],
        ...,
        [ 19,   0,   0],
        [ 21,   0,   0],
        [ 24,   0,   0]],

       [[ 79,   0,   0],
        [ 84,   0,   0],
        [ 92,   0,   0],
        ...,
        [ 19,   0,   0],
        [ 21,   0,   0],
        [ 24,   0,   0]]], dtype=uint8)
```

In [39]:
```
horse_img
```

Out[39]:

In [40]:
```
arr1 = np.asarray(horse_img)
```

In [41]:
```
type(arr1)
```

Out[41]:
```
numpy.ndarray
```

In [42]:
```
arr1.shape
```

Out[42]:
```
(183, 275, 3)
```

In [43]:
```
plt.imshow(arr1)
```

Out[43]:
```
<matplotlib.image.AxesImage at 0x13469587800>
```

In [44]:
```
horse_img1 = arr1.copy()
```

In [45]:
```
horse_img1[:,:,0] = 0
```

In [46]:
```
plt.imshow(horse_img1)
```

Out[46]:
```
<matplotlib.image.AxesImage at 0x13469694410>
```

In [47]:
```
horse_img1[:,:,1]
```

Out[47]:
```
array([[19, 18, 18, ..., 36, 36, 36],
       [19, 19, 18, ..., 30, 30, 30],
       [19, 19, 18, ..., 24, 24, 24],
       ...,
       [53, 73, 86, ..., 36, 38, 41],
       [56, 59, 62, ..., 28, 30, 33],
       [60, 65, 73, ..., 31, 33, 36]], dtype=uint8)
```

In [48]:
```
horse_red[:,:,1] = 0
```

In [49]:
```
plt.imshow(horse_img1)
```

Out[49]:
```
<matplotlib.image.AxesImage at 0x13468aa6780>
```

In [ ]: