In [2]:
```
import numpy as np  #numpy is a library for n-dimension Array
```

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

Out[3]:
```
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 [4]:
```
ones_arr=np.ones((5,5), dtype= 'int')
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]:
```
zeros_arr = np.zeros((3,3), dtype = 'int')
```

In [6]:
```
zeros_arr
```

Out[6]:
```
array([[0, 0, 0],
       [0, 0, 0],
       [0, 0, 0]])
```

In [7]:
```
ones_arr
```

Out[7]:
```
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 [8]:
```
ones_arr*155
```

Out[8]:
```
array([[155, 155, 155, 155, 155],
       [155, 155, 155, 155, 155],
       [155, 155, 155, 155, 155],
       [155, 155, 155, 155, 155],
       [155, 155, 155, 155, 155]])
```

In [9]:
```
zeros_arr
```

Out[9]:
```
array([[0, 0, 0],
       [0, 0, 0],
       [0, 0, 0]])
```

In [10]:
```
ones_arr
```

Out[10]:
```
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 [28]:
```
import matplotlib.pyplot as plt  #matplotlib is a library for visulizatio
```

In [12]:
```
#matplotlib inline use for keep the picture inside
```

In [29]:
```
%matplotlib inline
```

In [14]:
```
from PIL import Image #python imagine library
```

In [15]:
```
lion_img= Image.open('/Users/arsala/Downloads/lion.jpg')
```

In [16]:
```
lion_img
```

Out[16]:

In [20]:
```
type(lion_img)
```

Out[20]:
```
PIL.JpegImagePlugin.JpegImageFile
```

In [21]:
```
lion_arr = np.asarray(lion_img)
```

In [22]:
```
lion_arr
```

Out[22]:
```
array([[[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [198, 201, 216],
        [201, 204, 213],
        [204, 207, 212]],

       [[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [197, 200, 215],
        [201, 204, 213],
        [203, 206, 211]],

       [[ 91, 173, 213],
        [ 91, 173, 213],
        [ 91, 173, 213],
        ...,
        [196, 199, 214],
        [200, 203, 212],
        [203, 206, 211]],

       ...,

       [[155, 150,  58],
        [175, 168,  78],
        [192, 182,  97],
        ...,
        [163, 145,  63],
        [155, 137,  55],
        [150, 132,  50]],

       [[159, 154,  62],
        [169, 162,  72],
        [179, 169,  84],
        ...,
        [160, 142,  60],
        [153, 135,  53],
        [148, 130,  48]],

       [[164, 159,  67],
        [161, 154,  64],
        [164, 154,  69],
        ...,
        [157, 139,  57],
        [150, 132,  50],
        [145, 127,  45]]], dtype=uint8)
```

In [23]:
```
type(lion_arr)
```

Out[23]:
```
numpy.ndarray
```

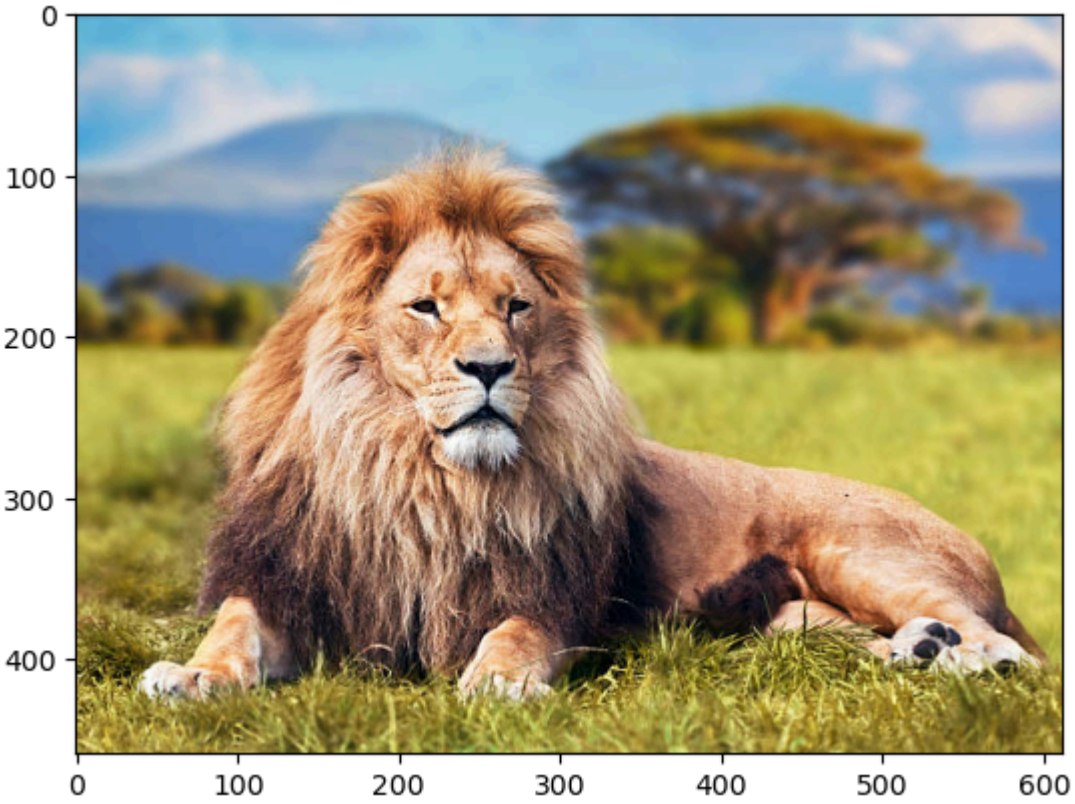
In [24]:
```
lion_arr.shape
```

Out[24]:
```
(459, 612, 3)
```

In [30]:
```
plt.imshow(lion_arr)
```

Out[30]: <matplotlib.image.AxesImage at 0x116da2e90>

In [31]:
```
plt.show()
```



In [32]:
```
lion_red = lion_arr.copy()
```

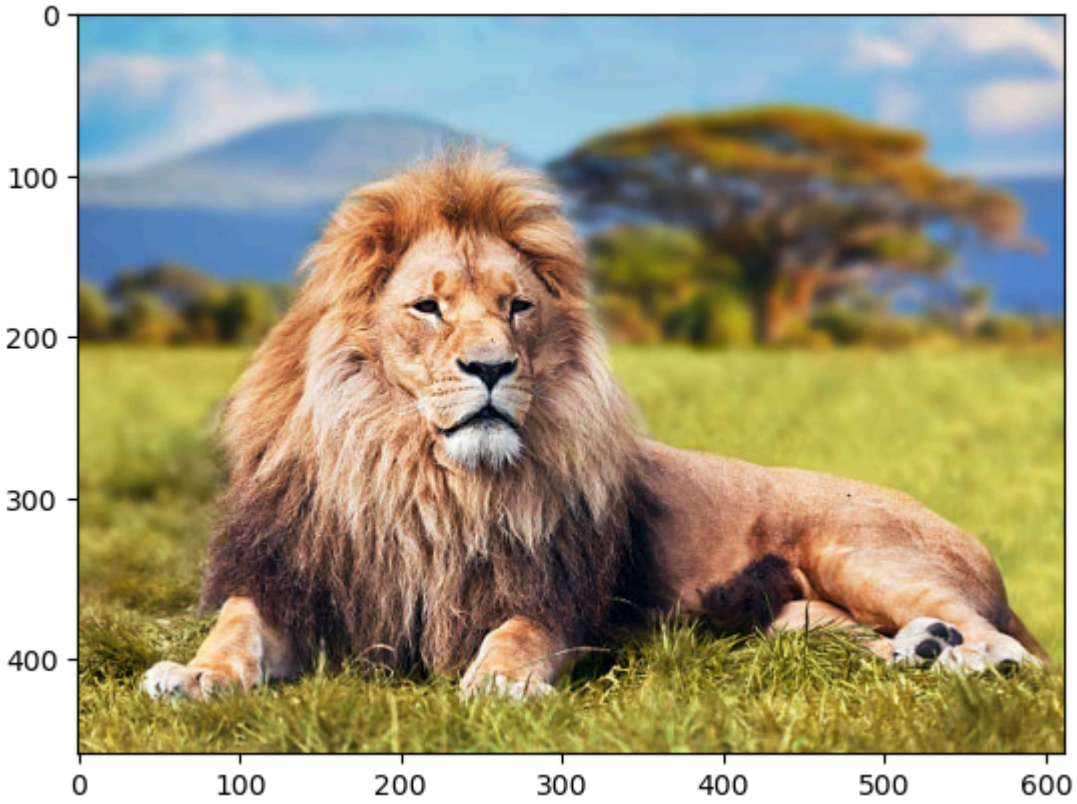
In [34]:
```
lion_red
```

Out[34]:
```
array([[[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [198, 201, 216],
        [201, 204, 213],
        [204, 207, 212]],

       [[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [197, 200, 215],
        [201, 204, 213],
        [203, 206, 211]],

       [[ 91, 173, 213],
        [ 91, 173, 213],
        [ 91, 173, 213],
        ...,
        [196, 199, 214],
        [200, 203, 212],
        [203, 206, 211]],

       ...,

       [[155, 150,  58],
        [175, 168,  78],
        [192, 182,  97],
        ...,
        [163, 145,  63],
        [155, 137,  55],
        [150, 132,  50]],

       [[159, 154,  62],
        [169, 162,  72],
        [179, 169,  84],
        ...,
        [160, 142,  60],
        [153, 135,  53],
        [148, 130,  48]],

       [[164, 159,  67],
        [161, 154,  64],
        [164, 154,  69],
        ...,
        [157, 139,  57],
        [150, 132,  50],
        [145, 127,  45]]], dtype=uint8)
```

In [35]:
```
lion_arr == lion_red
```

Out[35]:
```
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 [37]:
```
plt.imshow(lion_red)
plt.show()
```



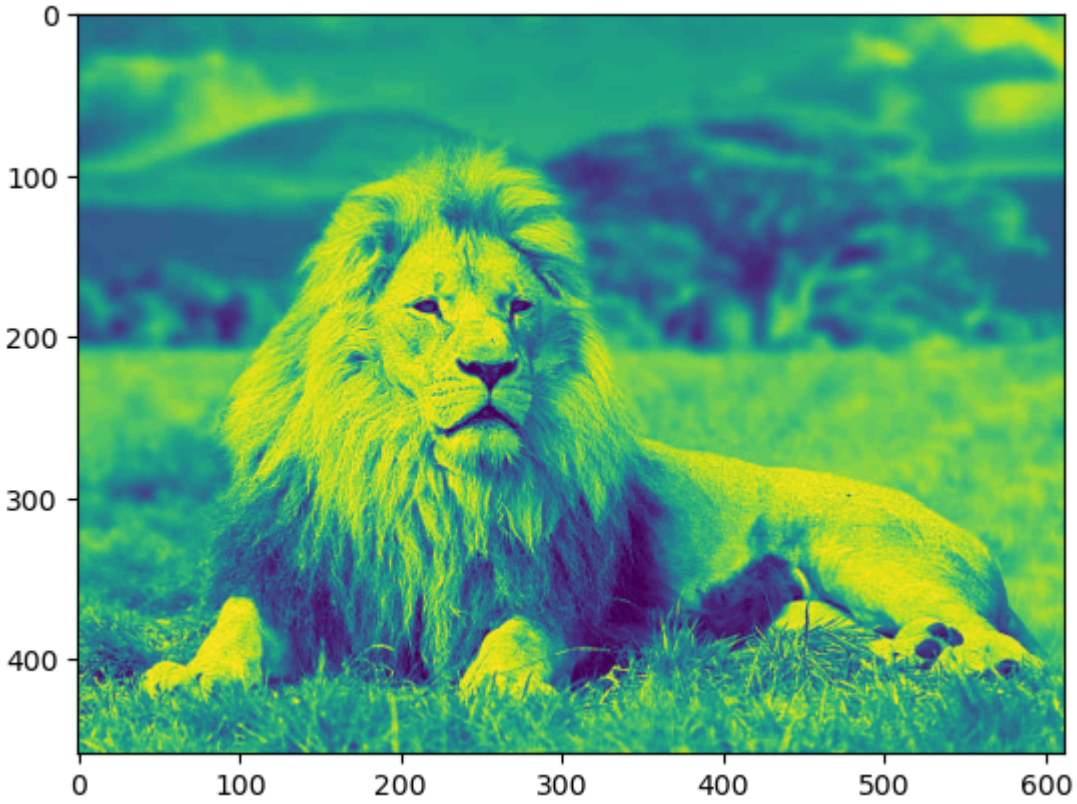
In [38]:
```
lion_red.shape
```

Out[38]:
```
(459, 612, 3)
```

In [39]:
```
# R G B

plt.imshow(lion_red[:,:,0])
```

Out[39]:
```
<matplotlib.image.AxesImage at 0x1172ebed0>
```

In [41]:
```
plt.show()
```



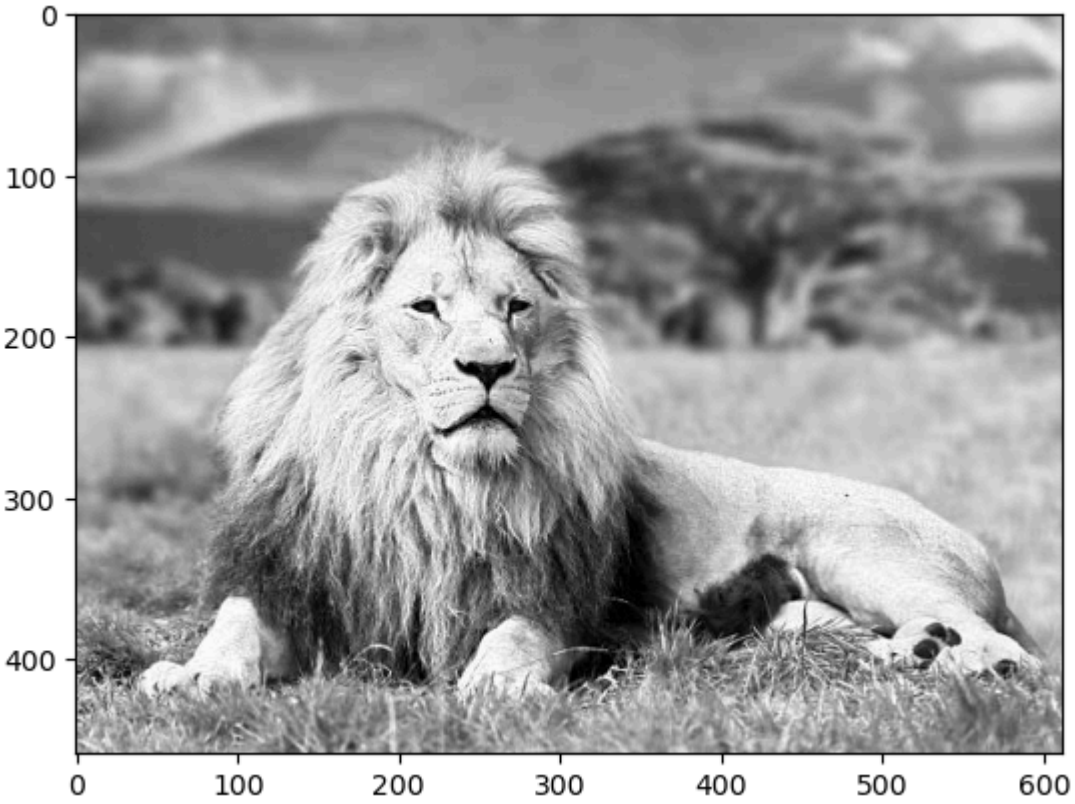
In [42]:
```
lion_red[:,:,0]
```

Out[42]:
```
array([[ 90,  90,  90, ..., 198, 201, 204],
       [ 90,  90,  90, ..., 197, 201, 203],
       [ 91,  91,  91, ..., 196, 200, 203],
       ...,
       [155, 175, 192, ..., 163, 155, 150],
       [159, 169, 179, ..., 160, 153, 148],
       [164, 161, 164, ..., 157, 150, 145]], dtype=uint8)
```

In [43]:
```
plt.imshow(lion_red[:,:,0], cmap='gray')
```

Out[43]:
```
<matplotlib.image.AxesImage at 0x11750d950>
```

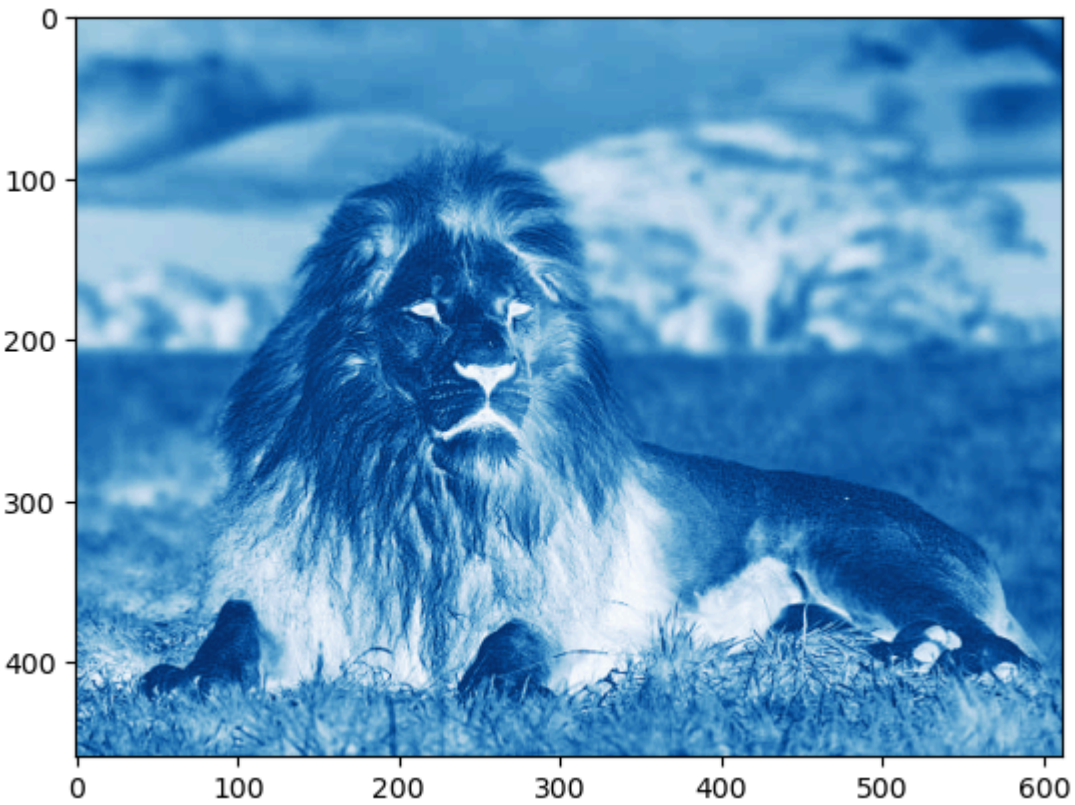
In [44]:
```
plt.show()
```



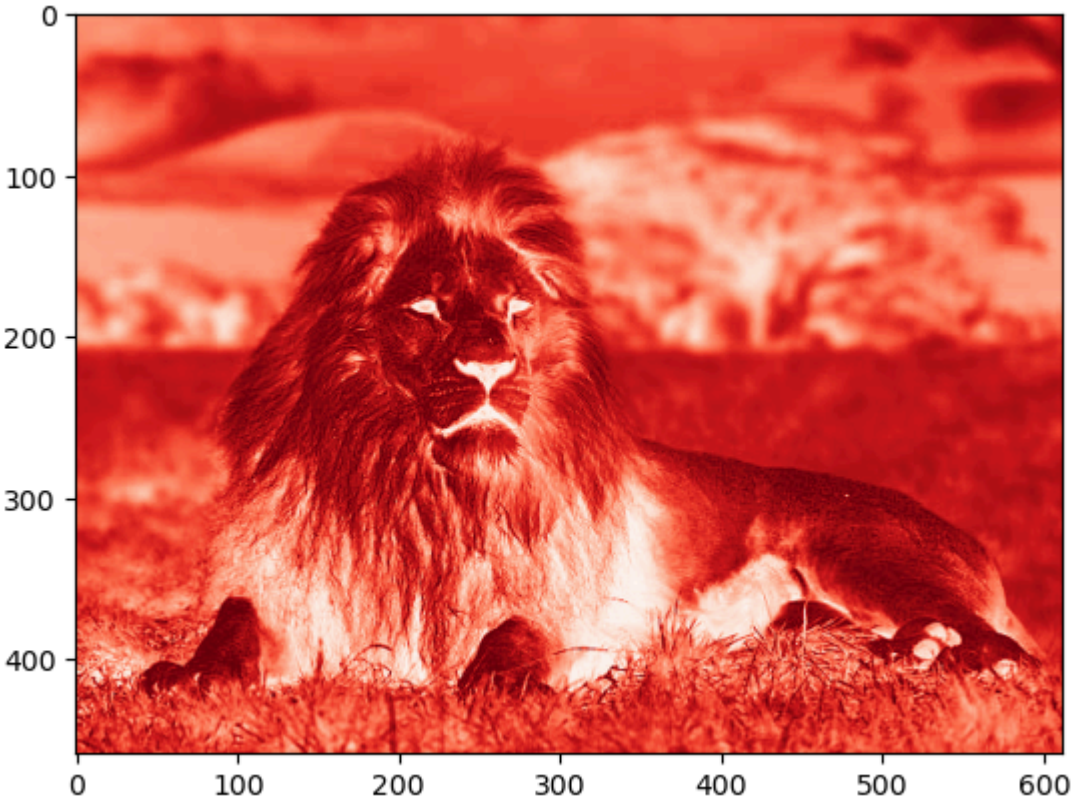
In [47]:
```
plt.imshow(lion_red[:,:,0], cmap='Blues')
```

Out[47]: <matplotlib.image.AxesImage at 0x147252490>

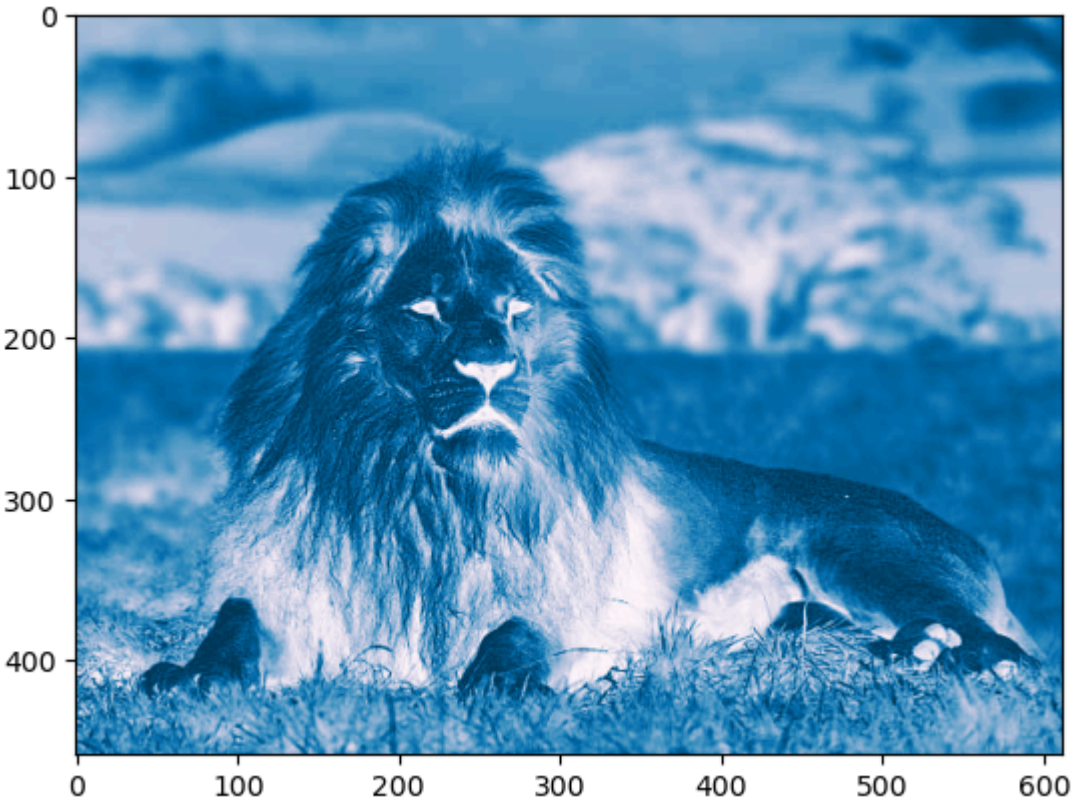
In [48]:
```
plt.show()
```



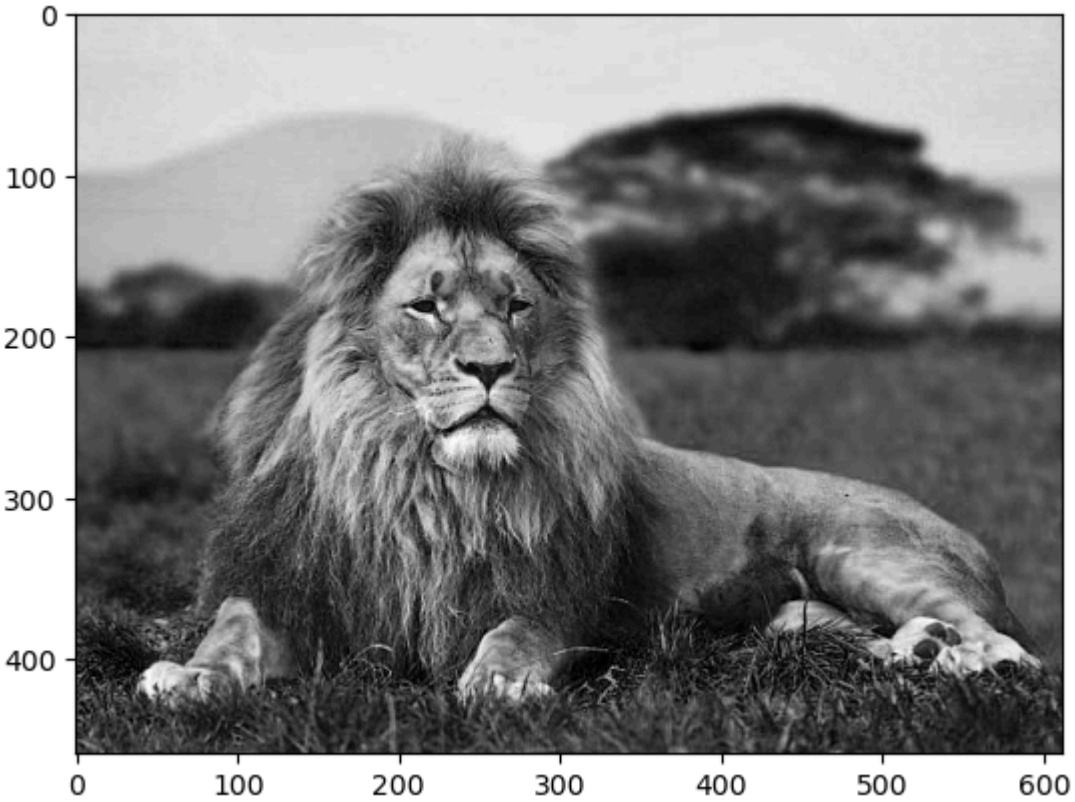
In [50]:
```
plt.imshow(lion_red[:,:,0], cmap='Reds')
plt.show()
```



In [51]:
```
plt.imshow(lion_red[:,:,0], cmap='PuBu')
plt.show()
```



In [52]:
```
plt.imshow(lion_red[:,:,2], cmap='gray')
plt.show()
```



In [56]:
```
lion_red[:,:,0]
```

Out[56]:
```
array([[ 90,  90,  90, ..., 198, 201, 204],
       [ 90,  90,  90, ..., 197, 201, 203],
       [ 91,  91,  91, ..., 196, 200, 203],
       ...,
       [155, 175, 192, ..., 163, 155, 150],
       [159, 169, 179, ..., 160, 153, 148],
       [164, 161, 164, ..., 157, 150, 145]], dtype=uint8)
```

In [57]:
```
lion_red[:,:,1]
```

Out[57]:
```
array([[172, 172, 172, ..., 201, 204, 207],
       [172, 172, 172, ..., 200, 204, 206],
       [173, 173, 173, ..., 199, 203, 206],
       ...,
       [150, 168, 182, ..., 145, 137, 132],
       [154, 162, 169, ..., 142, 135, 130],
       [159, 154, 154, ..., 139, 132, 127]], dtype=uint8)
```

In [58]:
```
lion_red[:,:,2]
```

Out[58]:
```
array([[212, 212, 212, ..., 216, 213, 212],
       [212, 212, 212, ..., 215, 213, 211],
       [213, 213, 213, ..., 214, 212, 211],
       ...,
       [ 58,  78,  97, ...,  63,  55,  50],
       [ 62,  72,  84, ...,  60,  53,  48],
       [ 67,  64,  69, ...,  57,  50,  45]], dtype=uint8)
```

In [59]:
```
lion_red[:,:,1] = 0
```

In [60]:
```
lion_red[:,:,1]
```

Out[60]:
```
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 [61]:
```
plt.imshow(lion_red)
```

Out[61]:
```
<matplotlib.image.AxesImage at 0x147460f50>
```

In [62]:
```
plt.show()
```

In [63]:
```
lion_arr
```

Out[63]:
```
array([[[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [198, 201, 216],
        [201, 204, 213],
        [204, 207, 212]],

       [[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [197, 200, 215],
        [201, 204, 213],
        [203, 206, 211]],

       [[ 91, 173, 213],
        [ 91, 173, 213],
        [ 91, 173, 213],
        ...,
        [196, 199, 214],
        [200, 203, 212],
        [203, 206, 211]],

       ...,

       [[155, 150,  58],
        [175, 168,  78],
        [192, 182,  97],
        ...,
        [163, 145,  63],
        [155, 137,  55],
        [150, 132,  50]],

       [[159, 154,  62],
        [169, 162,  72],
        [179, 169,  84],
        ...,
        [160, 142,  60],
        [153, 135,  53],
        [148, 130,  48]],

       [[164, 159,  67],
        [161, 154,  64],
        [164, 154,  69],
        ...,
        [157, 139,  57],
        [150, 132,  50],
        [145, 127,  45]]], dtype=uint8)
```

In [64]:
```
lion_img
```

Out[64]:

In [65]:
```
lion_red
```

Out[65]:
```
array([[[ 90,   0, 212],
        [ 90,   0, 212],
        [ 90,   0, 212],
        ...,
        [198,   0, 216],
        [201,   0, 213],
        [204,   0, 212]],

       [[ 90,   0, 212],
        [ 90,   0, 212],
        [ 90,   0, 212],
        ...,
        [197,   0, 215],
        [201,   0, 213],
        [203,   0, 211]],

       [[ 91,   0, 213],
        [ 91,   0, 213],
        [ 91,   0, 213],
        ...,
        [196,   0, 214],
        [200,   0, 212],
        [203,   0, 211]],

       ...,

       [[155,   0,  58],
        [175,   0,  78],
        [192,   0,  97],
        ...,
        [163,   0,  63],
        [155,   0,  55],
        [150,   0,  50]],

       [[159,   0,  62],
        [169,   0,  72],
        [179,   0,  84],
        ...,
        [160,   0,  60],
        [153,   0,  53],
        [148,   0,  48]],

       [[164,   0,  67],
        [161,   0,  64],
        [164,   0,  69],
        ...,
        [157,   0,  57],
        [150,   0,  50],
        [145,   0,  45]]], dtype=uint8)
```

In [66]:
```
arr1 = np.asarray(lion_img)
```

In [67]:
```
arr1
```

Out[67]:
```
array([[[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [198, 201, 216],
        [201, 204, 213],
        [204, 207, 212]],

       [[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [197, 200, 215],
        [201, 204, 213],
        [203, 206, 211]],

       [[ 91, 173, 213],
        [ 91, 173, 213],
        [ 91, 173, 213],
        ...,
        [196, 199, 214],
        [200, 203, 212],
        [203, 206, 211]],

       ...,

       [[155, 150,  58],
        [175, 168,  78],
        [192, 182,  97],
        ...,
        [163, 145,  63],
        [155, 137,  55],
        [150, 132,  50]],

       [[159, 154,  62],
        [169, 162,  72],
        [179, 169,  84],
        ...,
        [160, 142,  60],
        [153, 135,  53],
        [148, 130,  48]],

       [[164, 159,  67],
        [161, 154,  64],
        [164, 154,  69],
        ...,
        [157, 139,  57],
        [150, 132,  50],
        [145, 127,  45]]], dtype=uint8)
```

In [68]:
```
type(arr1)
```

Out[68]:
```
numpy.ndarray
```

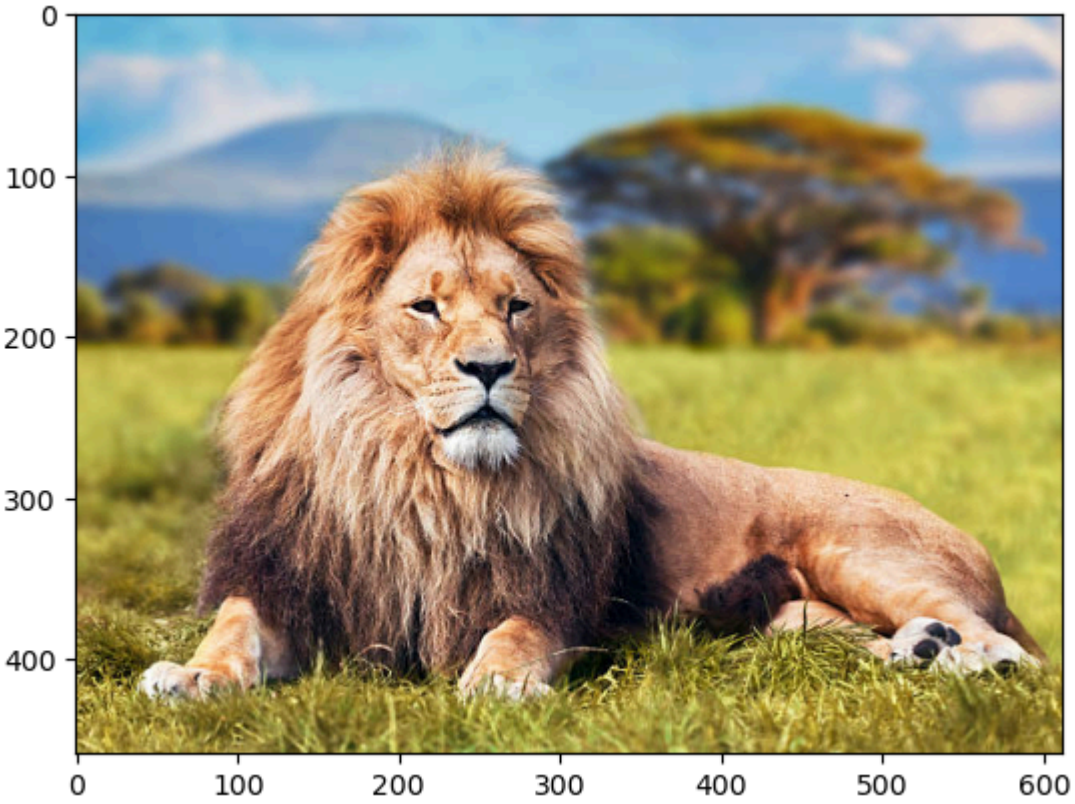
In [70]:
```
arr1.shape
```

Out[70]:
```
(459, 612, 3)
```

In [71]:
```
plt.imshow(arr1)
```

Out[71]: <matplotlib.image.AxesImage at 0x151748b90>

In [73]:
```
plt.show()
```



In [82]:
```
lion_img1 = arr1.copy()
```

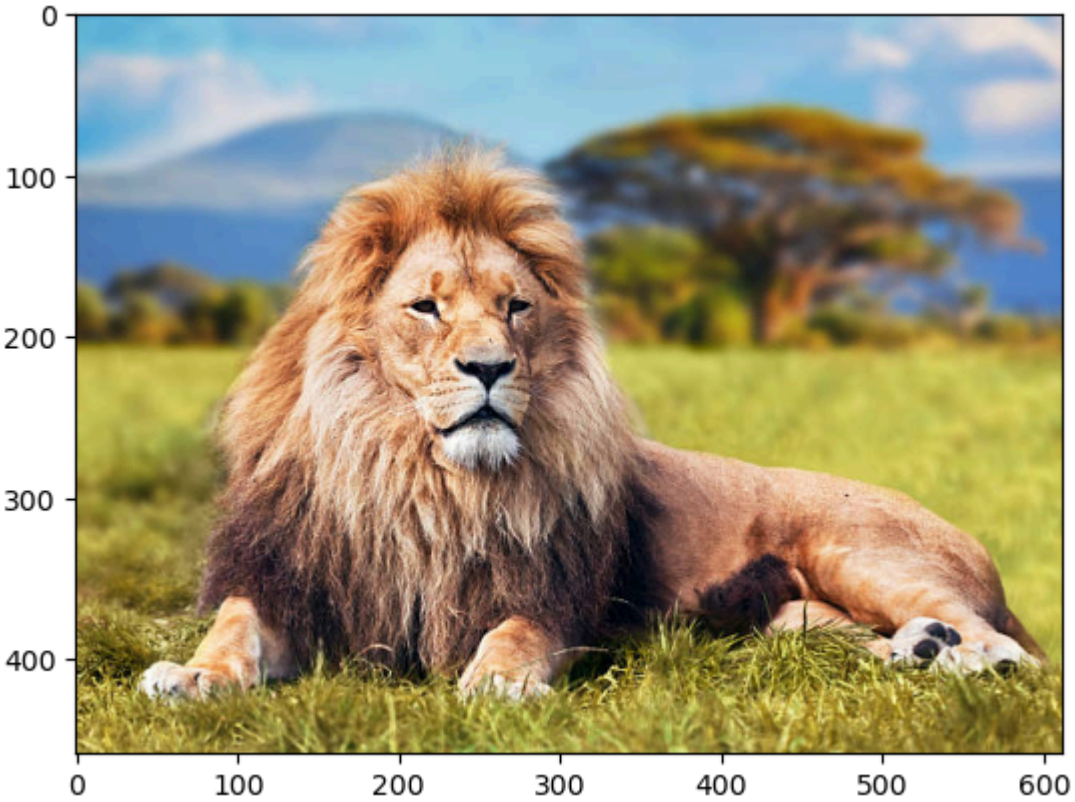
In [83]:
```
lion_img1
```

Out[83]:
```
array([[[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [198, 201, 216],
        [201, 204, 213],
        [204, 207, 212]],

       [[ 90, 172, 212],
        [ 90, 172, 212],
        [ 90, 172, 212],
        ...,
        [197, 200, 215],
        [201, 204, 213],
        [203, 206, 211]],

       [[ 91, 173, 213],
        [ 91, 173, 213],
        [ 91, 173, 213],
        ...,
        [196, 199, 214],
        [200, 203, 212],
        [203, 206, 211]],

       ...,

       [[155, 150,  58],
        [175, 168,  78],
        [192, 182,  97],
        ...,
        [163, 145,  63],
        [155, 137,  55],
        [150, 132,  50]],

       [[159, 154,  62],
        [169, 162,  72],
        [179, 169,  84],
        ...,
        [160, 142,  60],
        [153, 135,  53],
        [148, 130,  48]],

       [[164, 159,  67],
        [161, 154,  64],
        [164, 154,  69],
        ...,
        [157, 139,  57],
        [150, 132,  50],
        [145, 127,  45]]], dtype=uint8)
```

In [84]:
```
plt.imshow(lion_img1)
```

Out[84]:
```
<matplotlib.image.AxesImage at 0x15134c7d0>
```

In [80]:
```
plt.show()
```



In [85]:
```
lion_img1[:,:,1]
```

Out[85]:
```
array([[172, 172, 172, ..., 201, 204, 207],
       [172, 172, 172, ..., 200, 204, 206],
       [173, 173, 173, ..., 199, 203, 206],
       ...,
       [150, 168, 182, ..., 145, 137, 132],
       [154, 162, 169, ..., 142, 135, 130],
       [159, 154, 154, ..., 139, 132, 127]], dtype=uint8)
```

In [86]:
```
lion_img1[:,:,1] = 0
```

In [88]:
```
plt.imshow(lion_img1)
```

Out[88]:
```
<matplotlib.image.AxesImage at 0x1513c3390>
```

In [89]:
```
plt.show()
```


0
100
200
300
400
0
100
200
300
400
500
600