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

In [6]:
```
ones_arr = np.ones((5,5), dtype=int)
ones_arr
```

Out[6]:
```
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]:
```
zeros_arr = np.zeros((3,3), dtype=int)
zeros_arr
```

Out[8]:
```
array([[0, 0, 0],
       [0, 0, 0],
       [0, 0, 0]])
```

In [10]:
```
ones_arr * 255
```

Out[10]:
```
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 [12]:
```
import matplotlib.pyplot as plt
```

In [14]:
```
%matplotlib inline
```

In [16]:
```
from PIL import Image
```

In [18]:
```
horse_img = Image.open(r"C:\Users\AKSHAY\OneDrive\Desktop\horse.jpg")
horse_img
```

Out[18]:

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

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

In [24]:
```
horse_arr = np.asarray(horse_img)
horse_arr
```

Out[24]:
```
array([[[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [25, 37, 35],
        [19, 34, 31],
        [14, 30, 27]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [26, 38, 36],
        [22, 37, 34],
        [20, 36, 33]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [28, 40, 38],
        [25, 40, 37],
        [24, 40, 37]],

       ...,

       [[49, 50, 44],
        [40, 41, 35],
        [35, 35, 27],
        ...,
        [14, 30, 29],
        [13, 25, 25],
        [12, 22, 23]],

       [[45, 50, 44],
        [38, 43, 37],
        [31, 36, 30],
        ...,
        [11, 25, 25],
        [12, 24, 24],
        [16, 26, 27]],

       [[31, 41, 33],
        [31, 41, 33],
        [32, 39, 32],
        ...,
        [14, 26, 26],
        [16, 26, 27],
        [23, 31, 33]]], dtype=uint8)
```

In [26]:
```
type(horse_arr)
```

Out[26]:
```
numpy.ndarray
```

In [28]:
```
plt.imshow(horse_img)
plt.show()
```

In [30]:
```
horse_arr.shape
```

Out[30]:
```
(2334, 3502, 3)
```

In [32]:
```
horse_red = horse_arr.copy()
horse_red
```

Out[32]:
```
array([[[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [25, 37, 35],
        [19, 34, 31],
        [14, 30, 27]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [26, 38, 36],
        [22, 37, 34],
        [20, 36, 33]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [28, 40, 38],
        [25, 40, 37],
        [24, 40, 37]],

       ...,

       [[49, 50, 44],
        [40, 41, 35],
        [35, 35, 27],
        ...,
        [14, 30, 29],
        [13, 25, 25],
        [12, 22, 23]],

       [[45, 50, 44],
        [38, 43, 37],
        [31, 36, 30],
        ...,
        [11, 25, 25],
        [12, 24, 24],
        [16, 26, 27]],

       [[31, 41, 33],
        [31, 41, 33],
        [32, 39, 32],
        ...,
        [14, 26, 26],
        [16, 26, 27],
        [23, 31, 33]]], dtype=uint8)
```

In [34]:
```
horse_arr == horse_red
```

Out[34]:
```
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 [36]:
```
plt.imshow(horse_red)
plt.show()
```

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

Out[38]: (2334, 3502, 3)

In [42]:
```
plt.imshow(horse_red[:,:,0])
plt.show()
```

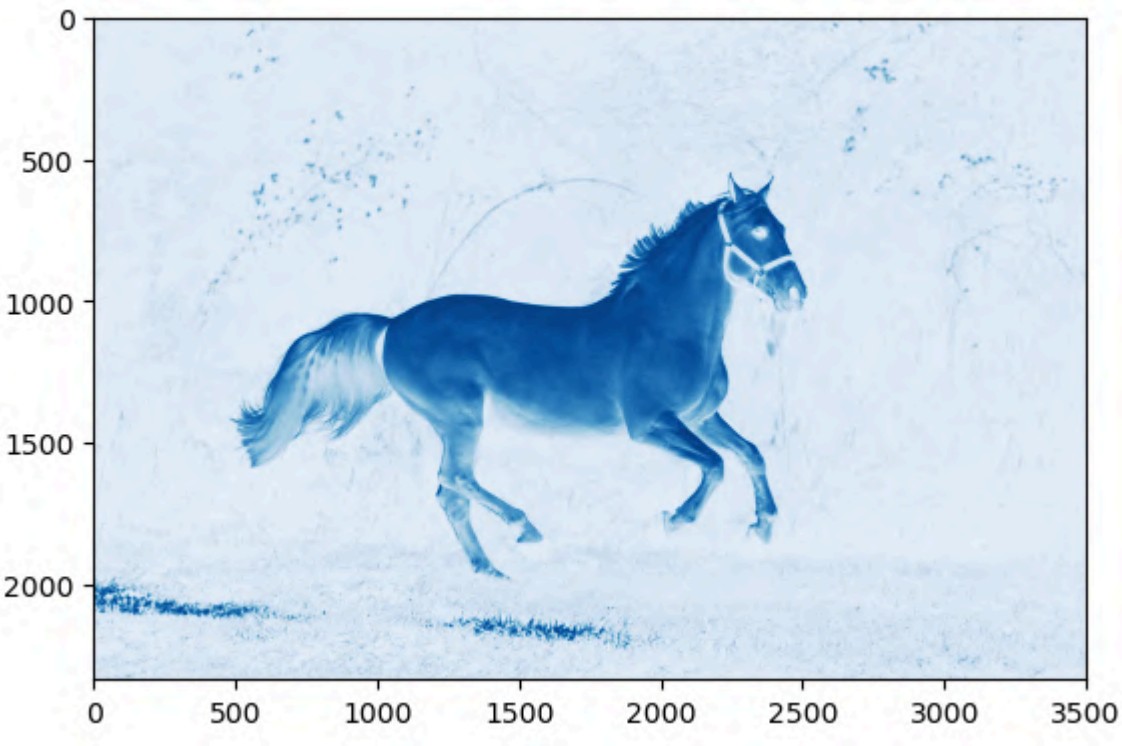
In [44]:
```
horse_red[:,:,0]
```

Out[44]:
```
array([[15, 15, 15, ..., 25, 19, 14],
       [15, 15, 15, ..., 26, 22, 20],
       [15, 15, 15, ..., 28, 25, 24],
       ...,
       [49, 40, 35, ..., 14, 13, 12],
       [45, 38, 31, ..., 11, 12, 16],
       [31, 31, 32, ..., 14, 16, 23]], dtype=uint8)
```

In [46]:
```
plt.imshow(horse_red[:,:,0], cmap='Greys')
plt.show()
```

In [48]:
```
plt.imshow(horse_red[:,:,1], cmap='grey')
plt.show()
```

In [50]:
```
plt.imshow(horse_red[:,:,2], cmap='Blues')
plt.show()
```



In [52]:
```
horse_red[:,:,0]
```

Out[52]:
```
array([[15, 15, 15, ..., 25, 19, 14],
       [15, 15, 15, ..., 26, 22, 20],
       [15, 15, 15, ..., 28, 25, 24],
       ...,
       [49, 40, 35, ..., 14, 13, 12],
       [45, 38, 31, ..., 11, 12, 16],
       [31, 31, 32, ..., 14, 16, 23]], dtype=uint8)
```

In [54]:
```
horse_red[:,:,1]
```

Out[54]:
```
array([[17, 17, 17, ..., 37, 34, 30],
       [17, 17, 17, ..., 38, 37, 36],
       [17, 17, 17, ..., 40, 40, 40],
       ...,
       [50, 41, 35, ..., 30, 25, 22],
       [50, 43, 36, ..., 25, 24, 26],
       [41, 41, 39, ..., 26, 26, 31]], dtype=uint8)
```

In [56]:
```
horse_red[:,:,2]
```

Out[56]:
```
array([[29, 29, 29, ..., 35, 31, 27],
       [29, 29, 29, ..., 36, 34, 33],
       [29, 29, 29, ..., 38, 37, 37],
       ...,
       [44, 35, 27, ..., 29, 25, 23],
       [44, 37, 30, ..., 25, 24, 27],
       [33, 33, 32, ..., 26, 27, 33]], dtype=uint8)
```

In [58]:
```
horse_red[:,:,1] = 0
horse_red[:,:,1]
```

Out[58]:
```
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 [60]:
```
plt.imshow(horse_red)
plt.show()
```

In [62]:
```
horse_red[:,:,2] = 0
horse_red[:,:,2]
```

Out[62]:
```
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 [64]:
```
plt.imshow(horse_red)
plt.show()
```

In [66]:
```
horse_arr
```

Out[66]:
```
array([[[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [25, 37, 35],
        [19, 34, 31],
        [14, 30, 27]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [26, 38, 36],
        [22, 37, 34],
        [20, 36, 33]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [28, 40, 38],
        [25, 40, 37],
        [24, 40, 37]],

       ...,

       [[49, 50, 44],
        [40, 41, 35],
        [35, 35, 27],
        ...,
        [14, 30, 29],
        [13, 25, 25],
        [12, 22, 23]],

       [[45, 50, 44],
        [38, 43, 37],
        [31, 36, 30],
        ...,
        [11, 25, 25],
        [12, 24, 24],
        [16, 26, 27]],

       [[31, 41, 33],
        [31, 41, 33],
        [32, 39, 32],
        ...,
        [14, 26, 26],
        [16, 26, 27],
        [23, 31, 33]]], dtype=uint8)
```

In [68]:
```
horse_red
```

Out[68]:
```
array([[[15,  0,  0],
        [15,  0,  0],
        [15,  0,  0],
        ...,
        [25,  0,  0],
        [19,  0,  0],
        [14,  0,  0]],

       [[15,  0,  0],
        [15,  0,  0],
        [15,  0,  0],
        ...,
        [26,  0,  0],
        [22,  0,  0],
        [20,  0,  0]],

       [[15,  0,  0],
        [15,  0,  0],
        [15,  0,  0],
        ...,
        [28,  0,  0],
        [25,  0,  0],
        [24,  0,  0]],

       ...,

       [[49,  0,  0],
        [40,  0,  0],
        [35,  0,  0],
        ...,
        [14,  0,  0],
        [13,  0,  0],
        [12,  0,  0]],

       [[45,  0,  0],
        [38,  0,  0],
        [31,  0,  0],
        ...,
        [11,  0,  0],
        [12,  0,  0],
        [16,  0,  0]],

       [[31,  0,  0],
        [31,  0,  0],
        [32,  0,  0],
        ...,
        [14,  0,  0],
        [16,  0,  0],
        [23,  0,  0]]], dtype=uint8)
```

In [70]:
```
horse_img
```

Out[70]:

In [72]:

```
arr1 = np.asarray(horse_img)
arr1
```

Out[72]:
```
array([[[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [25, 37, 35],
        [19, 34, 31],
        [14, 30, 27]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [26, 38, 36],
        [22, 37, 34],
        [20, 36, 33]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [28, 40, 38],
        [25, 40, 37],
        [24, 40, 37]],

       ...,

       [[49, 50, 44],
        [40, 41, 35],
        [35, 35, 27],
        ...,
        [14, 30, 29],
        [13, 25, 25],
        [12, 22, 23]],

       [[45, 50, 44],
        [38, 43, 37],
        [31, 36, 30],
        ...,
        [11, 25, 25],
        [12, 24, 24],
        [16, 26, 27]],

       [[31, 41, 33],
        [31, 41, 33],
        [32, 39, 32],
        ...,
        [14, 26, 26],
        [16, 26, 27],
        [23, 31, 33]]], dtype=uint8)
```

In [74]:
```
type(arr1)
```

Out[74]:
```
numpy.ndarray
```

In [76]:
```
arr1.shape
```

Out[76]:
```
(2334, 3502, 3)
```

In [78]:
```
plt.imshow(arr1)
plt.show()
```

In [82]:
```
horse_img1 = arr1.copy()
horse_img1
```

Out[82]:
```
array([[[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [25, 37, 35],
        [19, 34, 31],
        [14, 30, 27]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [26, 38, 36],
        [22, 37, 34],
        [20, 36, 33]],

       [[15, 17, 29],
        [15, 17, 29],
        [15, 17, 29],
        ...,
        [28, 40, 38],
        [25, 40, 37],
        [24, 40, 37]],

       ...,

       [[49, 50, 44],
        [40, 41, 35],
        [35, 35, 27],
        ...,
        [14, 30, 29],
        [13, 25, 25],
        [12, 22, 23]],

       [[45, 50, 44],
        [38, 43, 37],
        [31, 36, 30],
        ...,
        [11, 25, 25],
        [12, 24, 24],
        [16, 26, 27]],

       [[31, 41, 33],
        [31, 41, 33],
        [32, 39, 32],
        ...,
        [14, 26, 26],
        [16, 26, 27],
        [23, 31, 33]]], dtype=uint8)
```

In [84]:
```
horse_img1[:,:,0] = 0
horse_img1[:,:,0]
```

Out[84]:
```
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 [86]:
```
plt.imshow(horse_img1)
plt.show()
```

In [88]:
```
horse_img1[:,:,1]
```

Out[88]:
```
array([[17, 17, 17, ..., 37, 34, 30],
       [17, 17, 17, ..., 38, 37, 36],
       [17, 17, 17, ..., 40, 40, 40],
       ...,
       [50, 41, 35, ..., 30, 25, 22],
       [50, 43, 36, ..., 25, 24, 26],
       [41, 41, 39, ..., 26, 26, 31]], dtype=uint8)
```

In [90]:
```
horse_img1[:,:,1] = 0
horse_img1[:,:,1]
```

Out[90]:
```
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 [92]:
```
plt.imshow(horse_img1)
plt.show()
```


0
500
1000
1500
2000
0
500
1000
1500
2000
2500
3000
3500