02nd May 2025

Data Visualization - Matplotlib

- It is a comprehensive library for creating static, animated and interactive visualizations in Python

```
In [2]:  import numpy as np       # any image is divided into mega pixles (0 to 255)
```

```
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 [6]:  ones_arr*255
```

```
Out[6]:  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 [9]:  import matplotlib.pyplot as plt
```

```
In [13]: from PIL import Image   # Python Image library
```

```
In [15]: leaf = Image.open(r'C:\\Users\\Windows10 Pro\\Downloads\\bird.jpg')
         leaf
```

Out[15]:

In [16]:
```python
horse = Image.open(r'C:\\Users\\Windows10 Pro\\Downloads\\horse.jpg')
horse
```

Out[16]:

In [17]:
```python
type(horse)
```

Out[17]:   PIL.JpegImagePlugin.JpegImageFile

In [18]:
```python
horse_arr = np.asarray(horse)
horse_arr
```

```
Out[18]:   array([[[150, 169, 176],
                   [150, 169, 176],
                   [151, 170, 177],
                   ...,
                   [179, 181, 176],
                   [177, 182, 176],
                   [177, 182, 176]],

                  [[150, 169, 176],
                   [150, 169, 176],
                   [151, 170, 177],
                   ...,
                   [178, 180, 175],
                   [176, 181, 175],
                   [176, 181, 175]],

                  [[150, 169, 176],
                   [150, 169, 176],
                   [151, 170, 177],
                   ...,
                   [177, 179, 174],
                   [175, 180, 174],
                   [175, 180, 174]],

                  ...,

                  [[179, 149, 115],
                   [180, 150, 116],
                   [181, 151, 117],
                   ...,
                   [124, 104,  80],
                   [124, 104,  80],
                   [124, 104,  80]],

                  [[169, 139, 105],
                   [169, 139, 105],
                   [168, 138, 104],
                   ...,
                   [ 97,  77,  53],
                   [ 96,  76,  52],
                   [ 96,  76,  52]],

                  [[177, 147, 113],
                   [170, 140, 106],
                   [159, 129,  95],
                   ...,
                   [106,  85,  64],
                   [105,  84,  63],
                   [105,  84,  63]]], dtype=uint8)
```

```python
In [25]:   plt.imshow(horse_arr)
           plt.show()
```

```
In [26]:  horse_arr.shape
```

```
Out[26]:  (183, 275, 3)
```

```
In [28]:  horse_red = horse_arr.copy()
          horse_red
```

```
Out[28]:  array([[[150, 169, 176],
                  [150, 169, 176],
                  [151, 170, 177],
                  ...,
                  [179, 181, 176],
                  [177, 182, 176],
                  [177, 182, 176]],

                 [[150, 169, 176],
                  [150, 169, 176],
                  [151, 170, 177],
                  ...,
                  [178, 180, 175],
                  [176, 181, 175],
                  [176, 181, 175]],

                 [[150, 169, 176],
                  [150, 169, 176],
                  [151, 170, 177],
                  ...,
                  [177, 179, 174],
                  [175, 180, 174],
                  [175, 180, 174]],

                 ...,

                 [[179, 149, 115],
                  [180, 150, 116],
                  [181, 151, 117],
                  ...,
                  [124, 104,  80],
                  [124, 104,  80],
                  [124, 104,  80]],

                 [[169, 139, 105],
                  [169, 139, 105],
                  [168, 138, 104],
                  ...,
                  [ 97,  77,  53],
                  [ 96,  76,  52],
                  [ 96,  76,  52]],

                 [[177, 147, 113],
                  [170, 140, 106],
                  [159, 129,  95],
                  ...,
                  [106,  85,  64],
                  [105,  84,  63],
                  [105,  84,  63]]], dtype=uint8)
```

```
In [29]:  horse_arr == horse_red
```

```
Out[29]: 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 [30]: plt.imshow(horse_red)
```

```
Out[30]: <matplotlib.image.AxesImage at 0x247f7c4e3c0>
```

In [ ]: `# RGB`