In [6]:
```
import numpy as np
import matplotlib.pyplot as plt
from PIL import Image
import glob
import os
```

In [7]:
```
help (os)
```

```
|  Data descriptors defined here:
|
|  characters_written
|
|  errno
|      POSIX exception code
|
|  filename
|      exception filename
|
|  filename2
|      second exception filename
|
|  strerror
|      exception strerror
|
|  winerror
|      Win32 exception code
|
|  ----------------------------------------------------------------------
```

In [8]:
```
os.getcwd()
```

Out[8]:
```
'C:\\Users\\BrighterDays CodeLab'
```

In [10]:
```
path = "\\Users\\BrighterDays CodeLab\\Pictures\\Saved Pictures"
```

In [11]:
```
os.chdir(path)
```

In [13]:
```
os.getcwd()
```

Out[13]:
```
'C:\\Users\\BrighterDays CodeLab\\Pictures\\Saved Pictures'
```

In [ ]:
```

```

In [14]:
```
os.mkdir("images")
```

In [16]:
```
os.listdir()
```

Out[16]:
```
['desktop.ini', 'images']
```

In [17]:
```
img_org = []
img_crop =[]
```

In [20]:
```
for files in glob.glob(path):
    img = Image.open(files)
    pic_org.append(img)
```

```
---------------------------------------------------------------------------
PermissionError                           Traceback (most recent call last)
<ipython-input-20-60a119c63975> in <module>
      1 for files in glob.glob(path):
----> 2     img = Image.open(files)
      3     pic_org.append(img)

~\Anaconda3\lib\site-packages\PIL\Image.py in open(fp, mode)
   2807
   2808     if filename:
-> 2809         fp = builtins.open(filename, "rb")
   2810         exclusive_fp = True
   2811

PermissionError: [Errno 13] Permission denied: '\\Users\\BrighterDays CodeLab
\\Pictures\\Saved Pictures'
```

In [ ]:

In [ ]:

In [ ]:

In [ ]:

In [24]:
```
import pandas as pd
```

In [32]:
```
df = pd.DataFrame(data = np.random.randn(1000), index = pd.date_range('22-06-2020
tf = pd.Series(data = np.random.randn(1000), index = pd.date_range('22-06-2020',p
tf
```

Out[32]:
```
2020-06-22   -0.352844
2020-06-23    2.266157
2020-06-24   -1.264132
2020-06-25   -0.030768
2020-06-26   -0.938566
                ...
2023-03-14   -0.932408
2023-03-15   -0.179251
2023-03-16    0.183338
2023-03-17   -1.306270
2023-03-18    0.361991
Freq: D, Length: 1000, dtype: float64
```

***df***

In [34]:
```
type(df)
```

Out[34]:
```
pandas.core.frame.DataFrame
```

In [35]:
```
type(tf)
```

Out[35]:
```
pandas.core.series.Series
```

In [39]:
```
arr1 = np.array([[2,3,4,1],[6,7,3,5],[2,8,9,0]])
arr2 = ('a','b','c','d')
arr3 = ('A','B','C')
arr1
```

Out[39]:
```
array([[2, 3, 4, 1],
       [6, 7, 3, 5],
       [2, 8, 9, 0]])
```

In [40]:
```
arr2
```

Out[40]:
```
('a', 'b', 'c', 'd')
```

In [41]:
```
arr3
```

Out[41]:
```
('A', 'B', 'C')
```

In [42]:
```
dfs = pd.DataFrame(data = arr1, index = arr3, columns = arr2)
dfs
```

Out[42]:

| | a | b | c | d |
|---|---|---|---|---|
| **A** | 2 | 3 | 4 | 1 |
| **B** | 6 | 7 | 3 | 5 |
| **C** | 2 | 8 | 9 | 0 |

In [45]:
```
arr1
```

Out[45]:
```
array([[2, 3, 4, 1],
       [6, 7, 3, 5],
       [2, 8, 9, 0]])
```

In [48]:
```
dfs['a']
```

Out[48]:
```
A    2
B    6
C    2
Name: a, dtype: int32
```

In [52]:
```
dfs['b']
```

Out[52]:
```
A    3
B    7
C    8
Name: b, dtype: int32
```