In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
import seaborn as sns
```

In [3]:
```
import glob
```

In [4]:
```
#import all the packages
```

In [5]:
```
glob.glob(r'/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/
```

Out[5]:
```
['/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/XRX_data.csv',
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 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/TXN_data
(1).csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/DVN_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/VIAB_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ARNC_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/LLL_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MNST_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/LEN_data.c
sv',
```

```
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AEE_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MSI_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/CSX_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PVH_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/FL_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/IRM_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/DOV_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AAL_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/SPG_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MS_data.cs
v',
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/NVDA_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/RRC_data.c
sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/NSC_data.c
sv',
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csv',
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sv',
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csv',
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sv',
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/BLL_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/EMR_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/KMB_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/DIS_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PPL_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AET_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ES_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/UPS_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/EXR_data.c
sv',
```

```
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ULTA_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/GWW_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/TMK_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/K_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/SNI_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/GRMN_data.
csv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/CF_data.cs
v',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PNR_data.c
sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AME_data.c
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/CTSH_data.
csv',
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sv',
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v',
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csv',
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sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/UHS_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PPG_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/KMI_data.c
sv',
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v',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PX_data.cs
v',
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 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/RMD_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MAT_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PEG_data.c
sv',
```

```
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/INTU_data.
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sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ADM_data.c
sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AOS_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/CVX_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PLD_data.c
sv',
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v',
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/A_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/EQIX_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/GE_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/GD_data.cs
v',
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csv',
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sv',
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sv',
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sv',
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csv',
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csv',
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MON_data.c
sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/APA_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/BRK.B_dat
a.csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AMP_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/FCX_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PCAR_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/NLSN_data.
csv',
```

```
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/TJX_data.c
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/FBHS_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AXP_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/BA_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/LNT_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ALB_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PG_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/XEL_data.c
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csv',
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csv',
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 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/CMI_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/EL_data.cs
v',
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csv',
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sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/T_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/CHRW_data.
csv',
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sv',
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sv',
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sv',
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v',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/SYK_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MAA_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/SCHW_data.
csv',
```

```
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/USB_data.c
sv',
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sv',
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v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/NTRS_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/BAX_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ITW_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/BK_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/DVA_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/GPN_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/IT_data.cs
v',
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sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/HCN_data.c
sv',
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v',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/SEE_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/VTR_data.c
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 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/HST_data.c
sv',
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sv',
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sv',
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v',
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v',
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sv',
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/NUE_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/GPC_data.c
sv',
```

```
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/FDX_data.c
sv',
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sv',
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sv',
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sv',
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a.csv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/EXPE_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/EXPD_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/DRE_data.c
sv',
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v',
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sv',
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sv',
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csv',
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csv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/WM_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AMAT_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/JEC_data.c
sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/HPQ_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/WYNN_data.
csv',
```

```
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PDCO_data.
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sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/FE_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/WHR_data.c
sv',
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/FTI_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AWK_data.c
sv',
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 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/DISCK_dat
a.csv',
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sv',
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sv',
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/HII_data.c
sv',
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v',
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sv',
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csv',
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sv',
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sv',
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sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/HRS_data.c
sv',
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sv',
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csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PAYX_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/DG_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MCD_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/FTV_data.c
sv',
```

```
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/IPG_data.c
sv',
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v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/L_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ABT_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/WBA_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/BMY_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/HOLX_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/PBCT_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/URI_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/COL_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AMZN_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/JCI_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/CBG_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/NCLH_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/RCL_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/NBL_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/SYMC_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/CA_data.cs
v',
```

```
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/JBHT_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/FOX_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/FAST_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ZION_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ABBV_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MCO_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/SYY_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MAS_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/OXY_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MAR_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AAP_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/HPE_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MO_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ARE_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/ORLY_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/HCP_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/T_data(1).
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/NKE_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/HAL_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/CERN_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/SJM_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/WY_data.cs
v',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/WYN_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/WFC_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/QCOM_data.
csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/TWX_data
(1).csv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/COF_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/COG_data.c
sv',
 '/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/F_data.cs
v']
```

In [6]:
```
#import data in the python # only csv file # it is raw string
```

In [7]:
```
len(glob.glob(r'/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5
```

Out[7]:
```
509
```

In [8]:
```
#glob is use for specific file pattern or extension
```

In [9]:
```
company_list = [
    r'/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AAPL_da
    r'/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AMZN_da
    r'/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/GOOG_da
    r'/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/MSFT_da

]
```

In [10]:
```
#import specific data file from above data set
#will take stocks of this four company # amazon,apple,google,microsoft
```

In [11]:
```
all_data = pd.DataFrame() # blank dataframe

for file in company_list:
    current_df = pd.read_csv(file)
    all_data = pd.concat([all_data, current_df], ignore_index=True)

# Now 'all_data' should contain the concatenated data from all CSV files.
```

In [12]:
```
all_data.shape
```

Out[12]:
```
(4752, 7)
```

In [13]:
```
all_data.head(6)
```

Out[13]:

	date	open	high	low	close	volume	Name
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL
4	2013-02-14	66.3599	67.3771	66.2885	66.6556	88809154	AAPL
5	2013-02-15	66.9785	67.1656	65.7028	65.7371	97924631	AAPL

In [14]:
```
all_data['Name'].unique()
```

Out[14]:
```
array(['AAPL', 'AMZN', 'GOOG', 'MSFT'], dtype=object)
```

In [15]:
```
all_data.isnull()
```

Out[15]:

	date	open	high	low	close	volume	Name
0	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False
...	...	...	...	...	...	...	...
4747	False	False	False	False	False	False	False
4748	False	False	False	False	False	False	False
4749	False	False	False	False	False	False	False
4750	False	False	False	False	False	False	False
4751	False	False	False	False	False	False	False

4752 rows × 7 columns

In [16]:
```
#False means in that row there is no missing value
```

In [17]:
```
all_data.isnull().sum()
```

Out[17]:
```
date      0
open      0
high      0
low       0
close     0
volume    0
Name      0
dtype: int64
```

In [18]:
```
all_data.dtypes
```

Out[18]:
```
date       object
open      float64
high      float64
low       float64
close     float64
volume      int64
Name       object
dtype: object
```

In [19]:
```
#date can't be string it should be date time object
#date time have it's own type which is datetime64[ns] ns is nenosec
##or it can be uts as well which is universal co-ordinated
## 64 means 64 bits
```

In [20]:
```
all_data['date'] = pd.to_datetime(all_data['date'])
```

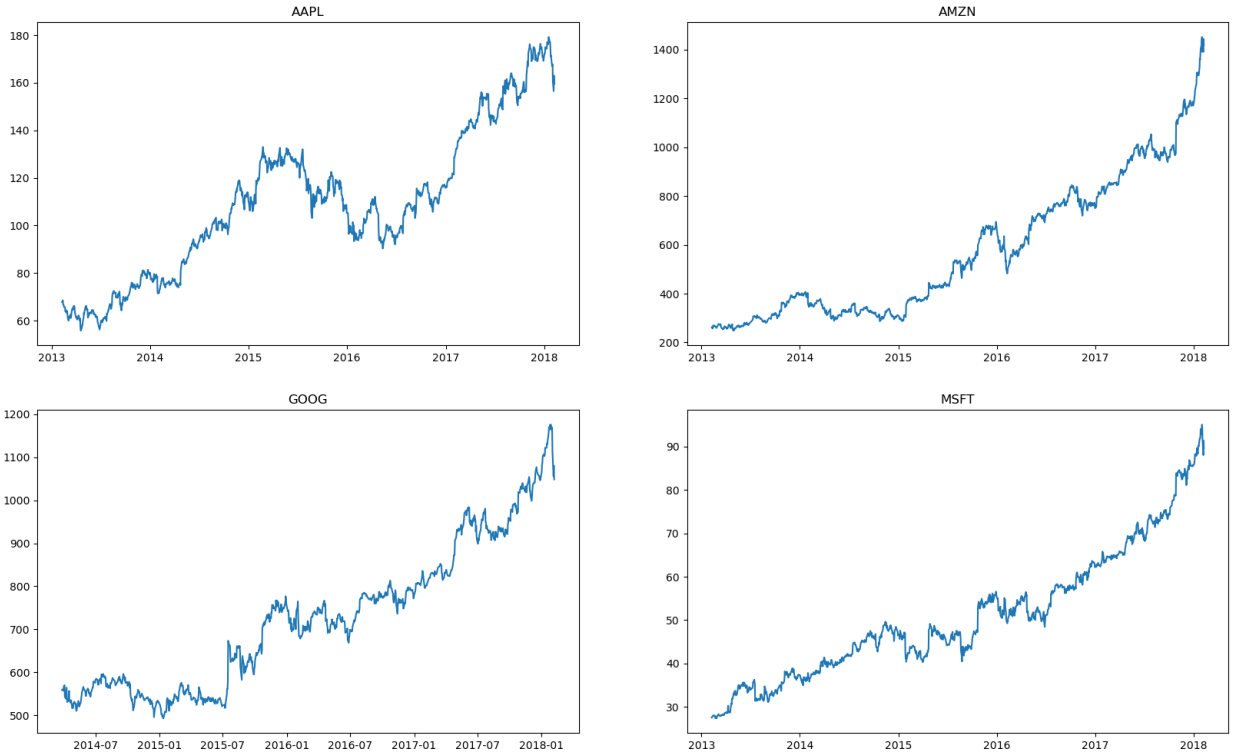
In [21]:
```
all_data['date']
```

Out[21]:
```
0       2013-02-08
1       2013-02-11
2       2013-02-12
3       2013-02-13
4       2013-02-14
           ...
4747    2018-02-01
4748    2018-02-02
4749    2018-02-05
4750    2018-02-06
4751    2018-02-07
Name: date, Length: 4752, dtype: datetime64[ns]
```

In [22]:
```
tech_list = all_data['Name'].unique()
```

In [23]:
```
plt.figure(figsize=(20,12))

for index , company in enumerate(tech_list , 1):
    plt.subplot(2 , 2 , index) ## creating subplot for each stock
    filter1 = all_data['Name']==company
    df = all_data[filter1]
    plt.plot(df['date'] , df['close']) ## plotting "date" vs "close"
    plt.title(company)
```



In [24]:
```
#First graph (AAPL)
#The stock price has steadily increased over the entire period, more than doub
#There have been a few periods of dips and fluctuations, but the overall trend
```

In [25]:
```
#Second graph (AMZN)
#the stock price of AMZN has also increased significantly over the period, fro
#The growth of AMZN's stock price has been even more impressive than that of A
#There have also been some dips and fluctuations for AMZN, but the overall tre
```

In [26]:
```
#Third graph (GOOG)
#GOOG's stock price has not shown a clear upward trend over the entire period.
```

```
#There have been periods of both growth and decline, with the stock price reacl
#GOOG's stock price has been more volatile than AAPL and AMZN.
```

In [27]:
```
#Fourth graph (MSFT)
#MSFT's stock price has not had a clear upward or downward trend over the entil
#There have been periods of both growth and decline, with the stock price reacl
#MSFT's stock price has also been more volatile than AAPL and AMZN.
```

In [28]:
```
#Overall
#The stocks of AAPL and AMZN have significantly outperformed the stocks of GOO(
#AAPL and AMZN have both shown steady upward trends in their stock prices, whi
```

In [29]:
```
all_data.head(15)
```

Out[29]:

	date	open	high	low	close	volume	Name
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL
4	2013-02-14	66.3599	67.3771	66.2885	66.6556	88809154	AAPL
5	2013-02-15	66.9785	67.1656	65.7028	65.7371	97924631	AAPL
6	2013-02-19	65.8714	66.1042	64.8356	65.7128	108854046	AAPL
7	2013-02-20	65.3842	65.3842	64.1142	64.1214	118891367	AAPL
8	2013-02-21	63.7142	64.1671	63.2599	63.7228	111596821	AAPL
9	2013-02-22	64.1785	64.5142	63.7999	64.4014	82583823	AAPL
10	2013-02-25	64.8356	65.0171	63.2242	63.2571	92899597	AAPL
11	2013-02-26	63.4028	64.5056	62.5228	64.1385	125096657	AAPL
12	2013-02-27	64.0614	64.6342	62.9499	63.5099	146674682	AAPL
13	2013-02-28	63.4357	63.9814	63.0571	63.0571	80532382	AAPL
14	2013-03-01	62.5714	62.5971	61.4257	61.4957	137899041	AAPL

In [30]:
```
all_data['close'].rolling(window = 10).mean().head(15)
```

Out[30]:
```
0          NaN
1          NaN
2          NaN
3          NaN
4          NaN
5          NaN
6          NaN
7          NaN
8          NaN
9     66.03251
10    65.57280
11    65.13051
12    64.79722
13    64.43137
14    63.91538
Name: close, dtype: float64
```

In [31]:
```
new_data = all_data.copy()
```

In [32]:
```
#### now lets consider different windows of rolling ,ie 10 days ,20 days ,30 da
ma_day = [10 ,20 , 50]

for ma in ma_day:
    new_data['close_'+str(ma)] = new_data['close'].rolling(ma).mean()
```

In [33]:
```
new_data
```

Out[33]:

	date	open	high	low	close	volume	Name	close_10	close_20	close
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL	NaN	NaN	
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL	NaN	NaN	
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL	NaN	NaN	
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL	NaN	NaN	
4	2013-02-14	66.3599	67.3771	66.2885	66.6556	88809154	AAPL	NaN	NaN	
...	...	...	...	...	...	...	...	...	...	
4747	2018-02-01	94.7900	96.0700	93.5813	94.2600	47227882	MSFT	92.765	90.6770	86.9
4748	2018-02-02	93.6400	93.9700	91.5000	91.7800	47867753	MSFT	92.943	90.9105	87.1
4749	2018-02-05	90.5600	93.2400	88.0000	88.0000	51031465	MSFT	92.582	90.9010	87.2
4750	2018-02-06	86.8900	91.4750	85.2500	91.3300	67998564	MSFT	92.525	91.0535	87.4
4751	2018-02-07	90.4900	91.7700	89.2000	89.6100	41107592	MSFT	92.304	91.1230	87.5

4752 rows × 10 columns

In [34]:
```
new_data.tail(17)
```

Out[34]:

	date	open	high	low	close	volume	Name	close_10	close_20	close_50
4735	2018-01-16	90.100	90.790	88.0104	88.35	36599736	MSFT	87.795	86.7955	84.9602
4736	2018-01-17	89.080	90.280	88.7500	90.14	25621164	MSFT	88.214	86.9600	85.0820
4737	2018-01-18	89.800	90.670	89.6600	90.10	24159683	MSFT	88.589	87.1460	85.2012
4738	2018-01-19	90.140	90.610	89.6600	90.00	36875013	MSFT	88.878	87.3545	85.3118
4739	2018-01-22	90.000	91.620	89.7400	91.61	23601555	MSFT	89.220	87.6590	85.4586
4740	2018-01-23	91.900	92.300	91.5400	91.90	23412841	MSFT	89.582	87.9790	85.6054
4741	2018-01-24	92.550	93.430	91.5800	91.82	33277483	MSFT	89.942	88.2945	85.7600
4742	2018-01-25	92.465	93.240	91.9300	92.33	26383238	MSFT	90.393	88.6410	85.9292
4743	2018-01-26	93.120	94.060	92.5800	94.06	29172167	MSFT	90.991	89.0585	86.1318
4744	2018-01-29	95.140	95.450	93.7200	93.92	31569940	MSFT	91.423	89.4685	86.3292
4745	2018-01-30	93.300	93.660	92.1000	92.74	38635053	MSFT	91.862	89.8285	86.5244
4746	2018-01-31	93.750	95.400	93.5100	95.01	48756338	MSFT	92.349	90.2815	86.7606
4747	2018-02-01	94.790	96.070	93.5813	94.26	47227882	MSFT	92.765	90.6770	86.9978
4748	2018-02-02	93.640	93.970	91.5000	91.78	47867753	MSFT	92.943	90.9105	87.1828
4749	2018-02-05	90.560	93.240	88.0000	88.00	51031465	MSFT	92.582	90.9010	87.2684
4750	2018-02-06	86.890	91.475	85.2500	91.33	67998564	MSFT	92.525	91.0535	87.4328
4751	2018-02-07	90.490	91.770	89.2000	89.61	41107592	MSFT	92.304	91.1230	87.5598

In [35]:
```
new_data.set_index('date', inplace = True)
```

In [36]:
```
new_data.columns
```

Out[36]:
```
Index(['open', 'high', 'low', 'close', 'volume', 'Name', 'close_10',
       'close_20', 'close_50'],
      dtype='object')
```

In [37]:
```
new_data
```

Out[37]:

date	open	high	low	close	volume	Name	close_10	close_20	close_50
2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL	NaN	NaN	NaN
2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL	NaN	NaN	NaN
2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL	NaN	NaN	NaN
2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL	NaN	NaN	NaN
2013-02-14	66.3599	67.3771	66.2885	66.6556	88809154	AAPL	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...
2018-02-01	94.7900	96.0700	93.5813	94.2600	47227882	MSFT	92.765	90.6770	86.9978
2018-02-02	93.6400	93.9700	91.5000	91.7800	47867753	MSFT	92.943	90.9105	87.1828
2018-02-05	90.5600	93.2400	88.0000	88.0000	51031465	MSFT	92.582	90.9010	87.2684
2018-02-06	86.8900	91.4750	85.2500	91.3300	67998564	MSFT	92.525	91.0535	87.4328
2018-02-07	90.4900	91.7700	89.2000	89.6100	41107592	MSFT	92.304	91.1230	87.5598

4752 rows × 9 columns

In [ ]:
```
```

In [38]:
```
plt.figure(figsize=(20,14))

for index , company in enumerate(tech_list , 1):
    plt.subplot(2 , 2 , index)
    filter1 = new_data['Name']==company
    df = new_data[filter1]
    df[['close_10','close_20', 'close_50']].plot(ax=plt.gca())
    plt.title(company)
```

In [39]:
```
#First graph (AAPL)
#Both moving averages show an upward trend over the entire period, indicating
#The 10-day moving average is more volatile than the 50-day moving average, as
#There are a few instances where the 10-day moving average dips below the 50-da
```

In [40]:
```
#Second graph (AMZN)
#Both moving averages show a very strong upward trend over the entire period,
#Like AAPL, the 10-day moving average for AMZN is more volatile than the 50-day
```

In [41]:
```
#Third graph (GOOG)
#Unlike AAPL and AMZN, the moving averages for GOOG do not show a clear upward
#The 10-day moving average for GOOG is more volatile than the 50-day moving ave
```

In [42]:
```
#Fourth graph (MSFT)
#Similar to GOOG, the moving averages for MSFT do not show a clear upward or do
#The 10-day moving average for MSFT is more volatile than the 50-day moving ave
```

In [43]:
```
#Overall
#The moving averages confirm that AAPL and AMZN outperformed GOOG and MSFT over
#AAPL and AMZN showed strong upward trends in their moving averages, while GOOG
#This suggests that AAPL and AMZN were more stable and predictable in their sto
```

In [ ]:
```

```

In [ ]:
```

```

In [44]:
```
apple = pd.read_csv(r'/Users/riyalachuriya/Desktop/Python Project/individual_st
```

In [45]:
```
apple.head(5)
```

Out[45]:

	date	open	high	low	close	volume	Name
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL
4	2013-02-14	66.3599	67.3771	66.2885	66.6556	88809154	AAPL

In [46]:
```
apple['close']
```

Out[46]:
```
0        67.8542
1        68.5614
2        66.8428
3        66.7156
4        66.6556
         ...
1254    167.7800
1255    160.5000
1256    156.4900
1257    163.0300
1258    159.5400
Name: close, Length: 1259, dtype: float64
```

In [47]:
```
apple.head(4)
```

Out[47]:

	date	open	high	low	close	volume	Name
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL

In [48]:
```
apple['Daily return (in %)']= apple['close'].pct_change()
```

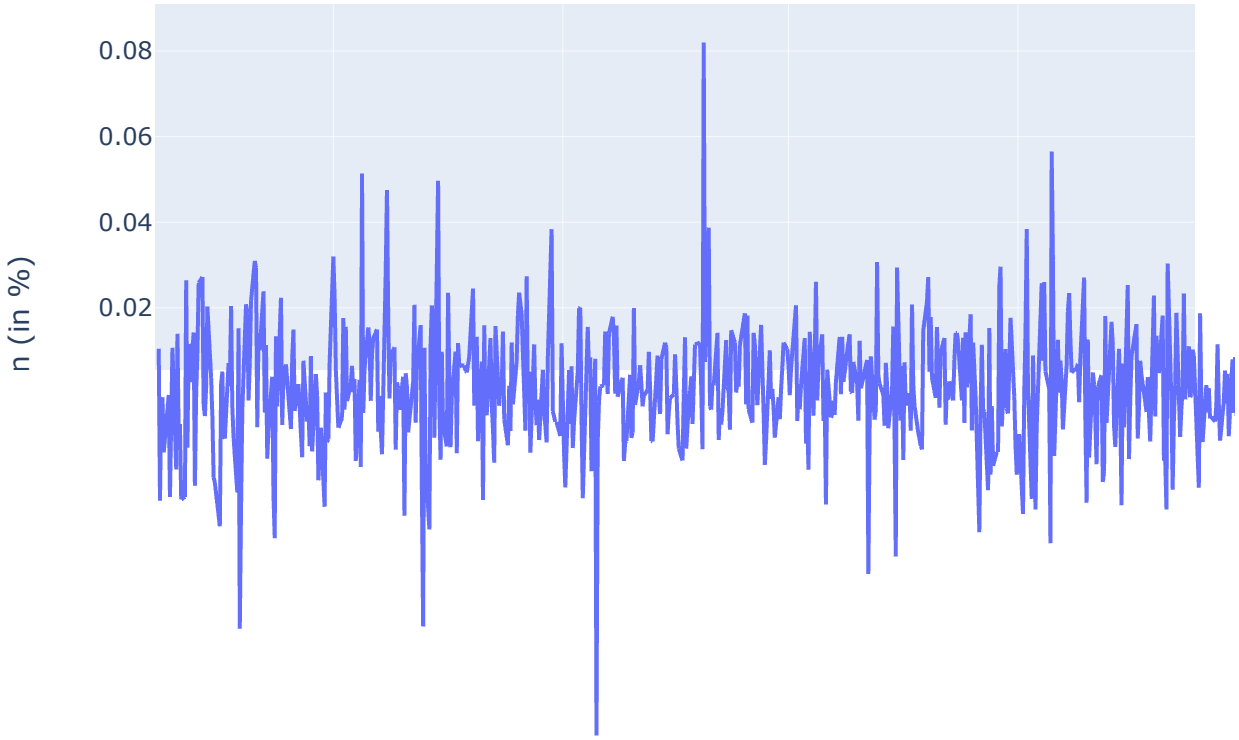
In [49]:
```
apple.head(4)
```

Out[49]:

	date	open	high	low	close	volume	Name	Daily return (in %)
0	2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL	NaN
1	2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL	0.010422
2	2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL	-0.025067
3	2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL	-0.001903

In [50]:
```
import plotly.express as px
```

In [51]:
```
px.line(apple, x = 'date', y = 'Daily return (in %)')
```



In [52]:
```
#The graph you sent me appears to show the daily percentage change in Apple's s
```

In [53]:
```
#Apple's stock price has been volatile over the past five years, with daily cha
#There have been several periods of significant volatility, such as in the summ
#Overall, the stock price has trended upwards over the period shown, with some
```

In [54]:
```
apple.dtypes
```

Out[54]:
```
date                    object
open                   float64
high                   float64
low                    float64
close                  float64
volume                   int64
Name                    object
Daily return (in %)    float64
dtype: object
```

In [55]:
```
apple['date'] = pd.to_datetime(apple['date'])
```

In [56]:
```
apple.dtypes
```

Out[56]:
```
date                    datetime64[ns]
open                           float64
high                           float64
low                            float64
close                          float64
volume                           int64
Name                            object
Daily return (in %)            float64
dtype: object
```

In [57]:
```
apple.set_index('date', inplace = True)
```

In [58]:
```
apple.head(4)
```

Out[58]:

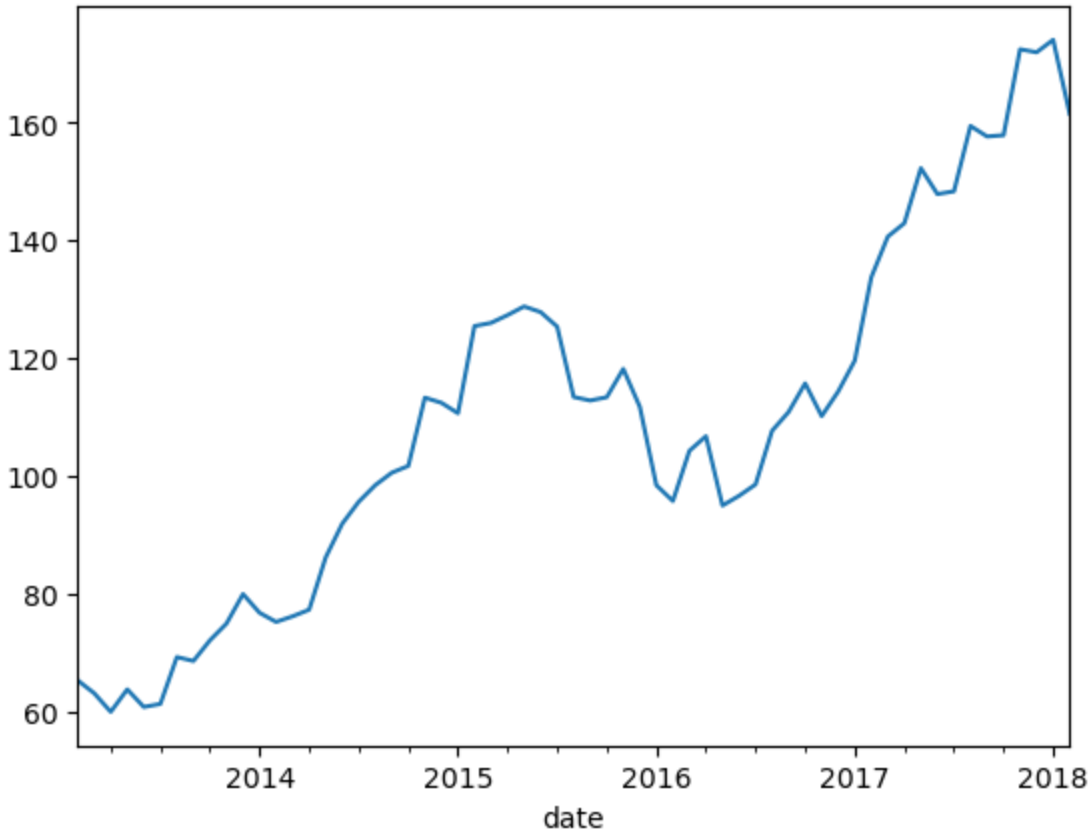
date	open	high	low	close	volume	Name	Daily return (in %)
2013-02-08	67.7142	68.4014	66.8928	67.8542	158168416	AAPL	NaN
2013-02-11	68.0714	69.2771	67.6071	68.5614	129029425	AAPL	0.010422
2013-02-12	68.5014	68.9114	66.8205	66.8428	151829363	AAPL	-0.025067
2013-02-13	66.7442	67.6628	66.1742	66.7156	118721995	AAPL	-0.001903

In [59]:
```
apple['close'].resample('M').mean()
```

Out[59]:
```
date
2013-02-28     65.306264
2013-03-31     63.120110
2013-04-30     59.966432
2013-05-31     63.778927
2013-06-30     60.791120
                  ...
2017-10-31    157.817273
2017-11-30    172.406190
2017-12-31    171.891500
2018-01-31    174.005238
2018-02-28    161.468000
Freq: M, Name: close, Length: 61, dtype: float64
```

In [60]:
```
apple['close'].resample('M').mean().plot()
```

Out[60]:
```
<Axes: xlabel='date'>
```



In [61]:
```
#The price has increased overall from around $80 in early 2014 to around $160 i
#There is a lot of volatility in the data, with some months seeing price increa
#However, the overall trend is clearly upwards.
```

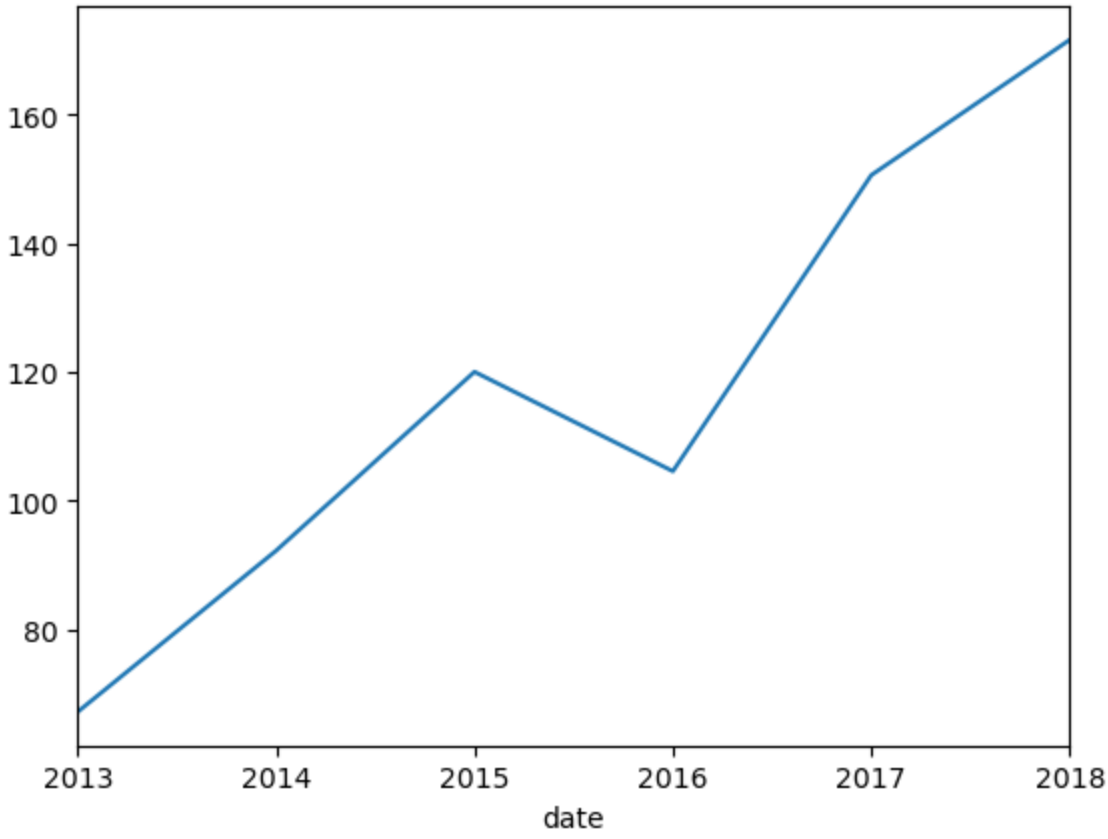
In [62]:
```
#The largest price increase occurred in January 2018, when the price jumped by
#The largest price decrease occurred in August 2015, when the price fell by ov
#There appears to be a seasonal pattern to the data, with prices tending to be
```

In [63]:
```
apple['close'].resample('Y').mean()
```

Out[63]:
```
date
2013-12-31     67.237839
2014-12-31     92.264531
2015-12-31    120.039861
2016-12-31    104.604008
2017-12-31    150.585080
2018-12-31    171.594231
Freq: A-DEC, Name: close, dtype: float64
```

In [64]:
```
apple['close'].resample('Y').mean().plot()
```

Out[64]:
```
<Axes: xlabel='date'>
```



In [65]:
```
#Overall, the stock price has increased significantly over the past 11 years. I
```

In [66]:
```
#There has been significant volatility year-to-year. While the overall trend is
```

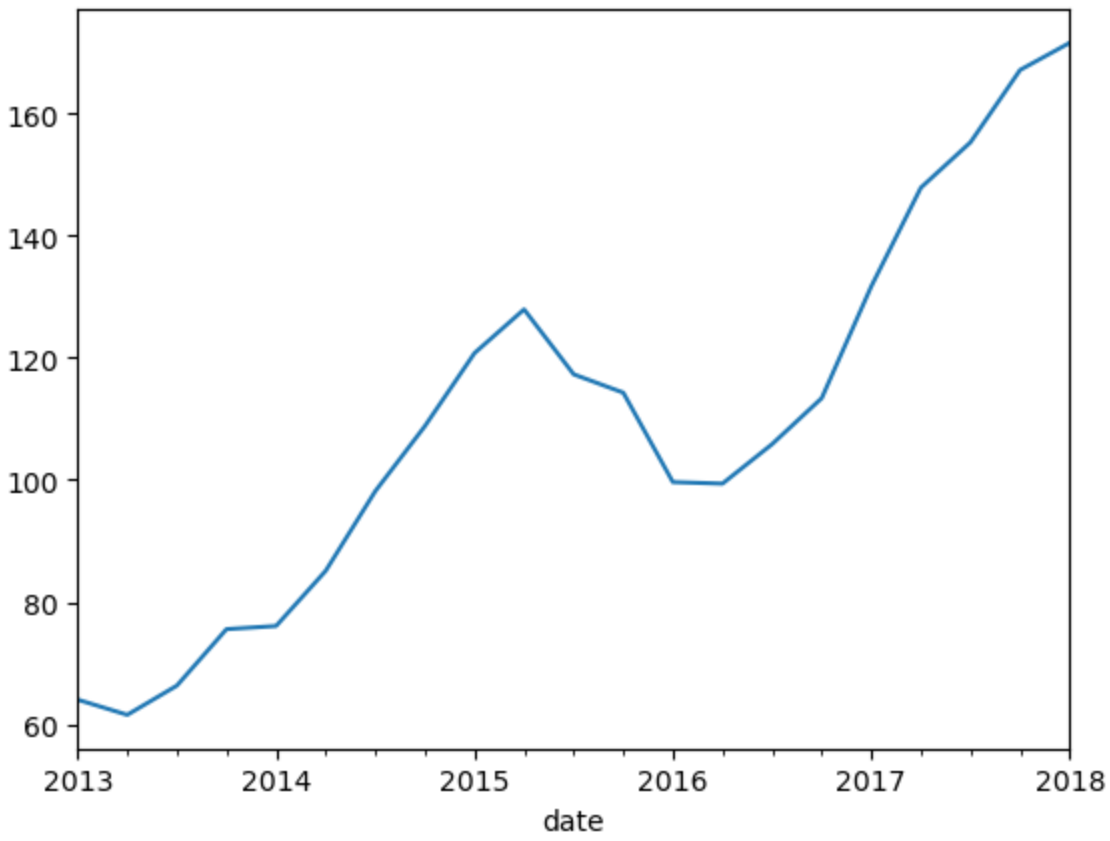
In [67]:
```
#The stock price has reached new all-time highs in recent years. In 2023, the p
```

In [68]:
```
apple['close'].resample('Q').mean()
```

Out[68]:
```
date
2013-03-31     64.020291
2013-06-30     61.534692
2013-09-30     66.320670
2013-12-31     75.567478
2014-03-31     76.086293
2014-06-30     85.117475
2014-09-30     98.163311
2014-12-31    108.821016
2015-03-31    120.776721
2015-06-30    127.937937
2015-09-30    117.303438
2015-12-31    114.299297
2016-03-31     99.655082
2016-06-30     99.401250
2016-09-30    105.866094
2016-12-31    113.399048
2017-03-31    131.712500
2017-06-30    147.875397
2017-09-30    155.304603
2017-12-31    167.148254
2018-03-31    171.594231
Freq: Q-DEC, Name: close, dtype: float64
```

In [69]:
```
apple['close'].resample('Q').mean().plot()
```

Out[69]:
```
<Axes: xlabel='date'>
```



In [70]:
```
#Apple's stock price has generally increased over the timeframe shown. There is
```

In [71]:
```
#There have been several periods of significant price increases. These include
```

In [72]:
```
#There have also been several periods of significant price declines. These inc
```

In [73]:
```
#Overall, the quarterly closing price of Apple stock has shown a generally upwa
```

In [74]:
```
company_list[0]
```

Out[74]:
```
'/Users/riyalachuriya/Desktop/Python Project/individual_stocks_5yr/AAPL_data.c
sv'
```

In [75]:
```
app = pd.read_csv(company_list[0])
amzn = pd.read_csv(company_list[1])
google = pd.read_csv(company_list[2])
msft = pd.read_csv(company_list[3])
```

In [76]:
```
closing_price = pd.DataFrame()
```

In [77]:
```
closing_price['apple_close'] = app['close']
closing_price['amzn_close'] = amzn['close']
closing_price['google_close'] = google['close']
closing_price['msft_close'] = msft['close']
```

In [78]:
```
closing_price
```

Out[78]:

	apple_close	amzn_close	google_close	msft_close
0	67.8542	261.95	558.46	27.55
1	68.5614	257.21	559.99	27.86
2	66.8428	258.70	556.97	27.88
3	66.7156	269.47	567.16	28.03
4	66.6556	269.24	567.00	28.04
...	...	...	...	...
1254	167.7800	1390.00	NaN	94.26
1255	160.5000	1429.95	NaN	91.78
1256	156.4900	1390.00	NaN	88.00
1257	163.0300	1442.84	NaN	91.33
1258	159.5400	1416.78	NaN	89.61

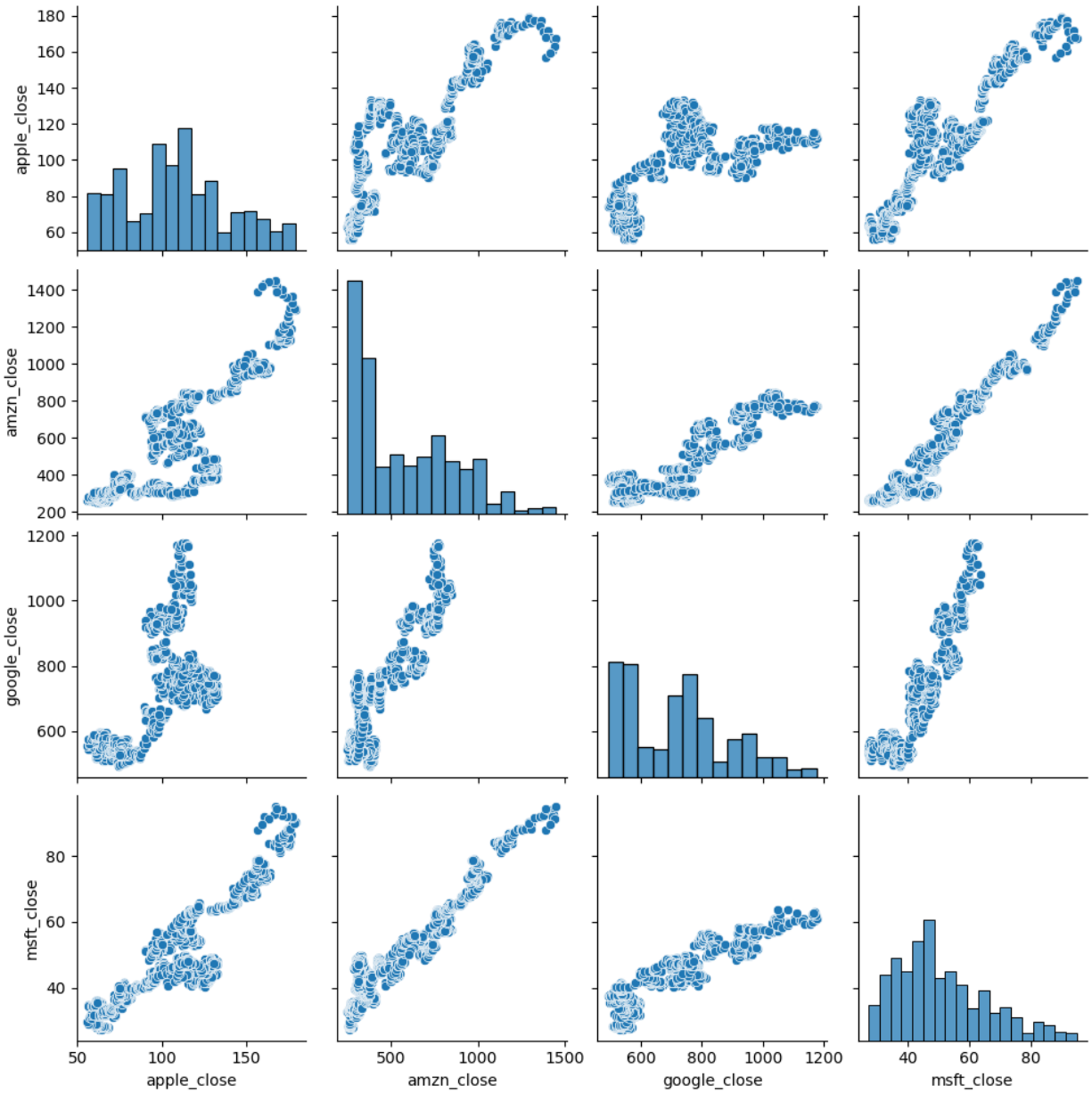
1259 rows × 4 columns

In [79]:
```
sns.pairplot(closing_price)
```

```
/Users/riyalachuriya/anaconda3/lib/python3.11/site-packages/seaborn/axisgrid.py:118: UserWarning:

The figure layout has changed to tight
```

Out[79]:
```
<seaborn.axisgrid.PairGrid at 0x1597de110>
```



In [80]:
```
#apple nd amazon have a straight line graph which mean they have higher co rela
```

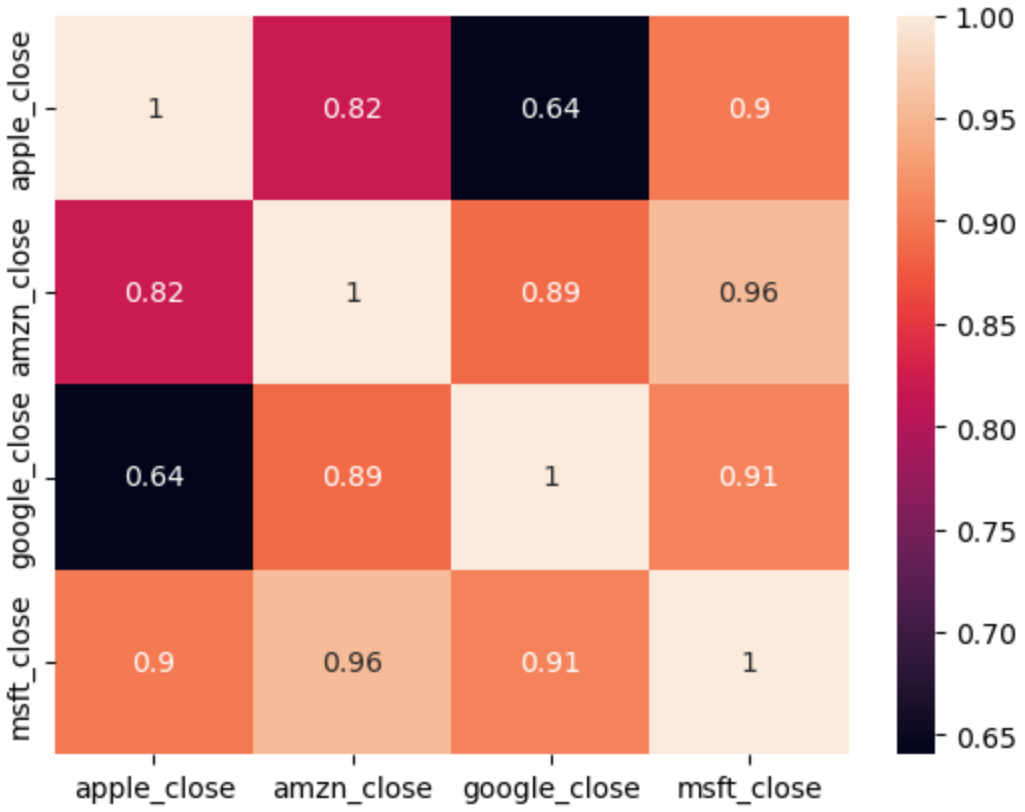
In [81]:
```
closing_price.corr()
```

Out[81]:

	apple_close	amzn_close	google_close	msft_close
apple_close	1.000000	0.819078	0.640522	0.899689
amzn_close	0.819078	1.000000	0.888456	0.955977
google_close	0.640522	0.888456	1.000000	0.907011
msft_close	0.899689	0.955977	0.907011	1.000000

In [82]:
```
sns.heatmap(closing_price.corr(), annot= True)
```

Out[82]:
```
<Axes: >
```



In [83]:
```
closing_price['apple_close']
```

Out[83]:
```
0        67.8542
1        68.5614
2        66.8428
3        66.7156
4        66.6556
          ...
1254    167.7800
1255    160.5000
1256    156.4900
1257    163.0300
1258    159.5400
Name: apple_close, Length: 1259, dtype: float64
```

In [84]:
```
closing_price['apple_close'].shift(1)
```

Out[84]:
```
0           NaN
1       67.8542
2       68.5614
3       66.8428
4       66.7156
          ...
1254    167.4300
1255    167.7800
1256    160.5000
1257    156.4900
1258    163.0300
Name: apple_close, Length: 1259, dtype: float64
```

In [85]:
```
closing_price['apple_close'] - closing_price['apple_close'].shift(1)
```

Out[85]:
```
0          NaN
1       0.7072
2      -1.7186
3      -0.1272
4      -0.0600
          ...
1254    0.3500
1255   -7.2800
1256   -4.0100
1257    6.5400
1258   -3.4900
Name: apple_close, Length: 1259, dtype: float64
```

In [86]:
```
(closing_price['apple_close'] - closing_price['apple_close'].shift(1))/closing_
```

Out[86]:
```
0           NaN
1       0.010422
2      -0.025067
3      -0.001903
4      -0.000899
          ...
1254    0.002090
1255   -0.043390
1256   -0.024984
1257    0.041792
1258   -0.021407
Name: apple_close, Length: 1259, dtype: float64
```

In [87]:
```
(closing_price['apple_close'] - closing_price['apple_close'].shift(1))/closing_
```

Out[87]:
```
0           NaN
1       1.042235
2      -2.506658
3      -0.190297
4      -0.089934
          ...
1254    0.209043
1255   -4.339015
1256   -2.498442
1257    4.179181
1258   -2.140710
Name: apple_close, Length: 1259, dtype: float64
```

In [88]:
```
for col in closing_price.columns:
    closing_price[col + '_pct_change']= (closing_price[col] - closing_price[co
```

In [89]:
```
closing_price
```

Out[89]:

	apple_close	amzn_close	google_close	msft_close	apple_close_pct_change	amzn_close
0	67.8542	261.95	558.46	27.55	NaN	
1	68.5614	257.21	559.99	27.86	1.042235	
2	66.8428	258.70	556.97	27.88	-2.506658	
3	66.7156	269.47	567.16	28.03	-0.190297	
4	66.6556	269.24	567.00	28.04	-0.089934	
...	...	...	...	...	...	
1254	167.7800	1390.00	NaN	94.26	0.209043	
1255	160.5000	1429.95	NaN	91.78	-4.339015	
1256	156.4900	1390.00	NaN	88.00	-2.498442	
1257	163.0300	1442.84	NaN	91.33	4.179181	
1258	159.5400	1416.78	NaN	89.61	-2.140710	

1259 rows × 8 columns

In [90]:
```
closing_price.columns
```

Out[90]:
```
Index(['apple_close', 'amzn_close', 'google_close', 'msft_close',
       'apple_close_pct_change', 'amzn_close_pct_change',
       'google_close_pct_change', 'msft_close_pct_change'],
      dtype='object')
```

In [91]:
```
clsing_p = closing_price[['apple_close_pct_change', 'amzn_close_pct_change',
                          'google_close_pct_change', 'msft_close_pct_change']]
```

In [92]:
```
clsing_p
```

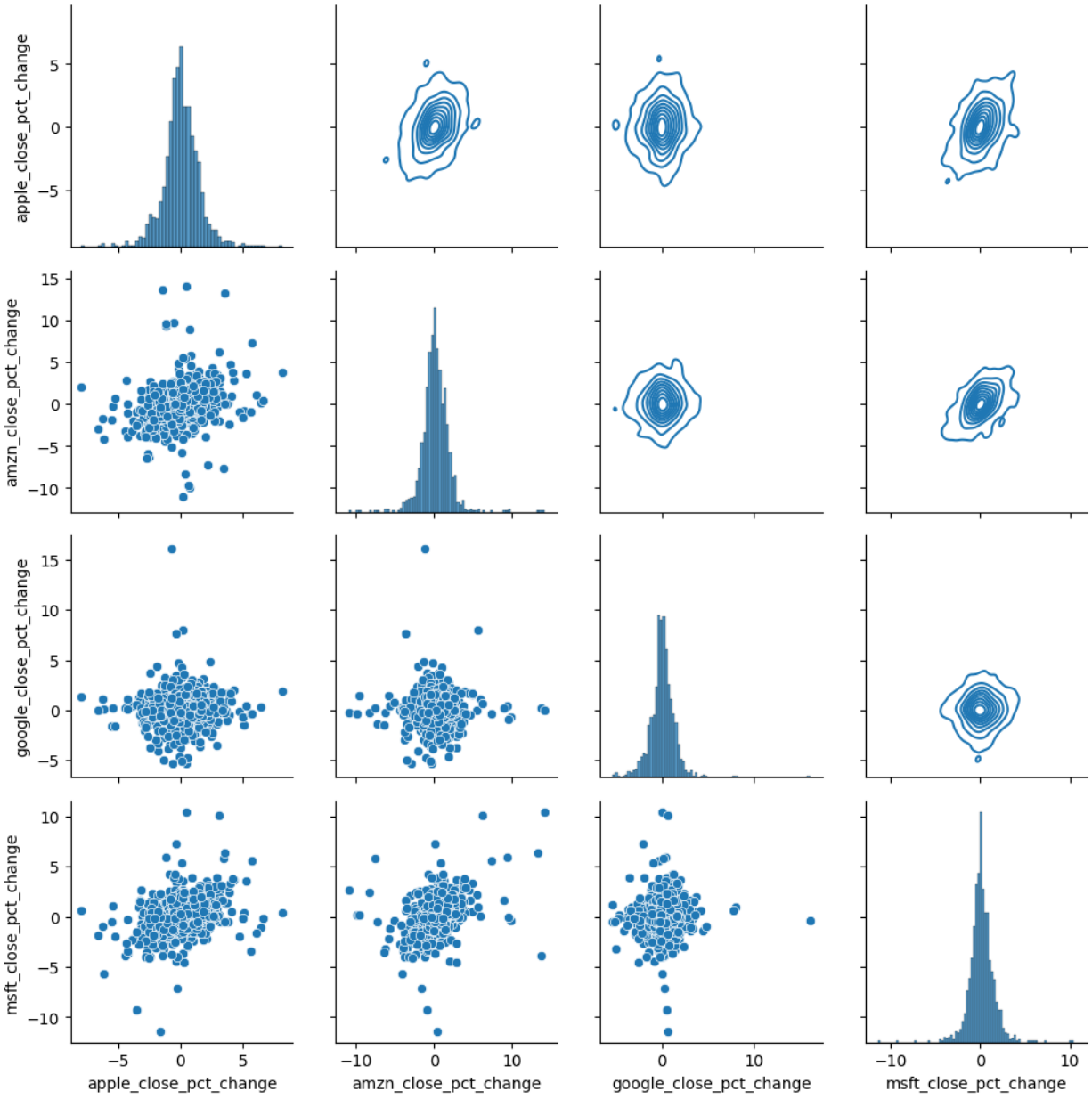
Out[92]:

	apple_close_pct_change	amzn_close_pct_change	google_close_pct_change	msft_close_
0	NaN	NaN	NaN	
1	1.042235	-1.809506	0.273968	
2	-2.506658	0.579293	-0.539295	
3	-0.190297	4.163123	1.829542	
4	-0.089934	-0.085353	-0.028211	
...	...	...	...	
1254	0.209043	-4.196734	NaN	
1255	-4.339015	2.874101	NaN	
1256	-2.498442	-2.793804	NaN	
1257	4.179181	3.801439	NaN	
1258	-2.140710	-1.806160	NaN	

1259 rows × 4 columns

In [93]:
```
g = sns.PairGrid(data = clsing_p)
g.map_diag(sns.histplot)
g.map_lower(sns.scatterplot)
g.map_upper(sns.kdeplot)
```

Out[93]:
```
<seaborn.axisgrid.PairGrid at 0x15a91ce90>
```



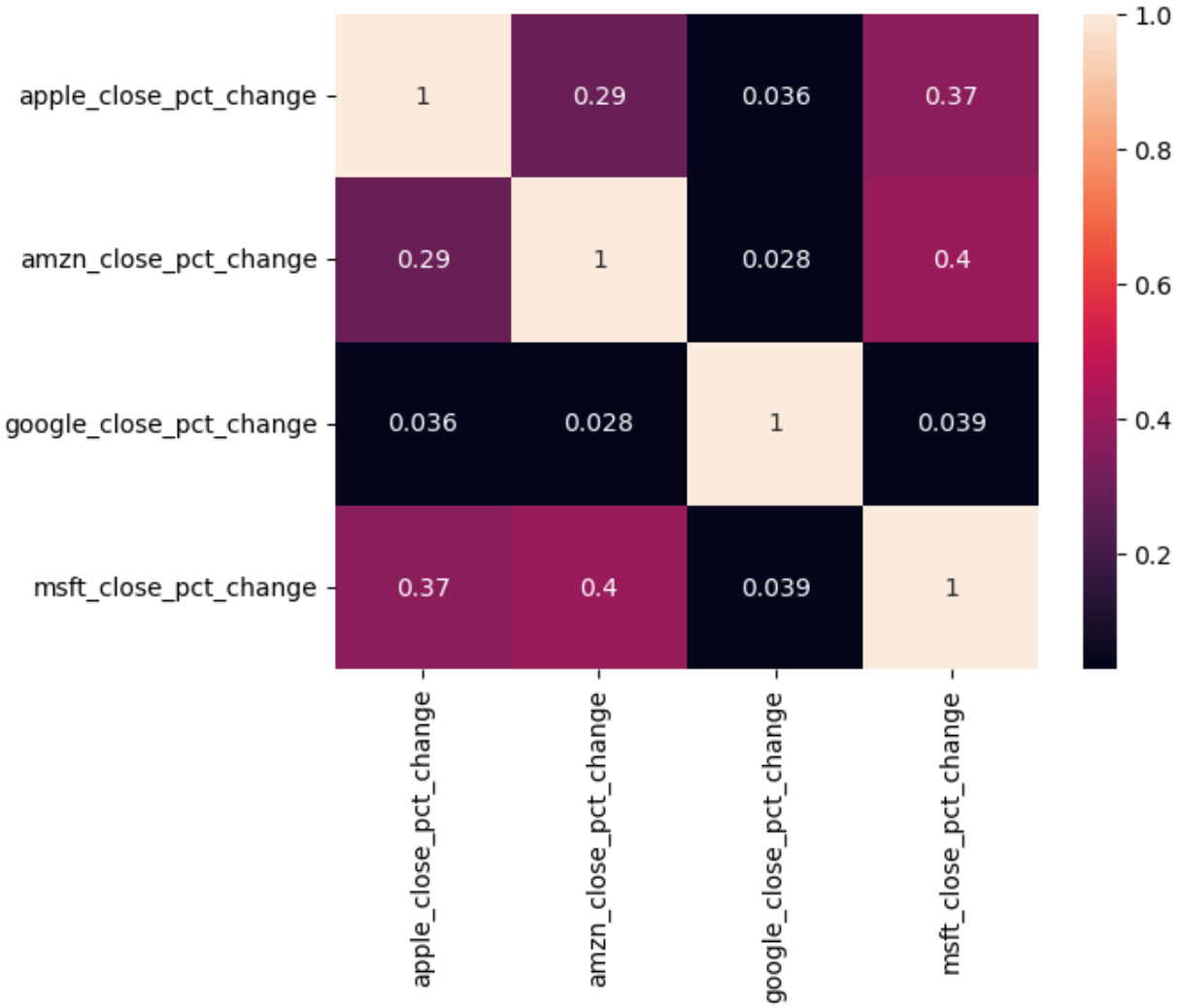
In [94]:
```
clsing_p.corr()
```

Out[94]:

	apple_close_pct_change	amzn_close_pct_change	google_close_pct_c
apple_close_pct_change	1.000000	0.287659	0.(
amzn_close_pct_change	0.287659	1.000000	0.(
google_close_pct_change	0.036202	0.027698	1.(
msft_close_pct_change	0.366598	0.402678	0.(

In [95]:
```
sns.heatmap(clsing_p.corr(), annot= True)
```

Out[95]: <Axes: >



In [ ]: