Ecommerce_Portfolio

September 29, 2021

1 E-commerce (Online Retail)

[1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import math

import warnings
warnings.filterwarnings("ignore")

# yahoo finance data
import yfinance as yf
yf.pdr_override()
```

[2]:

```
# input
# Online Gaming
title = "Online Shopping"
symbols = ['AMZN', 'BABA', 'JD', 'W', 'CPRT', 'VIPS', 'EXPE', 'STMP', 'CMPR',␣
 ↪'MMYT', 'SSTK', 'GRPN', 'LQDT', 'TOUR', 'ETSY']
start = '2018-01-01'
end = '2020-06-26'
```

[3]:

```
df = pd.DataFrame()
for s in symbols:
    df[s] = yf.download(s,start,end)['Adj Close']
```

```
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```

[4]:

```
from datetime import datetime
from dateutil import relativedelta

d1 = datetime.strptime(start, "%Y-%m-%d")
d2 = datetime.strptime(end, "%Y-%m-%d")
delta = relativedelta.relativedelta(d2,d1)
print('How many years of investing?')
print('%s years' % delta.years)
```

```
How many years of investing?
2 years
```

[5]:

```
number_of_years = delta.years
```

[6]:

```
days = (df.index[-1] - df.index[0]).days
days
```

[6]:

```
905
```

[7]:

```
df.head()
```

[7]:

```
                   AMZN        BABA         JD          W       CPRT   VIPS  \
Date
2018-01-02  1189.010010  183.649994  43.279999  81.019997  43.599998  12.50
2018-01-03  1204.199951  184.000000  43.509998  78.449997  43.389999  12.20
2018-01-04  1209.589966  185.710007  43.669998  79.300003  43.740002  12.01
2018-01-05  1229.140015  190.699997  45.639999  80.750000  43.529999  12.37
2018-01-08  1246.869995  190.330002  46.099998  83.050003  43.549999  13.58

                  EXPE        STMP        CMPR       MMYT       SSTK  \
Date
2018-01-02  118.357040  187.350006  121.250000  31.150000  40.635517
2018-01-03  122.012444  188.949997  123.470001  30.799999  41.485981
2018-01-04  122.957962  186.800003  124.839996  29.350000  41.785049
2018-01-05  123.913246  187.500000  123.620003  30.650000  41.299068
2018-01-08  124.975761  190.250000  124.930000  31.549999  40.747665

                  GRPN  LQDT  TOUR   ETSY
Date
2018-01-02  104.800003  4.70  7.72  20.83
2018-01-03  103.000000  4.70  7.76  20.41
```

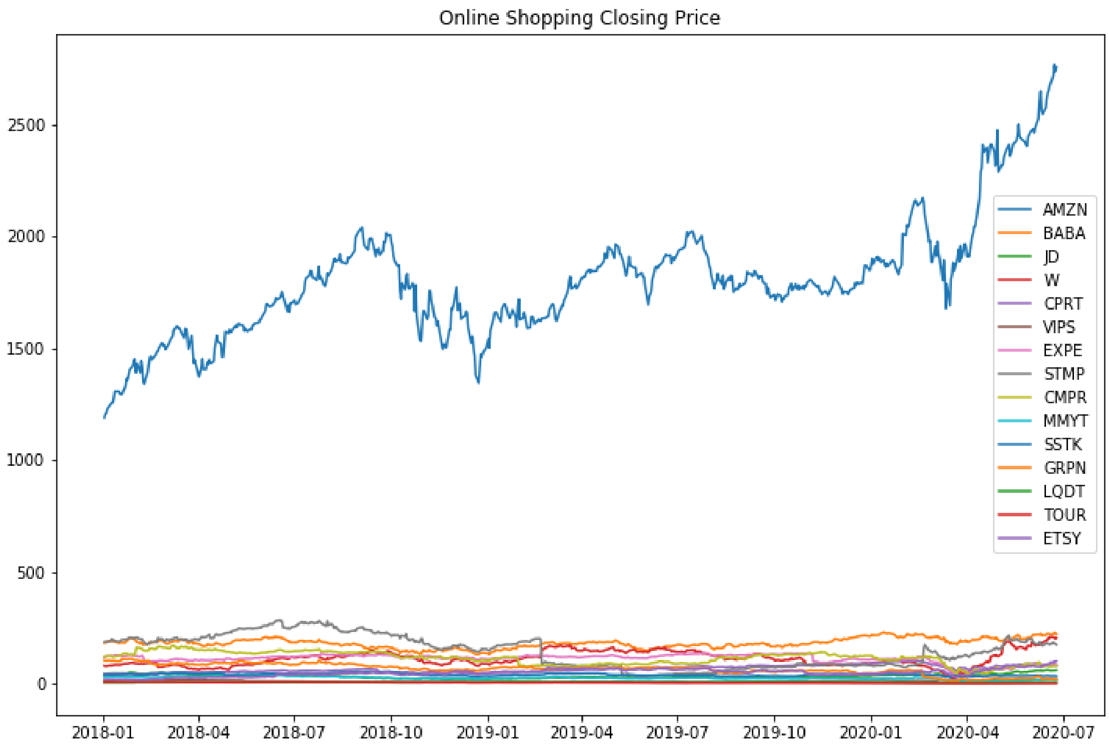
```
2018-01-04  102.400002  4.80  7.77  20.23
2018-01-05  104.599998  4.85  7.79  20.25
2018-01-08  104.400002  4.90  7.80  20.32
```

```
[8]: df.tail()
```

```
[8]:                AMZN        BABA         JD           W       CPRT  \
Date
2020-06-19  2675.010010  220.639999  58.639999  209.990005  84.410004
2020-06-22  2713.820068  221.410004  59.090000  208.059998  84.660004
2020-06-23  2764.409912  228.750000  59.919998  207.529999  84.529999
2020-06-24  2734.399902  226.220001  59.840000  200.710007  81.309998
2020-06-25  2754.580078  222.160004  60.509998  205.119995  81.500000

                 VIPS       EXPE        STMP       CMPR       MMYT       SSTK  \
Date
2020-06-19  21.190001  82.059998  175.580002  76.930000  17.850000  35.480000
2020-06-22  21.110001  83.120003  185.470001  78.959999  17.020000  35.880001
2020-06-23  20.650000  86.599998  180.309998  79.510002  17.420000  36.009998
2020-06-24  20.240000  81.239998  179.050003  80.589996  16.940001  35.169998
2020-06-25  19.709999  82.720001  175.000000  81.290001  17.270000  34.820000

                 GRPN  LQDT   TOUR        ETSY
Date
2020-06-19  21.590000  5.84  1.100   95.389999
2020-06-22  20.059999  6.44  1.060   96.300003
2020-06-23  21.250000  6.45  1.180  101.220001
2020-06-24  19.889999  6.33  1.295   98.169998
2020-06-25  20.219999  6.24  1.350  101.279999
```

```
[9]: plt.figure(figsize=(12,8))
     plt.plot(df)
     plt.title(title + ' Closing Price')
     plt.legend(labels=df.columns)
```

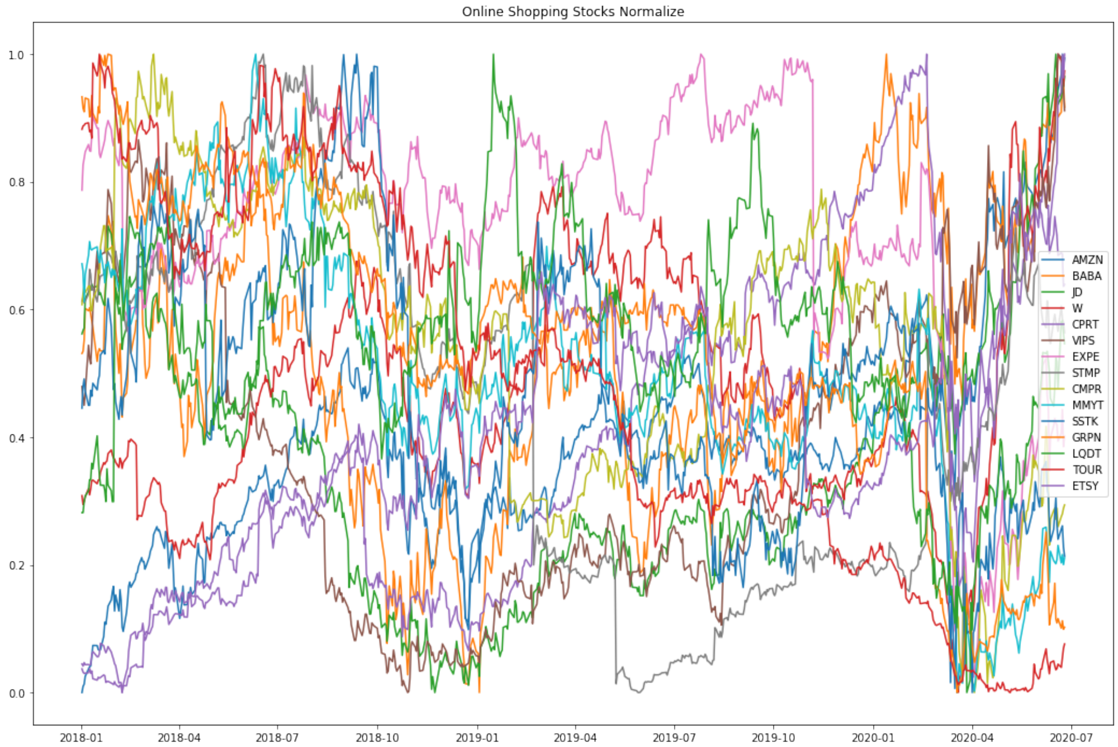
```
[9]: <matplotlib.legend.Legend at 0x159a253c2e8>
```



```
[10]: # Normalize the data
      normalize = (df - df.min())/ (df.max() - df.min())
```

```
[11]: plt.figure(figsize=(18,12))
      plt.plot(normalize)
      plt.title(title + ' Stocks Normalize')
      plt.legend(labels=normalize.columns)
```

```
[11]: <matplotlib.legend.Legend at 0x159a27d9a20>
```



[12]:

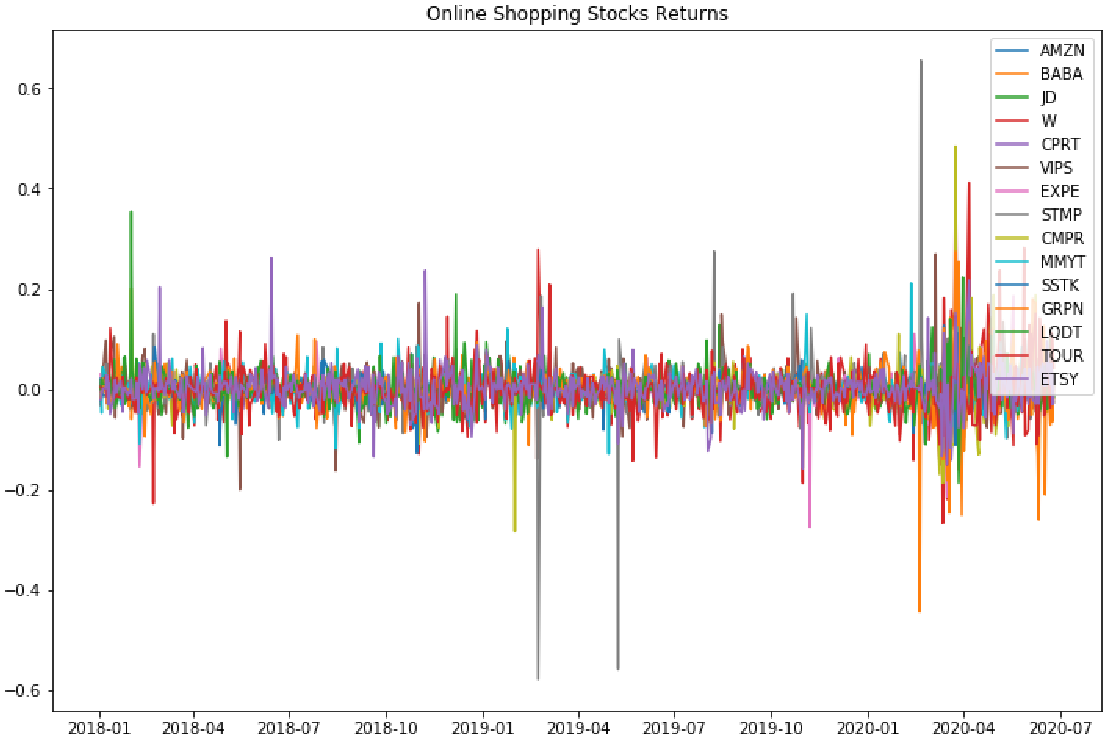
```
stock_rets = df.pct_change().dropna()
```

[13]:

```
plt.figure(figsize=(12,8))
plt.plot(stock_rets)
plt.title(title + ' Stocks Returns')
plt.legend(labels=stock_rets.columns)
```

[13]:

```
<matplotlib.legend.Legend at 0x159a25eda58>
```

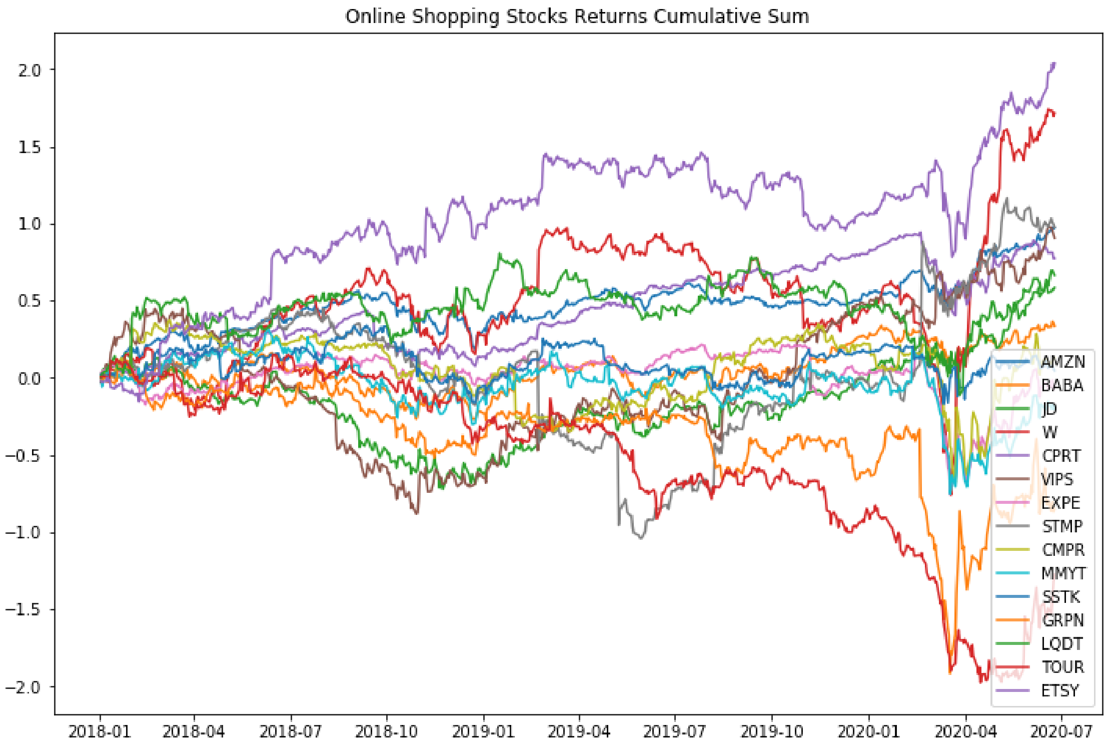


[14]:

```
plt.figure(figsize=(12,8))
plt.plot(stock_rets.cumsum())
plt.title(title + ' Stocks Returns Cumulative Sum')
plt.legend(labels=stock_rets.columns)
```

[14]:

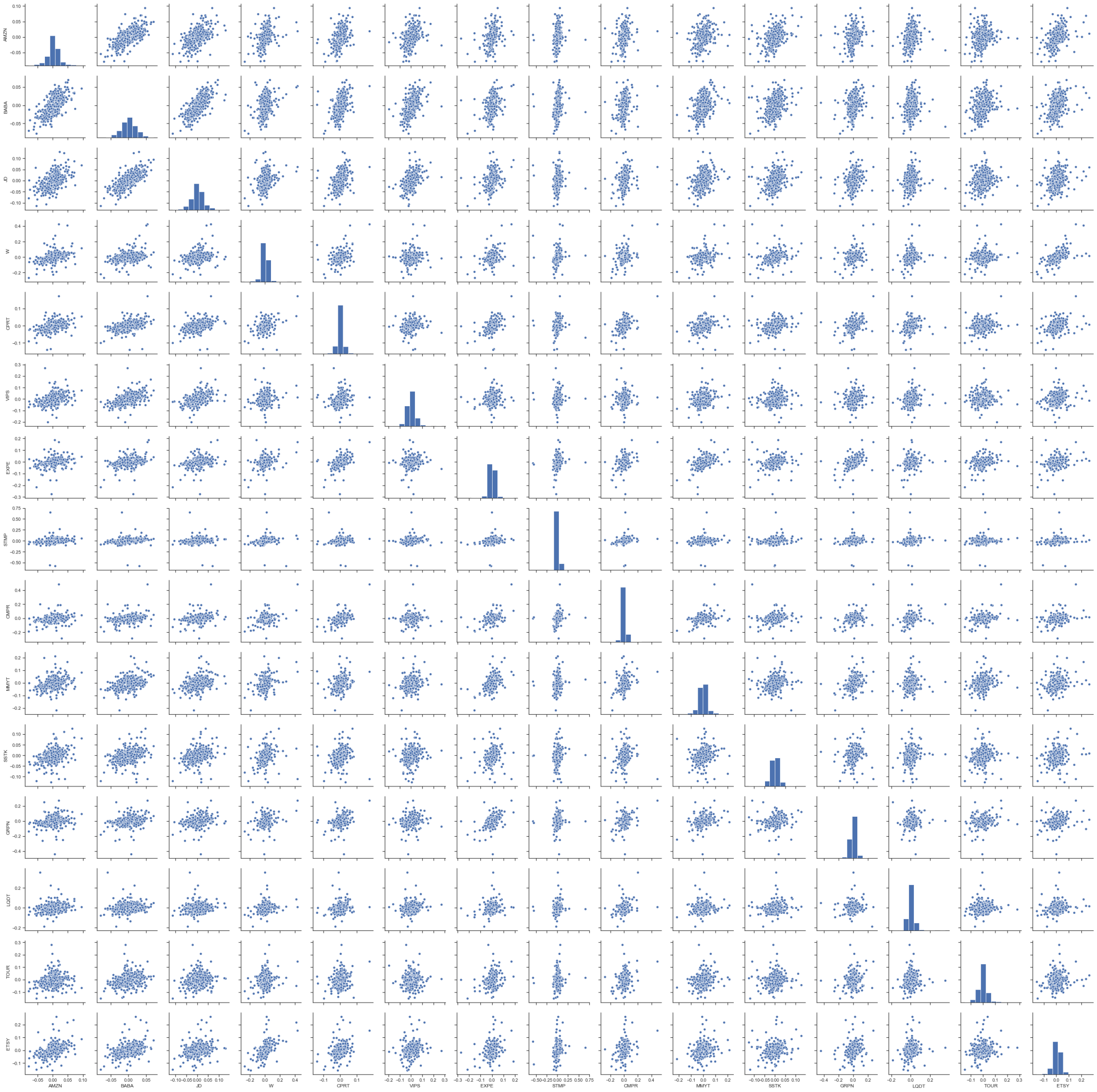
```
<matplotlib.legend.Legend at 0x159a2670c50>
```



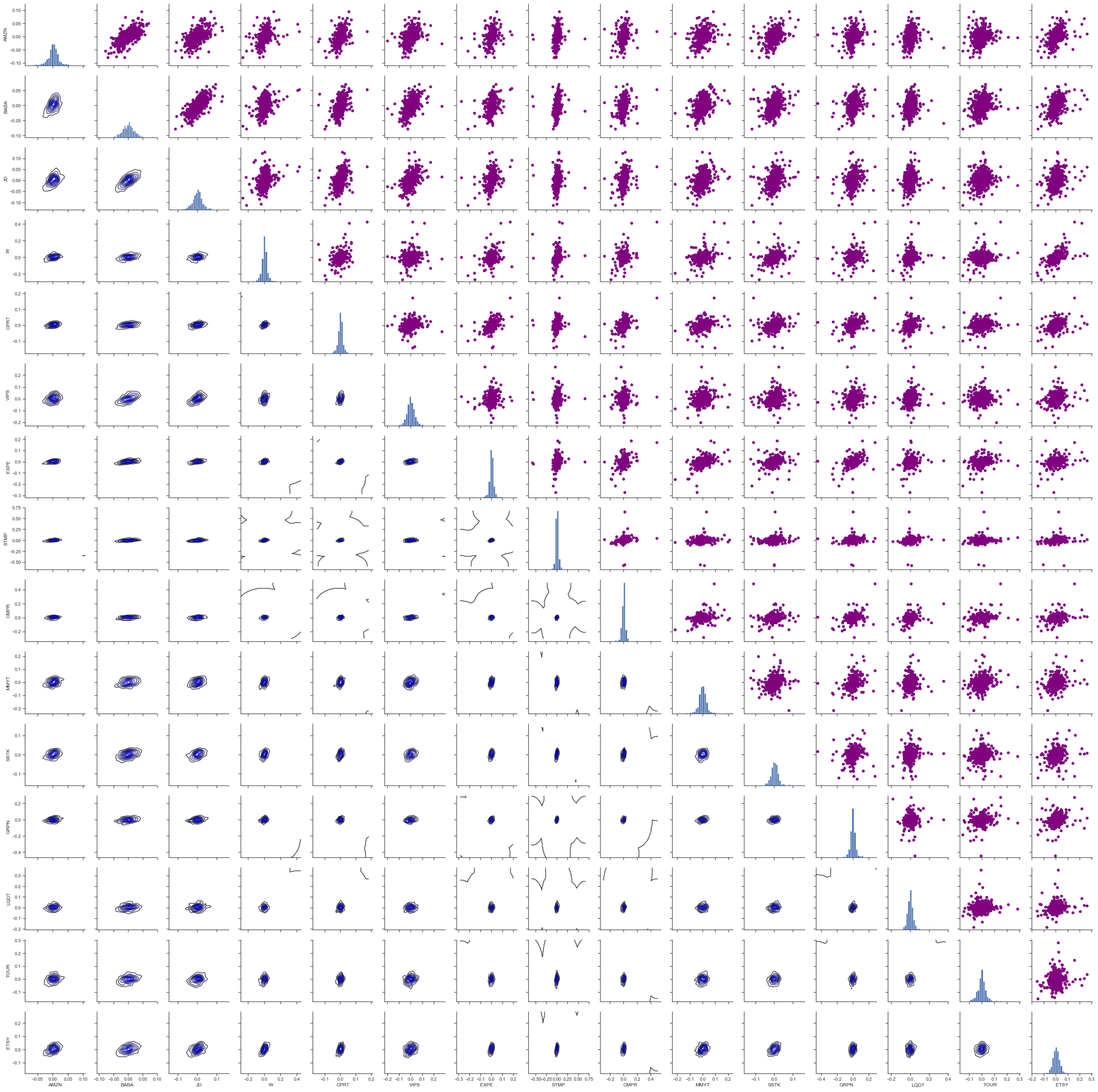
Online Shopping Stocks Returns Cumulative Sum

[15]:

```
sns.set(style='ticks')
ax = sns.pairplot(stock_rets, diag_kind='hist')

nplot = len(stock_rets.columns)
for i in range(nplot) :
    for j in range(nplot) :
        ax.axes[i, j].locator_params(axis='x', nbins=6, tight=True)
```

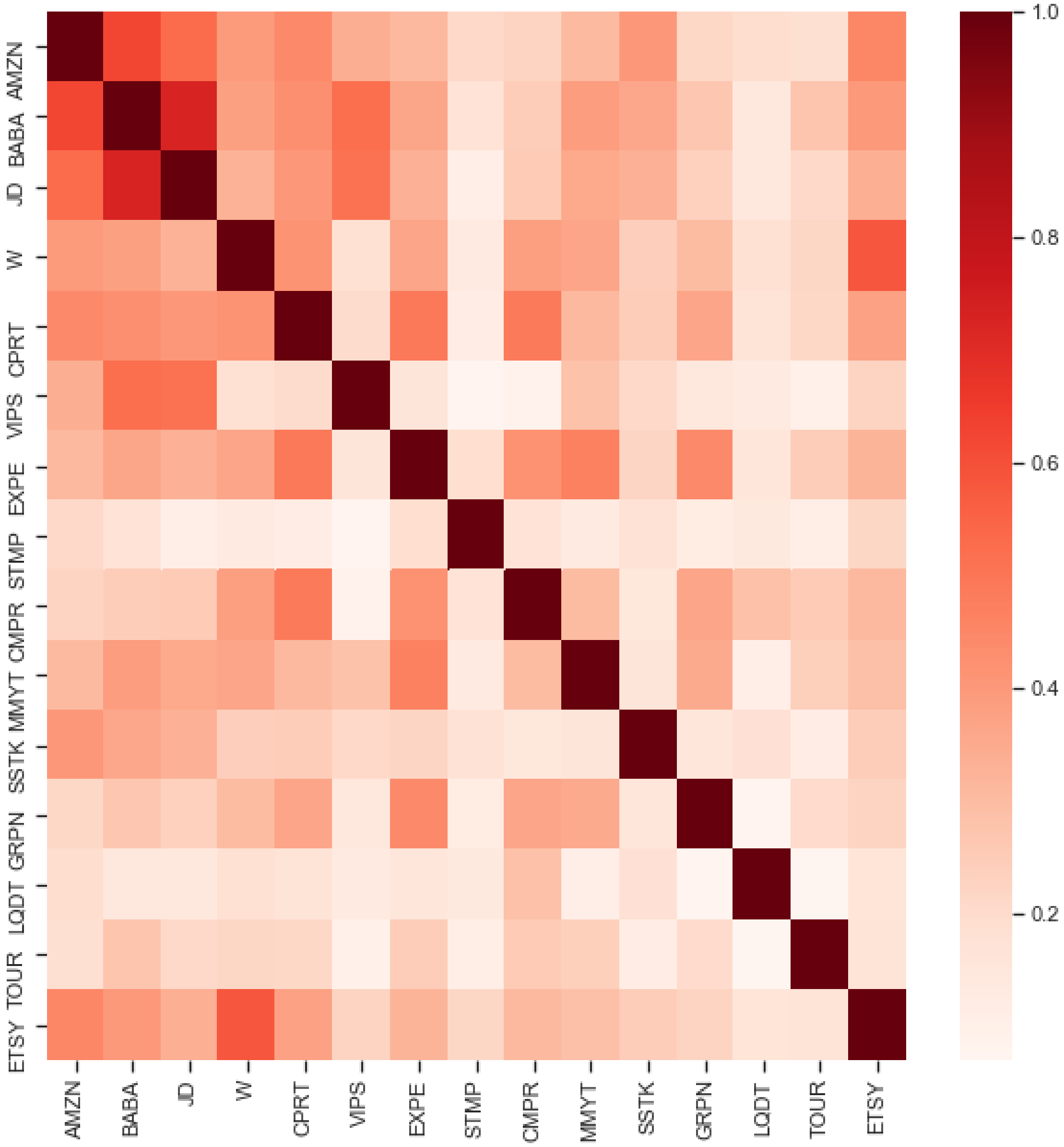


```
[16]: ax = sns.PairGrid(stock_rets)
      ax.map_upper(plt.scatter, color='purple')
      ax.map_lower(sns.kdeplot, color='blue')
      ax.map_diag(plt.hist, bins=30)
      for i in range(nplot) :
          for j in range(nplot) :
              ax.axes[i, j].locator_params(axis='x', nbins=6, tight=True)
```



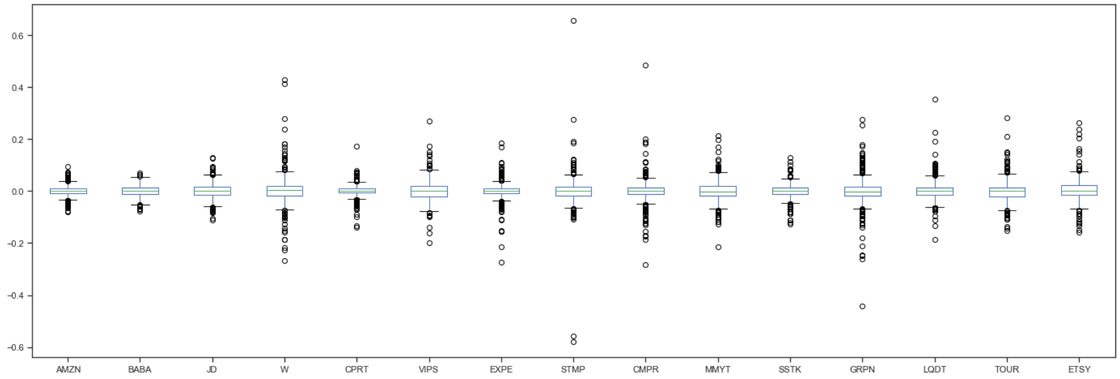
```
[17]: plt.figure(figsize=(10,10))
      corr = stock_rets.corr()

      # plot the heatmap
      sns.heatmap(corr,
              xticklabels=corr.columns,
              yticklabels=corr.columns,
                  cmap="Reds")
```

```
[17]: <matplotlib.axes._subplots.AxesSubplot at 0x159b7b3a828>
```



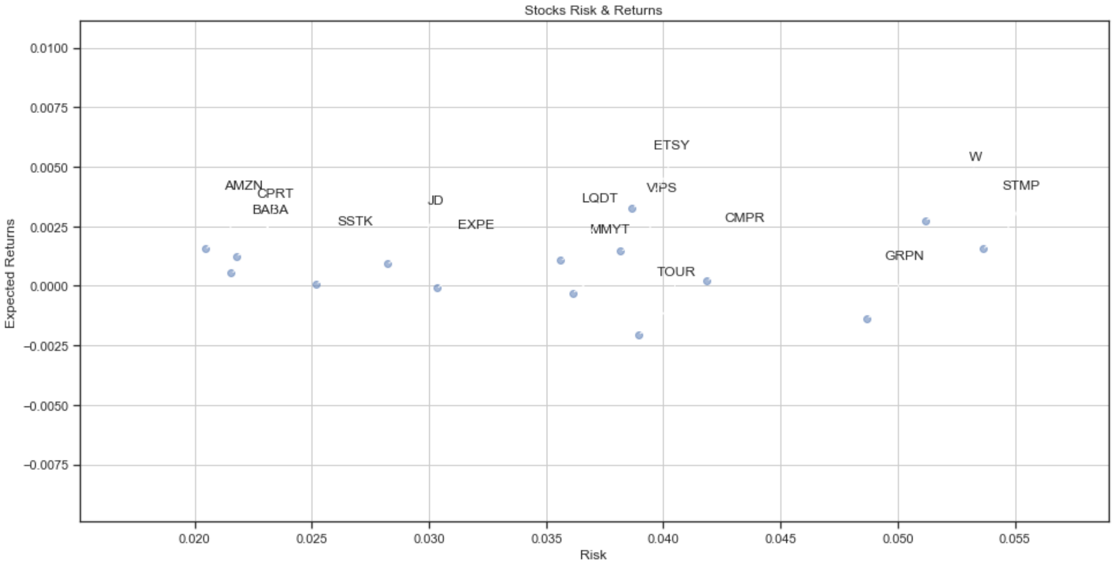
```
[18]: # Box plot
      stock_rets.plot(kind='box',figsize=(24,8))
```

```
[18]: <matplotlib.axes._subplots.AxesSubplot at 0x159b7b7ca58>
```

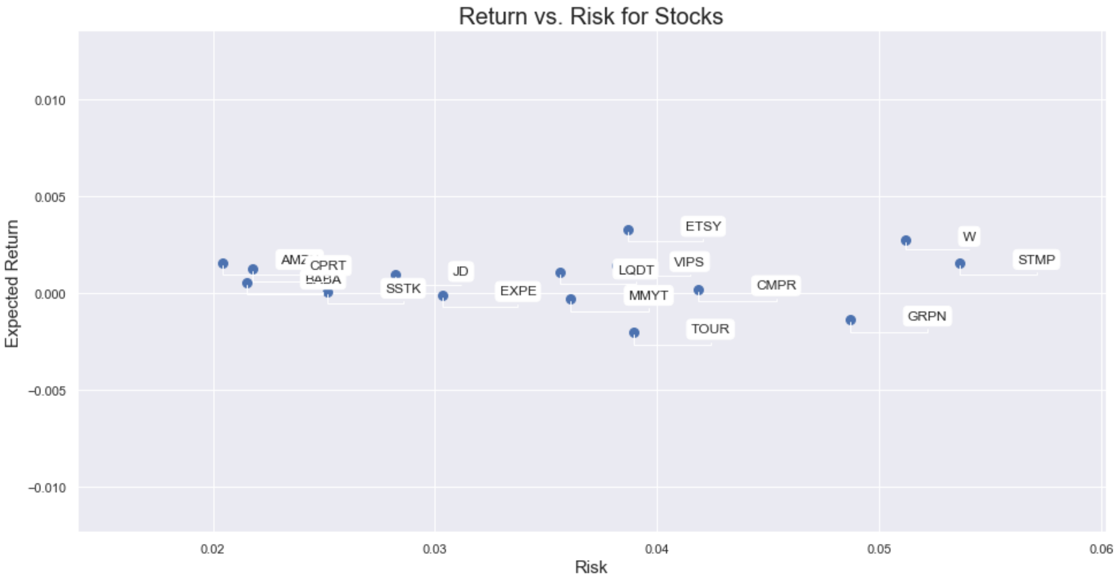


[19]:

```
rets = stock_rets.dropna()

plt.figure(figsize=(16,8))
plt.scatter(rets.std(), rets.mean(),alpha = 0.5)

plt.title('Stocks Risk & Returns')
plt.xlabel('Risk')
plt.ylabel('Expected Returns')
plt.grid(which='major')

for label, x, y in zip(rets.columns, rets.std(), rets.mean()):
    plt.annotate(
        label,
        xy = (x, y), xytext = (50, 50),
        textcoords = 'offset points', ha = 'right', va = 'bottom',
        arrowprops = dict(arrowstyle = '-', connectionstyle = 'arc3,rad=-0.3'))
```



[20]:
```
rets = stock_rets.dropna()
area = np.pi*20.0

sns.set(style='darkgrid')
plt.figure(figsize=(16,8))
plt.scatter(rets.std(), rets.mean(), s=area)
plt.xlabel("Risk", fontsize=15)
plt.ylabel("Expected Return", fontsize=15)
plt.title("Return vs. Risk for Stocks", fontsize=20)

for label, x, y in zip(rets.columns, rets.std(), rets.mean()) :
    plt.annotate(label, xy=(x,y), xytext=(50, 0), textcoords='offset points',
                arrowprops=dict(arrowstyle='-',␣
 ↪connectionstyle='bar,angle=180,fraction=-0.2'),
                bbox=dict(boxstyle="round", fc="w"))
```



[21]:
```
rest_rets = rets.corr()
pair_value = rest_rets.abs().unstack()
pair_value.sort_values(ascending = False)
```

[21]:
```
ETSY  ETSY    1.000000
TOUR  TOUR    1.000000
BABA  BABA    1.000000
JD    JD      1.000000
W     W       1.000000
```

```
CPRT  CPRT    1.000000
VIPS  VIPS    1.000000
EXPE  EXPE    1.000000
CMPR  CMPR    1.000000
MMYT  MMYT    1.000000
SSTK  SSTK    1.000000
GRPN  GRPN    1.000000
LQDT  LQDT    1.000000
STMP  STMP    1.000000
AMZN  AMZN    1.000000
BABA  JD      0.728167
JD    BABA    0.728167
AMZN  BABA    0.623540
BABA  AMZN    0.623540
ETSY  W       0.584408
W     ETSY    0.584408
AMZN  JD      0.529407
JD    AMZN    0.529407
VIPS  BABA    0.521914
BABA  VIPS    0.521914
VIPS  JD      0.511976
JD    VIPS    0.511976
CPRT  EXPE    0.493708
EXPE  CPRT    0.493708
CPRT  CMPR    0.491147
                 …
LQDT  STMP    0.138022
STMP  LQDT    0.138022
MMYT  STMP    0.132666
STMP  MMYT    0.132666
VIPS  LQDT    0.132209
LQDT  VIPS    0.132209
STMP  W       0.130498
W     STMP    0.130498
STMP  GRPN    0.122858
GRPN  STMP    0.122858
STMP  CPRT    0.118703
CPRT  STMP    0.118703
SSTK  TOUR    0.117426
TOUR  SSTK    0.117426
STMP  TOUR    0.112904
TOUR  STMP    0.112904
STMP  JD      0.110647
JD    STMP    0.110647
MMYT  LQDT    0.110364
LQDT  MMYT    0.110364
TOUR  VIPS    0.095004
```

```
VIPS  TOUR    0.095004
CMPR  VIPS    0.086648
VIPS  CMPR    0.086648
LQDT  GRPN    0.077633
GRPN  LQDT    0.077633
STMP  VIPS    0.076341
VIPS  STMP    0.076341
LQDT  TOUR    0.070838
TOUR  LQDT    0.070838
Length: 225, dtype: float64
```

[22]:

```
# Normalized Returns Data
Normalized_Value = ((rets[:] - rets[:].min()) /(rets[:].max() - rets[:].min()))
Normalized_Value.head()
```

[22]:

```
                AMZN      BABA        JD         W      CPRT      VIPS  \
Date
2018-01-03  0.529708  0.539969  0.488254  0.338183  0.432239  0.373907
2018-01-04  0.481922  0.589834  0.481474  0.399395  0.473252  0.391863
2018-01-05  0.549212  0.708469  0.653091  0.410111  0.432288  0.488922
2018-01-08  0.539206  0.514010  0.507989  0.424780  0.449035  0.633487
2018-01-09  0.483071  0.543773  0.468939  0.352634  0.442456  0.370129

                EXPE      STMP      CMPR      MMYT      SSTK      GRPN  \
Date
2018-01-03  0.662419  0.475557  0.392456  0.478691  0.580312  0.593523
2018-01-04  0.612131  0.459399  0.383051  0.394830  0.526239  0.609358
2018-01-05  0.612174  0.471669  0.355844  0.608614  0.451991  0.647456
2018-01-08  0.613925  0.480527  0.382401  0.573684  0.445208  0.614817
2018-01-09  0.579519  0.509989  0.369211  0.553184  0.497828  0.580069

                LQDT      TOUR      ETSY
Date
2018-01-03  0.344545  0.359829  0.326807
2018-01-04  0.383921  0.350828  0.353824
2018-01-05  0.363823  0.353800  0.377182
2018-01-08  0.363624  0.350817  0.383060
2018-01-09  0.382314  0.315241  0.442805
```

[23]:

```
Normalized_Value.corr()
```

[23]:

```
          AMZN      BABA        JD         W      CPRT      VIPS      EXPE  \
AMZN  1.000000  0.623540  0.529407  0.395002  0.443066  0.341891  0.308963
BABA  0.623540  1.000000  0.728167  0.382806  0.429878  0.521914  0.362231
JD    0.529407  0.728167  1.000000  0.329885  0.401921  0.511976  0.334538
W     0.395002  0.382806  0.329885  1.000000  0.418870  0.186704  0.365491
CPRT  0.443066  0.429878  0.401921  0.418870  1.000000  0.198783  0.493708
```

```
VIPS  0.341891  0.521914  0.511976  0.186704  0.198783  1.000000  0.160568
EXPE  0.308963  0.362231  0.334538  0.365491  0.493708  0.160568  1.000000
STMP  0.211119  0.175112  0.110647  0.130498  0.118703  0.076341  0.191786
CMPR  0.225842  0.248276  0.252861  0.384676  0.491147  0.086648  0.419566
MMYT  0.304840  0.388620  0.356663  0.367650  0.308657  0.282590  0.469207
SSTK  0.403535  0.358317  0.334997  0.242927  0.246260  0.209796  0.223167
GRPN  0.214087  0.269944  0.237358  0.302610  0.367466  0.150447  0.443468
LQDT  0.194879  0.145286  0.146901  0.183630  0.171930  0.132209  0.156999
TOUR  0.188695  0.271992  0.211198  0.219105  0.212513  0.095004  0.245878
ETSY  0.449388  0.398056  0.336071  0.584408  0.376194  0.226079  0.321978

          STMP      CMPR      MMYT      SSTK      GRPN      LQDT      TOUR  \
AMZN  0.211119  0.225842  0.304840  0.403535  0.214087  0.194879  0.188695
BABA  0.175112  0.248276  0.388620  0.358317  0.269944  0.145286  0.271992
JD    0.110647  0.252861  0.356663  0.334997  0.237358  0.146901  0.211198
W     0.130498  0.384676  0.367650  0.242927  0.302610  0.183630  0.219105
CPRT  0.118703  0.491147  0.308657  0.246260  0.367466  0.171930  0.212513
VIPS  0.076341  0.086648  0.282590  0.209796  0.150447  0.132209  0.095004
EXPE  0.191786  0.419566  0.469207  0.223167  0.443468  0.156999  0.245878
STMP  1.000000  0.175789  0.132666  0.176137  0.122858  0.138022  0.112904
CMPR  0.175789  1.000000  0.303116  0.150943  0.365095  0.286725  0.254538
MMYT  0.132666  0.303116  1.000000  0.161137  0.351165  0.110364  0.239634
SSTK  0.176137  0.150943  0.161137  1.000000  0.154366  0.182702  0.117426
GRPN  0.122858  0.365095  0.351165  0.154366  1.000000  0.077633  0.204033
LQDT  0.138022  0.286725  0.110364  0.182702  0.077633  1.000000  0.070838
TOUR  0.112904  0.254538  0.239634  0.117426  0.204033  0.070838  1.000000
ETSY  0.217647  0.308569  0.289695  0.247327  0.223572  0.162882  0.171830

          ETSY
AMZN  0.449388
BABA  0.398056
JD    0.336071
W     0.584408
CPRT  0.376194
VIPS  0.226079
EXPE  0.321978
STMP  0.217647
CMPR  0.308569
MMYT  0.289695
SSTK  0.247327
GRPN  0.223572
LQDT  0.162882
TOUR  0.171830
ETSY  1.000000
```

[24]:

```
normalized_rets = Normalized_Value.corr()
normalized_pair_value = normalized_rets.abs().unstack()
```

```
normalized_pair_value.sort_values(ascending = False)
```

```
[24]: ETSY  ETSY    1.000000
      TOUR  TOUR    1.000000
      BABA  BABA    1.000000
      JD    JD      1.000000
      W     W       1.000000
      CPRT  CPRT    1.000000
      VIPS  VIPS    1.000000
      EXPE  EXPE    1.000000
      CMPR  CMPR    1.000000
      MMYT  MMYT    1.000000
      SSTK  SSTK    1.000000
      GRPN  GRPN    1.000000
      LQDT  LQDT    1.000000
      STMP  STMP    1.000000
      AMZN  AMZN    1.000000
      BABA  JD      0.728167
      JD    BABA    0.728167
      AMZN  BABA    0.623540
      BABA  AMZN    0.623540
      ETSY  W       0.584408
      W     ETSY    0.584408
      AMZN  JD      0.529407
      JD    AMZN    0.529407
      VIPS  BABA    0.521914
      BABA  VIPS    0.521914
      VIPS  JD      0.511976
      JD    VIPS    0.511976
      CPRT  EXPE    0.493708
      EXPE  CPRT    0.493708
      CPRT  CMPR    0.491147
                      …
      LQDT  STMP    0.138022
      STMP  LQDT    0.138022
      MMYT  STMP    0.132666
      STMP  MMYT    0.132666
      VIPS  LQDT    0.132209
      LQDT  VIPS    0.132209
      STMP  W       0.130498
      W     STMP    0.130498
      STMP  GRPN    0.122858
      GRPN  STMP    0.122858
      STMP  CPRT    0.118703
      CPRT  STMP    0.118703
      SSTK  TOUR    0.117426
      TOUR  SSTK    0.117426
```

```
STMP  TOUR    0.112904
TOUR  STMP    0.112904
STMP  JD      0.110647
JD    STMP    0.110647
MMYT  LQDT    0.110364
LQDT  MMYT    0.110364
TOUR  VIPS    0.095004
VIPS  TOUR    0.095004
CMPR  VIPS    0.086648
VIPS  CMPR    0.086648
LQDT  GRPN    0.077633
GRPN  LQDT    0.077633
STMP  VIPS    0.076341
VIPS  STMP    0.076341
LQDT  TOUR    0.070838
TOUR  LQDT    0.070838
Length: 225, dtype: float64
```

[25]:

```
print("Stock returns: ")
print(rets.mean())
print('-' * 50)
print("Stock risks:")
print(rets.std())
```

```
Stock returns:
AMZN    0.001556
BABA    0.000537
JD      0.000933
W       0.002751
CPRT    0.001241
VIPS    0.001450
EXPE   -0.000094
STMP    0.001560
CMPR    0.000208
MMYT   -0.000296
SSTK    0.000071
GRPN   -0.001366
LQDT    0.001064
TOUR   -0.002046
ETSY    0.003266
dtype: float64
--------------------------------------------------
Stock risks:
AMZN    0.020436
BABA    0.021545
JD      0.028204
W       0.051164
```

```
CPRT    0.021769
VIPS    0.038174
EXPE    0.030316
STMP    0.053629
CMPR    0.041852
MMYT    0.036117
SSTK    0.025170
GRPN    0.048681
LQDT    0.035609
TOUR    0.038925
ETSY    0.038672
dtype: float64
```

[26]:

```
table = pd.DataFrame()
table['Returns'] = rets.mean()
table['Risk'] = rets.std()
table.sort_values(by='Returns')
```

[26]:

```
       Returns      Risk
TOUR -0.002046  0.038925
GRPN -0.001366  0.048681
MMYT -0.000296  0.036117
EXPE -0.000094  0.030316
SSTK  0.000071  0.025170
CMPR  0.000208  0.041852
BABA  0.000537  0.021545
JD    0.000933  0.028204
LQDT  0.001064  0.035609
CPRT  0.001241  0.021769
VIPS  0.001450  0.038174
AMZN  0.001556  0.020436
STMP  0.001560  0.053629
W     0.002751  0.051164
ETSY  0.003266  0.038672
```

[27]:

```
table.sort_values(by='Risk')
```

[27]:

```
       Returns      Risk
AMZN  0.001556  0.020436
BABA  0.000537  0.021545
CPRT  0.001241  0.021769
SSTK  0.000071  0.025170
JD    0.000933  0.028204
EXPE -0.000094  0.030316
LQDT  0.001064  0.035609
MMYT -0.000296  0.036117
VIPS  0.001450  0.038174
```

```
ETSY   0.003266  0.038672
TOUR  -0.002046  0.038925
CMPR   0.000208  0.041852
GRPN  -0.001366  0.048681
W      0.002751  0.051164
STMP   0.001560  0.053629
```

[28]:

```
rf = 0.01
table['Sharpe Ratio'] = (table['Returns'] - rf) / table['Risk']
table
```

[28]:

```
       Returns      Risk  Sharpe Ratio
AMZN  0.001556  0.020436     -0.413201
BABA  0.000537  0.021545     -0.439209
JD    0.000933  0.028204     -0.321467
W     0.002751  0.051164     -0.141674
CPRT  0.001241  0.021769     -0.402359
VIPS  0.001450  0.038174     -0.223972
EXPE -0.000094  0.030316     -0.332977
STMP  0.001560  0.053629     -0.157367
CMPR  0.000208  0.041852     -0.233958
MMYT -0.000296  0.036117     -0.285071
SSTK  0.000071  0.025170     -0.394455
GRPN -0.001366  0.048681     -0.233483
LQDT  0.001064  0.035609     -0.250961
TOUR -0.002046  0.038925     -0.309459
ETSY  0.003266  0.038672     -0.174131
```

[29]:

```
table['Max Returns'] = rets.max()
```

[30]:

```
table['Min Returns'] = rets.min()
```

[31]:

```
table['Median Returns'] = rets.median()
```

[32]:

```
total_return = stock_rets[-1:].transpose()
table['Total Return'] = 100 * total_return
table
```

[32]:

```
       Returns      Risk  Sharpe Ratio  Max Returns  Min Returns  \
AMZN  0.001556  0.020436     -0.413201     0.094452    -0.079221
BABA  0.000537  0.021545     -0.439209     0.070061    -0.078093
JD    0.000933  0.028204     -0.321467     0.128866    -0.112566
W     0.002751  0.051164     -0.141674     0.428384    -0.266830
CPRT  0.001241  0.021769     -0.402359     0.173528    -0.140591
VIPS  0.001450  0.038174     -0.223972     0.269817    -0.199470
EXPE -0.000094  0.030316     -0.332977     0.186189    -0.273862
STMP  0.001560  0.053629     -0.157367     0.655039    -0.577696
```

```
CMPR  0.000208  0.041852     -0.233958     0.484301    -0.282708
MMYT -0.000296  0.036117     -0.285071     0.211570    -0.215827
SSTK  0.000071  0.025170     -0.394455     0.127418    -0.126316
GRPN -0.001366  0.048681     -0.233483     0.274194    -0.442623
LQDT  0.001064  0.035609     -0.250961     0.354167    -0.186170
TOUR -0.002046  0.038925     -0.309459     0.282051    -0.150442
ETSY  0.003266  0.038672     -0.174131     0.262504    -0.157386

      Median Returns  Total Return
AMZN        0.002077      0.738011
BABA        0.001488     -1.794712
JD          0.000832      1.119649
W           0.002603      2.197194
CPRT        0.001972      0.233677
VIPS        0.000000     -2.618580
EXPE        0.000606      1.821767
STMP        0.001507     -2.261940
CMPR        0.001562      0.868600
MMYT       -0.000984      1.948051
SSTK        0.000874     -0.995162
GRPN       -0.002805      1.659125
LQDT        0.000000     -1.421803
TOUR        0.000000      4.247110
ETSY        0.001878      3.167975
```

[33]:

```python
table['Average Return Days'] = (1 + total_return)**(1 / days) - 1
table
```

[33]:

```
       Returns      Risk  Sharpe Ratio  Max Returns  Min Returns  \
AMZN  0.001556  0.020436     -0.413201     0.094452    -0.079221
BABA  0.000537  0.021545     -0.439209     0.070061    -0.078093
JD    0.000933  0.028204     -0.321467     0.128866    -0.112566
W     0.002751  0.051164     -0.141674     0.428384    -0.266830
CPRT  0.001241  0.021769     -0.402359     0.173528    -0.140591
VIPS  0.001450  0.038174     -0.223972     0.269817    -0.199470
EXPE -0.000094  0.030316     -0.332977     0.186189    -0.273862
STMP  0.001560  0.053629     -0.157367     0.655039    -0.577696
CMPR  0.000208  0.041852     -0.233958     0.484301    -0.282708
MMYT -0.000296  0.036117     -0.285071     0.211570    -0.215827
SSTK  0.000071  0.025170     -0.394455     0.127418    -0.126316
GRPN -0.001366  0.048681     -0.233483     0.274194    -0.442623
LQDT  0.001064  0.035609     -0.250961     0.354167    -0.186170
TOUR -0.002046  0.038925     -0.309459     0.282051    -0.150442
ETSY  0.003266  0.038672     -0.174131     0.262504    -0.157386

      Median Returns  Total Return  Average Return Days
AMZN        0.002077      0.738011             0.000008
```

```
BABA        0.001488     -1.794712            -0.000020
JD          0.000832      1.119649             0.000012
W           0.002603      2.197194             0.000024
CPRT        0.001972      0.233677             0.000003
VIPS        0.000000     -2.618580            -0.000029
EXPE        0.000606      1.821767             0.000020
STMP        0.001507     -2.261940            -0.000025
CMPR        0.001562      0.868600             0.000010
MMYT       -0.000984      1.948051             0.000021
SSTK        0.000874     -0.995162            -0.000011
GRPN       -0.002805      1.659125             0.000018
LQDT        0.000000     -1.421803            -0.000016
TOUR        0.000000      4.247110             0.000046
ETSY        0.001878      3.167975             0.000034
```

[34]:

```python
initial_value = df.iloc[0]
ending_value = df.iloc[-1]
table['CAGR'] = ((ending_value / initial_value) ** (252.0 / days)) -1
table
```

[34]:

```
       Returns      Risk  Sharpe Ratio  Max Returns  Min Returns  \
AMZN  0.001556  0.020436     -0.413201     0.094452    -0.079221
BABA  0.000537  0.021545     -0.439209     0.070061    -0.078093
JD    0.000933  0.028204     -0.321467     0.128866    -0.112566
W     0.002751  0.051164     -0.141674     0.428384    -0.266830
CPRT  0.001241  0.021769     -0.402359     0.173528    -0.140591
VIPS  0.001450  0.038174     -0.223972     0.269817    -0.199470
EXPE -0.000094  0.030316     -0.332977     0.186189    -0.273862
STMP  0.001560  0.053629     -0.157367     0.655039    -0.577696
CMPR  0.000208  0.041852     -0.233958     0.484301    -0.282708
MMYT -0.000296  0.036117     -0.285071     0.211570    -0.215827
SSTK  0.000071  0.025170     -0.394455     0.127418    -0.126316
GRPN -0.001366  0.048681     -0.233483     0.274194    -0.442623
LQDT  0.001064  0.035609     -0.250961     0.354167    -0.186170
TOUR -0.002046  0.038925     -0.309459     0.282051    -0.150442
ETSY  0.003266  0.038672     -0.174131     0.262504    -0.157386

      Median Returns  Total Return  Average Return Days      CAGR
AMZN        0.002077      0.738011             0.000008  0.263569
BABA        0.001488     -1.794712            -0.000020  0.054438
JD          0.000832      1.119649             0.000012  0.097807
W           0.002603      2.197194             0.000024  0.295187
CPRT        0.001972      0.233677             0.000003  0.190276
VIPS        0.000000     -2.618580            -0.000029  0.135198
EXPE        0.000606      1.821767             0.000020 -0.094940
STMP        0.001507     -2.261940            -0.000025 -0.018809
CMPR        0.001562      0.868600             0.000010 -0.105360
```

```
MMYT       -0.000984      1.948051             0.000021 -0.151465
SSTK        0.000874     -0.995162            -0.000011 -0.042096
GRPN       -0.002805      1.659125             0.000018 -0.367555
LQDT        0.000000     -1.421803            -0.000016  0.082116
TOUR        0.000000      4.247110             0.000046 -0.384636
ETSY        0.001878      3.167975             0.000034  0.553285
```

```
[35]: table.sort_values(by='Average Return Days')
```

```
[35]:        Returns      Risk  Sharpe Ratio  Max Returns  Min Returns  \
      VIPS  0.001450  0.038174     -0.223972     0.269817    -0.199470
      STMP  0.001560  0.053629     -0.157367     0.655039    -0.577696
      BABA  0.000537  0.021545     -0.439209     0.070061    -0.078093
      LQDT  0.001064  0.035609     -0.250961     0.354167    -0.186170
      SSTK  0.000071  0.025170     -0.394455     0.127418    -0.126316
      CPRT  0.001241  0.021769     -0.402359     0.173528    -0.140591
      AMZN  0.001556  0.020436     -0.413201     0.094452    -0.079221
      CMPR  0.000208  0.041852     -0.233958     0.484301    -0.282708
      JD    0.000933  0.028204     -0.321467     0.128866    -0.112566
      GRPN -0.001366  0.048681     -0.233483     0.274194    -0.442623
      EXPE -0.000094  0.030316     -0.332977     0.186189    -0.273862
      MMYT -0.000296  0.036117     -0.285071     0.211570    -0.215827
      W     0.002751  0.051164     -0.141674     0.428384    -0.266830
      ETSY  0.003266  0.038672     -0.174131     0.262504    -0.157386
      TOUR -0.002046  0.038925     -0.309459     0.282051    -0.150442

            Median Returns  Total Return  Average Return Days      CAGR
      VIPS        0.000000     -2.618580            -0.000029  0.135198
      STMP        0.001507     -2.261940            -0.000025 -0.018809
      BABA        0.001488     -1.794712            -0.000020  0.054438
      LQDT        0.000000     -1.421803            -0.000016  0.082116
      SSTK        0.000874     -0.995162            -0.000011 -0.042096
      CPRT        0.001972      0.233677             0.000003  0.190276
      AMZN        0.002077      0.738011             0.000008  0.263569
      CMPR        0.001562      0.868600             0.000010 -0.105360
      JD          0.000832      1.119649             0.000012  0.097807
      GRPN       -0.002805      1.659125             0.000018 -0.367555
      EXPE        0.000606      1.821767             0.000020 -0.094940
      MMYT       -0.000984      1.948051             0.000021 -0.151465
      W           0.002603      2.197194             0.000024  0.295187
      ETSY        0.001878      3.167975             0.000034  0.553285
      TOUR        0.000000      4.247110             0.000046 -0.384636
```