Weed_Portfolio

September 29, 2021

1 Weed Portfolio

[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
title = "Weed"
symbols = ['ABBV', 'BUD', 'MO','TAP','SMG','CGC', 'GWPH', 'CRON', 'ACB',␣
 ↪'TLRY', 'CRBP', 'CTST', 'NBEV', 'TRTC', 'CANN', 'MJ']
start = '2018-01-01'
end = '2020-06-25'
```

[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]:
```
904
```

[7]:
```
df.head()
```

[7]:

Date	ABBV	BUD	MO	TAP	SMG	\
2018-01-02	85.888794	104.851608	59.916634	76.489159	102.167892	
2018-01-03	87.232849	105.663048	59.696426	75.754410	102.346863	
2018-01-04	86.735374	105.952171	59.459267	76.265945	100.001511	
2018-01-05	88.245255	107.015411	59.628662	77.130905	101.395546	
2018-01-08	86.831360	106.278618	59.552422	77.958679	102.770699	

Date	CGC	GWPH	CRON	ACB	TLRY	CRBP	CTST	NBEV	\
2018-01-02	25.879999	134.089996	NaN	113.760002	NaN	7.95	NaN	2.220	
2018-01-03	28.650000	134.410004	NaN	135.720001	NaN	8.50	NaN	2.177	
2018-01-04	25.889999	133.919998	NaN	125.400002	NaN	8.35	NaN	2.120	
2018-01-05	27.389999	133.429993	NaN	127.320000	NaN	7.80	NaN	2.170	
2018-01-08	32.110001	131.500000	NaN	134.220001	NaN	8.10	NaN	2.140	

Date	TRTC	CANN	MJ
2018-01-02	6.90	8.15	32.423748
2018-01-03	6.15	10.35	34.465618
2018-01-04	4.20	7.76	32.332596

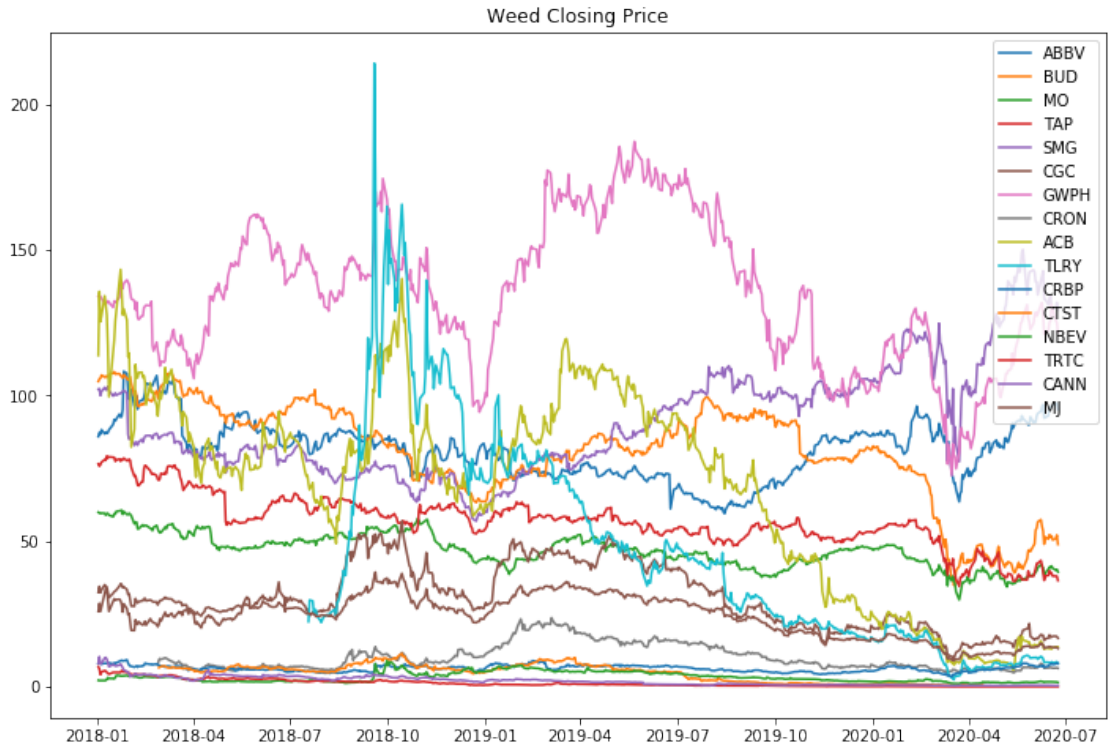
```
2018-01-05  5.10   8.06  33.225918
2018-01-08  5.55   9.87  35.021660
```

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

[8]:
```
                 ABBV        BUD         MO        TAP         SMG        CGC  \
Date
2020-06-18  96.230003  51.779999  41.470001  39.080002  129.850006  17.180000
2020-06-19  96.709999  50.439999  40.689999  38.029999  129.429993  17.330000
2020-06-22  97.269997  50.880001  40.049999  37.950001  130.149994  17.370001
2020-06-23  97.309998  52.099998  40.340000  37.970001  131.929993  17.240000
2020-06-24  95.139999  48.919998  39.430000  36.500000  129.580002  16.709999

                 GWPH  CRON    ACB  TLRY  CRBP  CTST  NBEV  TRTC    CANN  \
Date
2020-06-18  131.179993  6.56  13.01  8.56  7.97   NaN  1.74  0.13  0.4725
2020-06-19  129.710007  6.42  13.37  8.30  7.68   NaN  1.70  0.12  0.4600
2020-06-22  125.849998  6.45  13.72  8.41  7.84   NaN  1.64  0.11  0.4101
2020-06-23  125.000000  6.53  13.58  8.56  8.15   NaN  1.62  0.11  0.4280
2020-06-24  121.680000  6.38  13.67  8.15  7.96   NaN  1.50  0.11  0.4111

               MJ
Date
2020-06-18  13.66
2020-06-19  13.51
2020-06-22  13.50
2020-06-23  13.56
2020-06-24  13.17
```

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

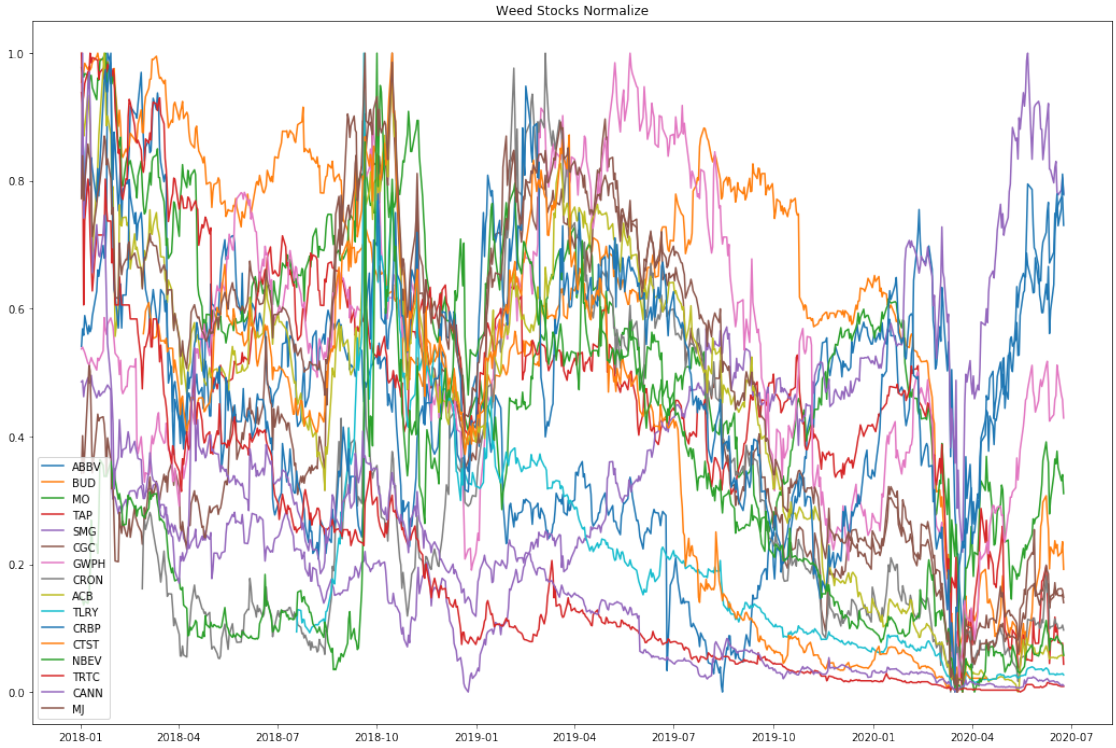
[9]:
```
<matplotlib.legend.Legend at 0x20bd7a254e0>
```



[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)
```

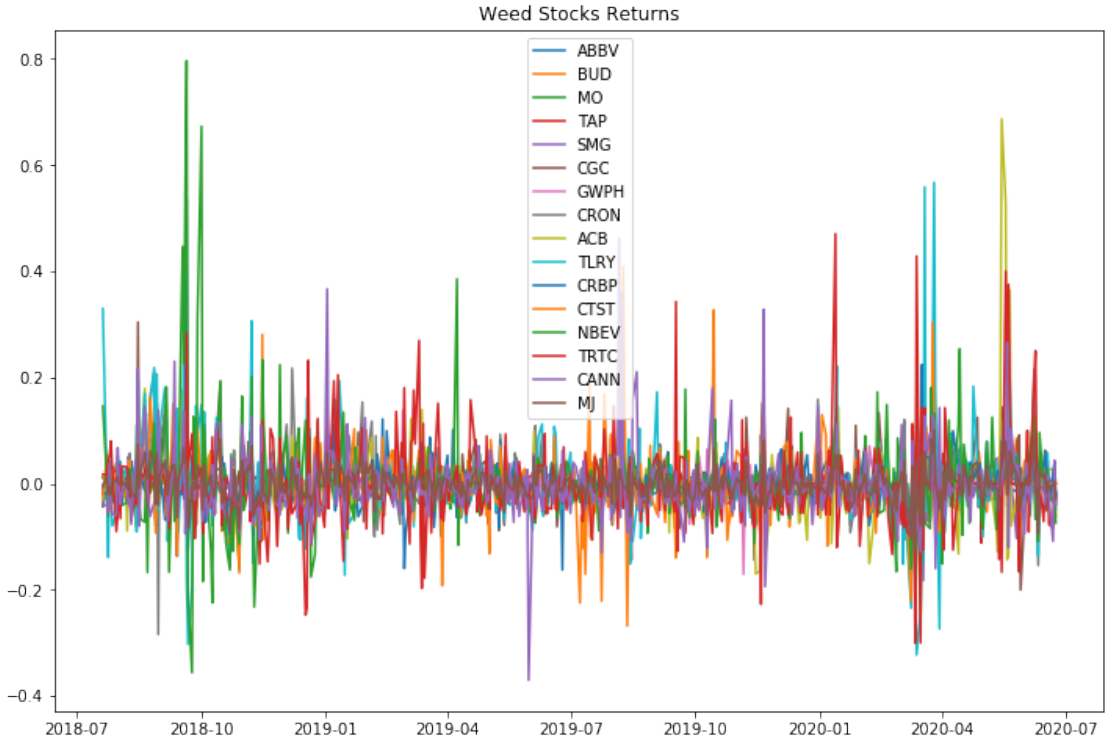
[11]: <matplotlib.legend.Legend at 0x20bdadcf0b8>



[12]:
```
stock_rets = df.pct_change().dropna()
```

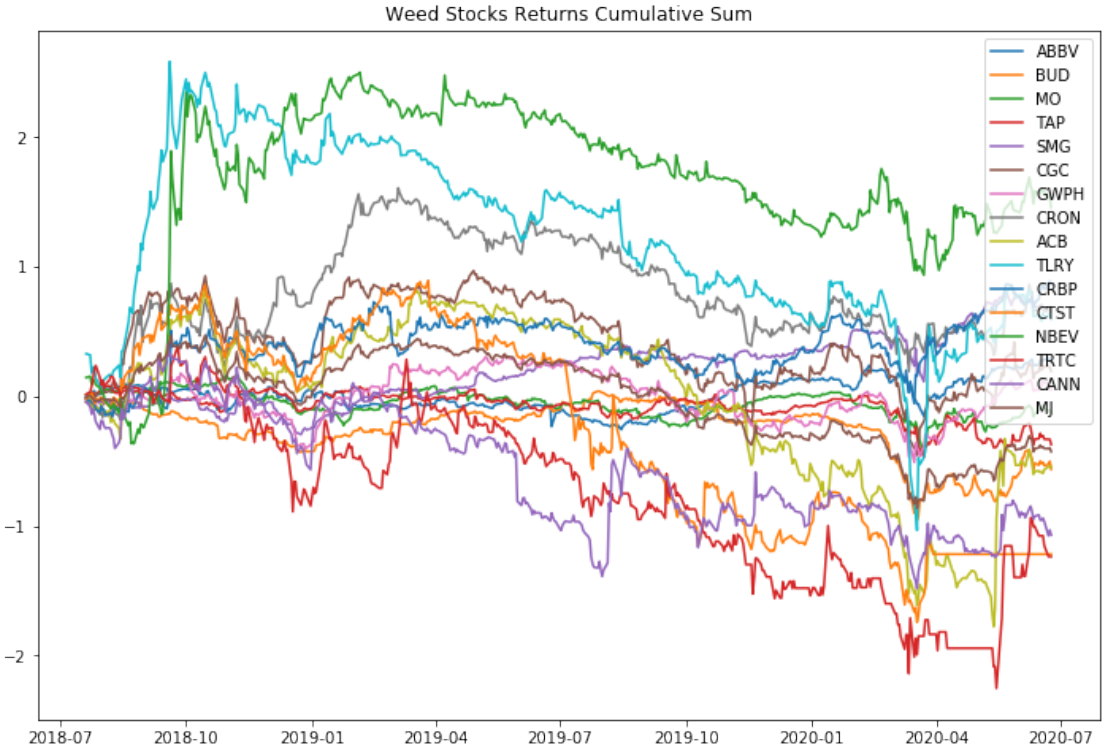
[13]:
```
plt.figure(figsize=(12,8))
plt.plot(stock_rets)
plt.title(title + ' Stocks Returns')
plt.legend(labels=stock_rets.columns)
```

[13]: <matplotlib.legend.Legend at 0x20bdabd9828>

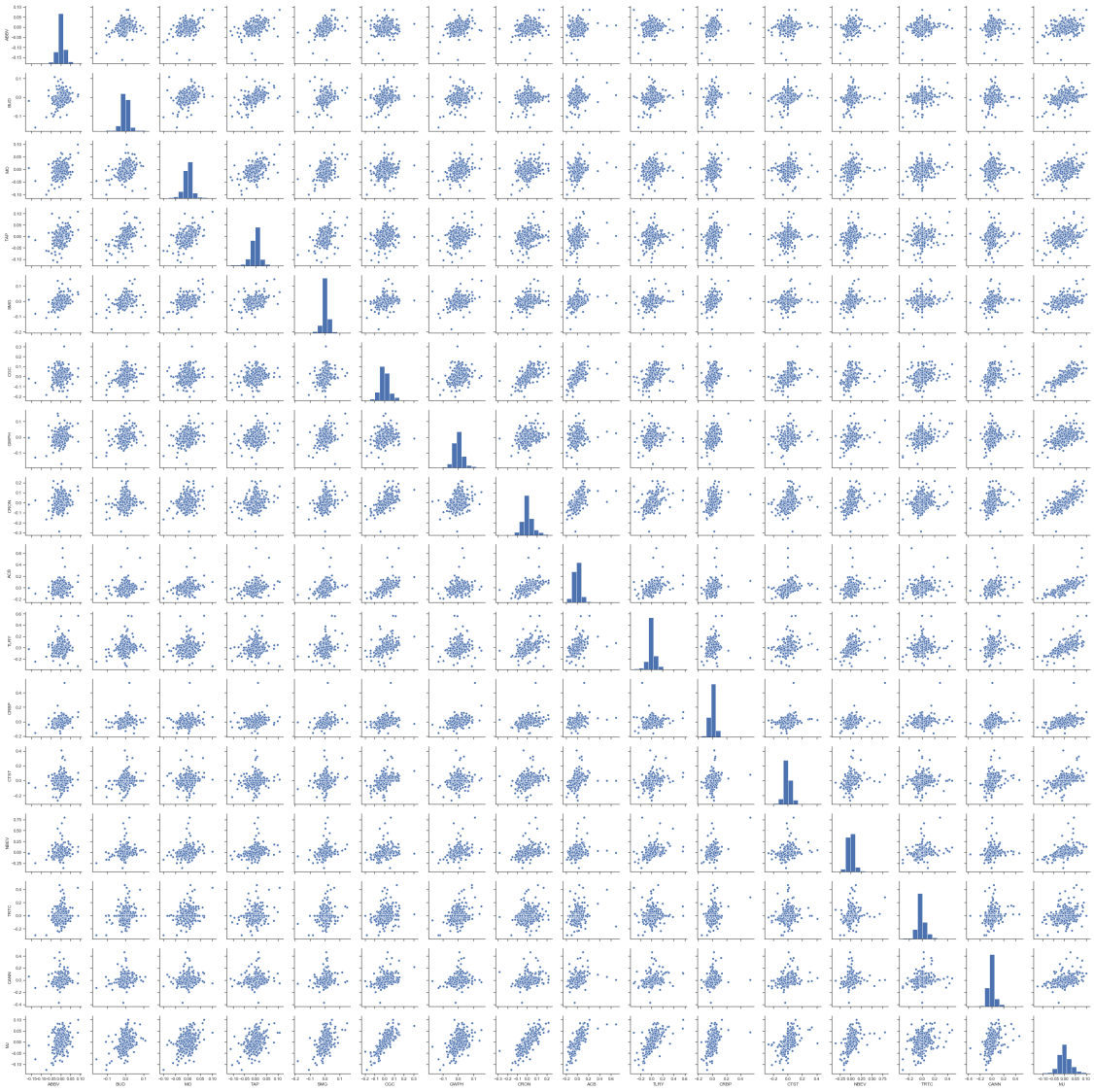


[14]:
```
plt.figure(figsize=(12,8))
plt.plot(stock_rets.cumsum())
plt.title(title + ' Stocks Returns Cumulative Sum')
plt.legend(labels=stock_rets.columns)
```

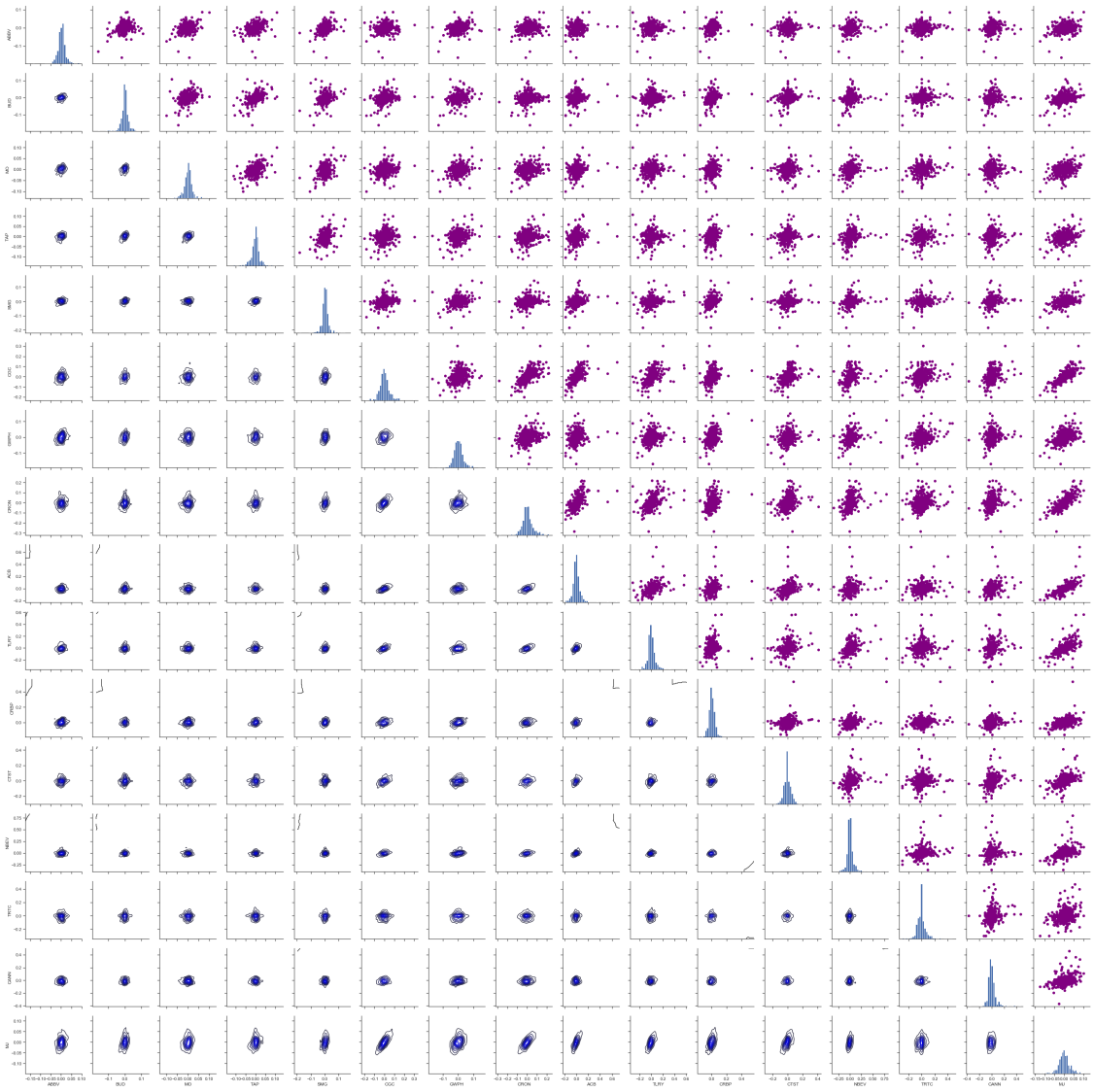
[14]: <matplotlib.legend.Legend at 0x20bdac5d908>



[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)
```

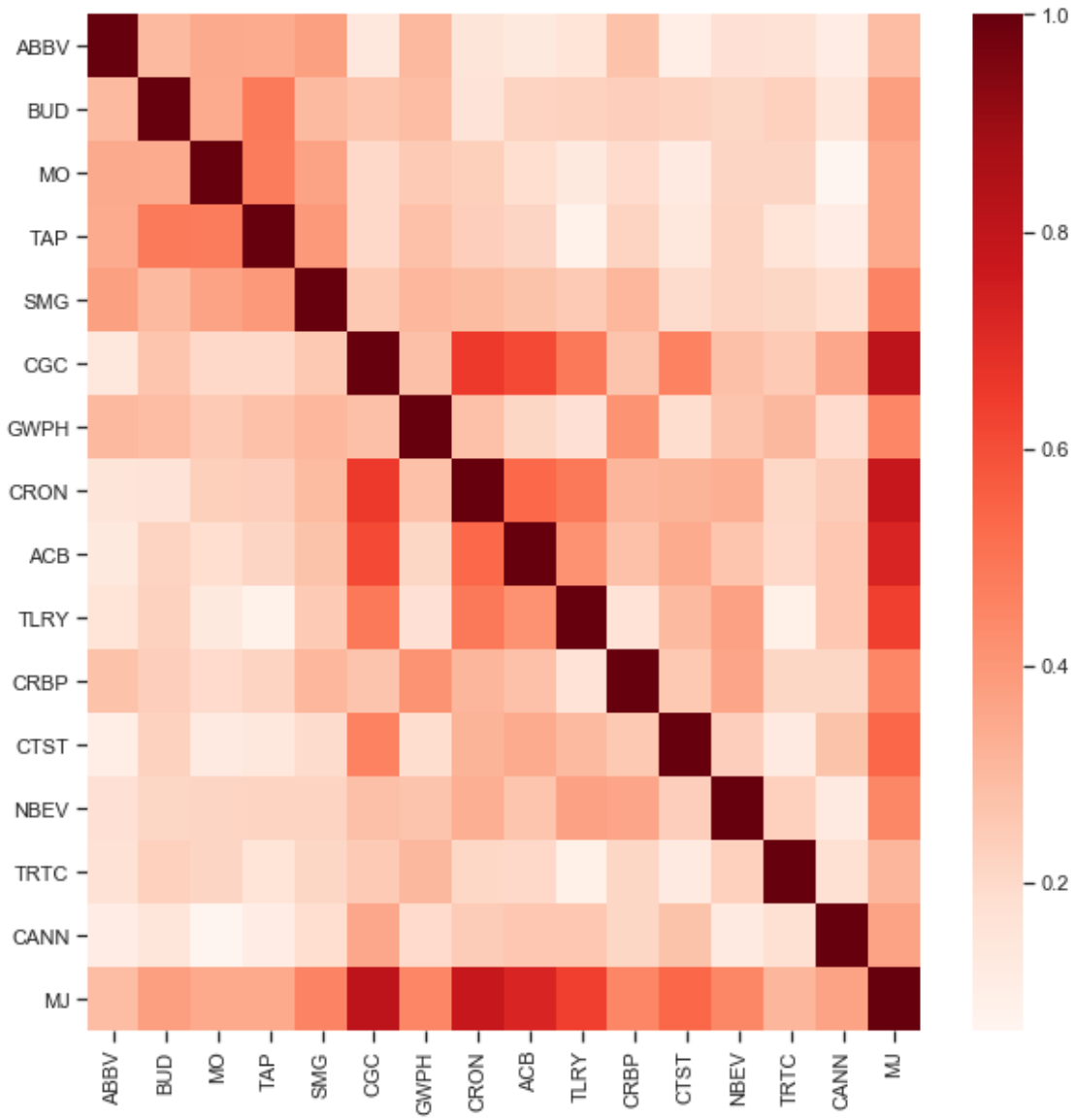


[16]:
```
ax = sns.PairGrid(stock_rets)
ax.map_upper(plt.scatter, color='purple')
ax.map_lower(sns.kdeplot, color='blue')
ax.map_diag(plt.hist, bins=30)
for i in range(nplot) :
    for j in range(nplot) :
        ax.axes[i, j].locator_params(axis='x', nbins=6, tight=True)
```



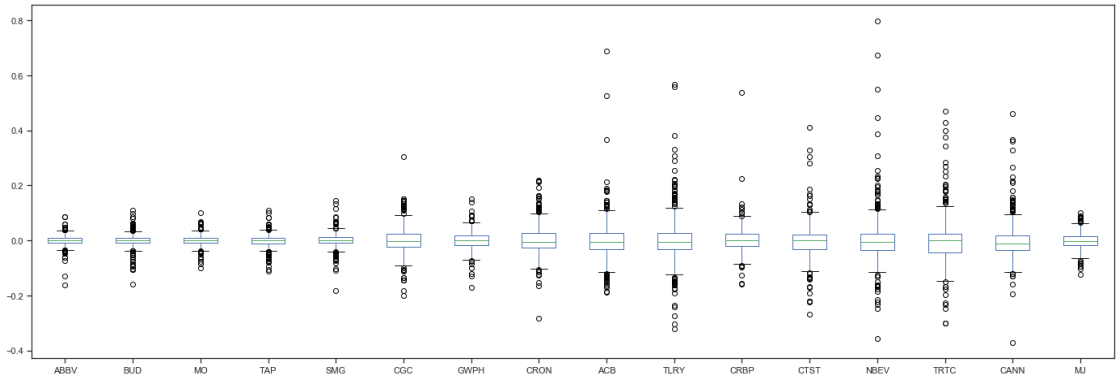
[17]:
```
plt.figure(figsize=(10,10))
corr = stock_rets.corr()

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

[17]: <matplotlib.axes._subplots.AxesSubplot at 0x20be2418ac8>

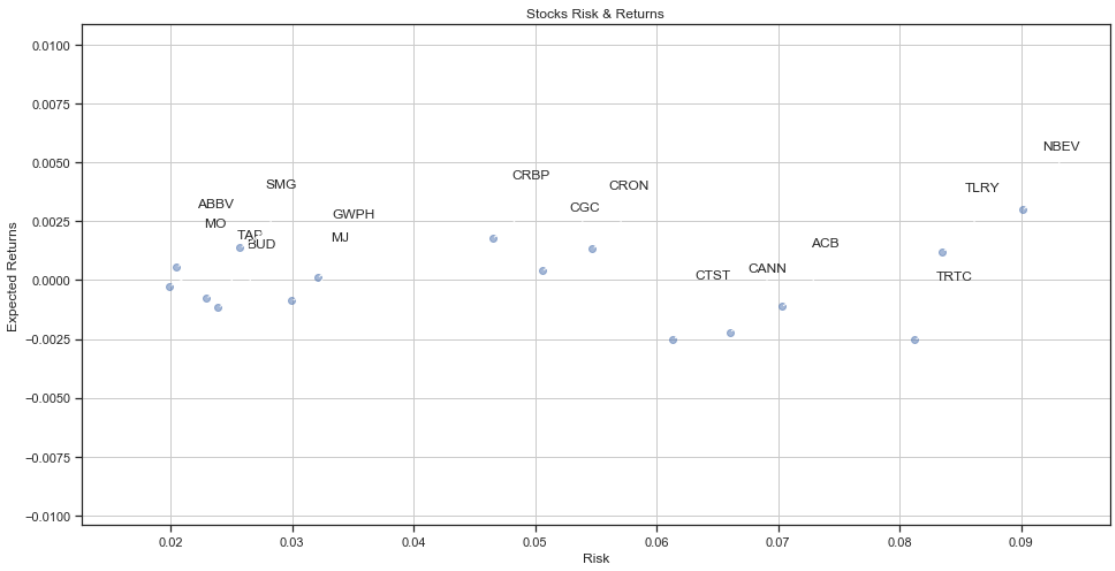


[18]:
```
# Box plot
stock_rets.plot(kind='box',figsize=(24,8))
```

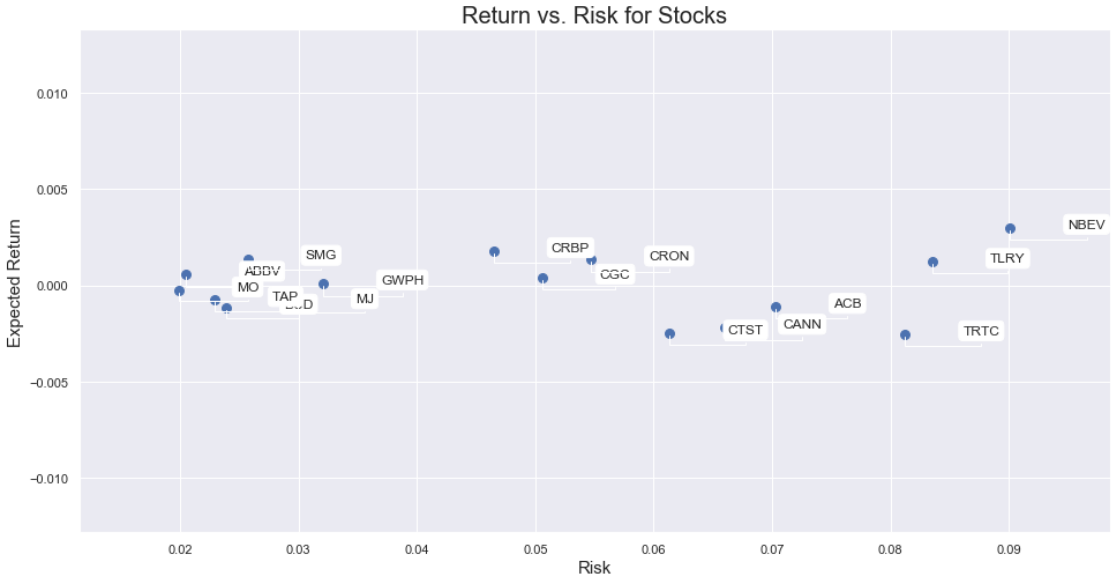
[18]: <matplotlib.axes._subplots.AxesSubplot at 0x20be3454d30>



[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]:
```
MJ    MJ      1.000000
CANN  CANN    1.000000
BUD   BUD     1.000000
MO    MO      1.000000
TAP   TAP     1.000000
```

```
SMG   SMG     1.000000
CGC   CGC     1.000000
GWPH  GWPH    1.000000
CRON  CRON    1.000000
ACB   ACB     1.000000
TLRY  TLRY    1.000000
CRBP  CRBP    1.000000
CTST  CTST    1.000000
NBEV  NBEV    1.000000
TRTC  TRTC    1.000000
ABBV  ABBV    1.000000
MJ    CGC     0.810819
CGC   MJ      0.810819
MJ    CRON    0.782384
CRON  MJ      0.782384
ACB   MJ      0.725535
MJ    ACB     0.725535
CRON  CGC     0.653592
CGC   CRON    0.653592
TLRY  MJ      0.640486
MJ    TLRY    0.640486
ACB   CGC     0.613705
CGC   ACB     0.613705
MJ    CTST    0.536440
CTST  MJ      0.536440
                …
CRON  ABBV    0.151795
ABBV  CRON    0.151795
BUD   CANN    0.148070
CANN  BUD     0.148070
CGC   ABBV    0.142989
ABBV  CGC     0.142989
CTST  TAP     0.140202
TAP   CTST    0.140202
ACB   ABBV    0.132702
ABBV  ACB     0.132702
MO    TLRY    0.130087
TLRY  MO      0.130087
CTST  TRTC    0.126612
TRTC  CTST    0.126612
MO    CTST    0.124939
CTST  MO      0.124939
NBEV  CANN    0.122163
CANN  NBEV    0.122163
ABBV  CANN    0.111023
CANN  ABBV    0.111023
      TAP     0.107233
```

```
TAP   CANN    0.107233
CTST  ABBV    0.106502
ABBV  CTST    0.106502
TRTC  TLRY    0.093788
TLRY  TRTC    0.093788
TAP   TLRY    0.081623
TLRY  TAP     0.081623
MO    CANN    0.063279
CANN  MO      0.063279
Length: 256, dtype: float64
```

[22]:
```
# Normalized Returns Data
Normalized_Value = ((rets[:] - rets[:].min()) /(rets[:].max() - rets[:].min()))
Normalized_Value.head()
```

[22]:

Date	ABBV	BUD	MO	TAP	SMG	CGC
2018-07-20	0.604578	0.635554	0.561502	0.435226	0.551081	0.310425
2018-07-23	0.672953	0.605948	0.495865	0.535980	0.549957	0.506239
2018-07-24	0.746747	0.599176	0.534830	0.591846	0.505120	0.362205
2018-07-25	0.720006	0.658794	0.488151	0.578326	0.570751	0.434735
2018-07-26	0.686147	0.409254	0.349327	0.500146	0.579742	0.355298

Date	GWPH	CRON	ACB	TLRY	CRBP	CTST
2018-07-20	0.480990	0.482049	0.184212	0.732799	0.203233	0.363230
2018-07-23	0.482726	0.542339	0.256214	0.350436	0.202740	0.468312
2018-07-24	0.486289	0.508074	0.133584	0.206493	0.215911	0.391442
2018-07-25	0.522931	0.573099	0.194646	0.412568	0.215780	0.355515
2018-07-26	0.553044	0.519172	0.202836	0.358694	0.215646	0.317725

Date	NBEV	TRTC	CANN	MJ
2018-07-20	0.435448	0.411433	0.397675	0.524747
2018-07-23	0.316607	0.411062	0.395720	0.617023
2018-07-24	0.256177	0.446355	0.377724	0.470588
2018-07-25	0.329082	0.457614	0.491436	0.526045
2018-07-26	0.314885	0.493130	0.398628	0.461898

[23]:
```
Normalized_Value.corr()
```

[23]:

	ABBV	BUD	MO	TAP	SMG	CGC	GWPH
ABBV	1.000000	0.299752	0.345455	0.341370	0.376258	0.142989	0.303617
BUD	0.299752	1.000000	0.341752	0.487035	0.300006	0.264805	0.290838
MO	0.345455	0.341752	1.000000	0.480350	0.369055	0.203886	0.251809
TAP	0.341370	0.487035	0.480350	1.000000	0.394010	0.204026	0.282370
SMG	0.376258	0.300006	0.369055	0.394010	1.000000	0.254896	0.310430

```
CGC   0.142989  0.264805  0.203886  0.204026  0.254896  1.000000  0.283343
GWPH  0.303617  0.290838  0.251809  0.282370  0.310430  0.283343  1.000000
CRON  0.151795  0.159286  0.233539  0.235371  0.294889  0.653592  0.279702
ACB   0.132702  0.224127  0.187347  0.213307  0.274614  0.613705  0.211599
TLRY  0.158178  0.224583  0.130087  0.081623  0.253283  0.489689  0.176141
CRBP  0.276853  0.238561  0.197093  0.219056  0.311451  0.270534  0.413548
CTST  0.106502  0.225768  0.124939  0.140202  0.194524  0.459309  0.188948
NBEV  0.175593  0.212874  0.215947  0.220178  0.217895  0.283808  0.271676
TRTC  0.171783  0.228349  0.216387  0.155940  0.210210  0.251091  0.306750
CANN  0.111023  0.148070  0.063279  0.107233  0.185494  0.352733  0.195904
MJ    0.290858  0.379891  0.350375  0.349039  0.458283  0.810819  0.449297

          CRON       ACB      TLRY      CRBP      CTST      NBEV      TRTC  \
ABBV  0.151795  0.132702  0.158178  0.276853  0.106502  0.175593  0.171783
BUD   0.159286  0.224127  0.224583  0.238561  0.225768  0.212874  0.228349
MO    0.233539  0.187347  0.130087  0.197093  0.124939  0.215947  0.216387
TAP   0.235371  0.213307  0.081623  0.219056  0.140202  0.220178  0.155940
SMG   0.294889  0.274614  0.253283  0.311451  0.194524  0.217895  0.210210
CGC   0.653592  0.613705  0.489689  0.270534  0.459309  0.283808  0.251091
GWPH  0.279702  0.211599  0.176141  0.413548  0.188948  0.271676  0.306750
CRON  1.000000  0.535275  0.488517  0.312369  0.317387  0.332213  0.206619
ACB   0.535275  1.000000  0.416411  0.282352  0.343071  0.264705  0.204751
TLRY  0.488517  0.416411  1.000000  0.166846  0.298170  0.373232  0.093788
CRBP  0.312369  0.282352  0.166846  1.000000  0.254839  0.360862  0.211844
CTST  0.317387  0.343071  0.298170  0.254839  1.000000  0.235262  0.126612
NBEV  0.332213  0.264705  0.373232  0.360862  0.235262  1.000000  0.230254
TRTC  0.206619  0.204751  0.093788  0.211844  0.126612  0.230254  1.000000
CANN  0.245535  0.258721  0.258778  0.212167  0.271966  0.122163  0.179612
MJ    0.782384  0.725535  0.640486  0.447811  0.536440  0.444827  0.315233

          CANN        MJ
ABBV  0.111023  0.290858
BUD   0.148070  0.379891
MO    0.063279  0.350375
TAP   0.107233  0.349039
SMG   0.185494  0.458283
CGC   0.352733  0.810819
GWPH  0.195904  0.449297
CRON  0.245535  0.782384
ACB   0.258721  0.725535
TLRY  0.258778  0.640486
CRBP  0.212167  0.447811
CTST  0.271966  0.536440
NBEV  0.122163  0.444827
TRTC  0.179612  0.315233
CANN  1.000000  0.368335
MJ    0.368335  1.000000
```

[24]:
```
normalized_rets = Normalized_Value.corr()
normalized_pair_value = normalized_rets.abs().unstack()
normalized_pair_value.sort_values(ascending = False)
```

[24]:
```
MJ    MJ      1.000000
CANN  CANN    1.000000
BUD   BUD     1.000000
MO    MO      1.000000
TAP   TAP     1.000000
SMG   SMG     1.000000
CGC   CGC     1.000000
GWPH  GWPH    1.000000
CRON  CRON    1.000000
ACB   ACB     1.000000
TLRY  TLRY    1.000000
CRBP  CRBP    1.000000
CTST  CTST    1.000000
NBEV  NBEV    1.000000
TRTC  TRTC    1.000000
ABBV  ABBV    1.000000
MJ    CGC     0.810819
CGC   MJ      0.810819
MJ    CRON    0.782384
CRON  MJ      0.782384
ACB   MJ      0.725535
MJ    ACB     0.725535
CRON  CGC     0.653592
CGC   CRON    0.653592
TLRY  MJ      0.640486
MJ    TLRY    0.640486
ACB   CGC     0.613705
CGC   ACB     0.613705
MJ    CTST    0.536440
CTST  MJ      0.536440
                 ...
CRON  ABBV    0.151795
ABBV  CRON    0.151795
BUD   CANN    0.148070
CANN  BUD     0.148070
CGC   ABBV    0.142989
ABBV  CGC     0.142989
CTST  TAP     0.140202
TAP   CTST    0.140202
ACB   ABBV    0.132702
ABBV  ACB     0.132702
MO    TLRY    0.130087
TLRY  MO      0.130087
```

```
CTST  TRTC    0.126612
TRTC  CTST    0.126612
MO    CTST    0.124939
CTST  MO      0.124939
NBEV  CANN    0.122163
CANN  NBEV    0.122163
ABBV  CANN    0.111023
CANN  ABBV    0.111023
      TAP     0.107233
TAP   CANN    0.107233
CTST  ABBV    0.106502
ABBV  CTST    0.106502
TRTC  TLRY    0.093788
TLRY  TRTC    0.093788
TAP   TLRY    0.081623
TLRY  TAP     0.081623
MO    CANN    0.063279
CANN  MO      0.063279
Length: 256, dtype: float64
```

[25]:
```
print("Stock returns: ")
print(rets.mean())
print('-' * 50)
print("Stock risks:")
print(rets.std())
```

```
Stock returns:
ABBV    0.000553
BUD    -0.001157
MO     -0.000263
TAP    -0.000762
SMG     0.001381
CGC     0.000400
GWPH    0.000103
CRON    0.001340
ACB    -0.001118
TLRY    0.001221
CRBP    0.001782
CTST   -0.002506
NBEV    0.002995
TRTC   -0.002544
CANN   -0.002204
MJ     -0.000878
dtype: float64
--------------------------------------------------
Stock risks:
ABBV    0.020498
```

```
BUD     0.023911
MO      0.019894
TAP     0.022924
SMG     0.025713
CGC     0.050582
GWPH    0.032086
CRON    0.054711
ACB     0.070286
TLRY    0.083543
CRBP    0.046494
CTST    0.061369
NBEV    0.090104
TRTC    0.081239
CANN    0.066023
MJ      0.029951
dtype: float64
```

[26]:
```
table = pd.DataFrame()
table['Returns'] = rets.mean()
table['Risk'] = rets.std()
table.sort_values(by='Returns')
```

[26]:

	Returns	Risk
TRTC	-0.002544	0.081239
CTST	-0.002506	0.061369
CANN	-0.002204	0.066023
BUD	-0.001157	0.023911
ACB	-0.001118	0.070286
MJ	-0.000878	0.029951
TAP	-0.000762	0.022924
MO	-0.000263	0.019894
GWPH	0.000103	0.032086
CGC	0.000400	0.050582
ABBV	0.000553	0.020498
TLRY	0.001221	0.083543
CRON	0.001340	0.054711
SMG	0.001381	0.025713
CRBP	0.001782	0.046494
NBEV	0.002995	0.090104

[27]:
```
table.sort_values(by='Risk')
```

[27]:

	Returns	Risk
MO	-0.000263	0.019894
ABBV	0.000553	0.020498
TAP	-0.000762	0.022924
BUD	-0.001157	0.023911

```
SMG   0.001381  0.025713
MJ   -0.000878  0.029951
GWPH  0.000103  0.032086
CRBP  0.001782  0.046494
CGC   0.000400  0.050582
CRON  0.001340  0.054711
CTST -0.002506  0.061369
CANN -0.002204  0.066023
ACB  -0.001118  0.070286
TRTC -0.002544  0.081239
TLRY  0.001221  0.083543
NBEV  0.002995  0.090104
```

[28]:
```
rf = 0.01
table['Sharpe Ratio'] = (table['Returns'] - rf) / table['Risk']
table
```

[28]:
```
        Returns      Risk  Sharpe Ratio
ABBV  0.000553  0.020498     -0.460876
BUD  -0.001157  0.023911     -0.466629
MO   -0.000263  0.019894     -0.515883
TAP  -0.000762  0.022924     -0.469473
SMG   0.001381  0.025713     -0.335198
CGC   0.000400  0.050582     -0.189792
GWPH  0.000103  0.032086     -0.308445
CRON  0.001340  0.054711     -0.158285
ACB  -0.001118  0.070286     -0.158187
TLRY  0.001221  0.083543     -0.105087
CRBP  0.001782  0.046494     -0.176764
CTST -0.002506  0.061369     -0.203778
NBEV  0.002995  0.090104     -0.077747
TRTC -0.002544  0.081239     -0.154405
CANN -0.002204  0.066023     -0.184838
MJ   -0.000878  0.029951     -0.363179
```

[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  \
ABBV  0.000553  0.020498     -0.460876     0.087174    -0.162524
```

```
BUD  -0.001157  0.023911     -0.466629     0.108361    -0.160081
MO   -0.000263  0.019894     -0.515883     0.100220    -0.100296
TAP  -0.000762  0.022924     -0.469473     0.108333    -0.111761
SMG   0.001381  0.025713     -0.335198     0.146244    -0.182526
CGC   0.000400  0.050582     -0.189792     0.304224    -0.200276
GWPH  0.000103  0.032086     -0.308445     0.150662    -0.170612
CRON  0.001340  0.054711     -0.158285     0.217225    -0.284144
ACB  -0.001118  0.070286     -0.158187     0.686747    -0.188889
TLRY  0.001221  0.083543     -0.105087     0.567460    -0.322689
CRBP  0.001782  0.046494     -0.176764     0.536232    -0.159806
CTST -0.002506  0.061369     -0.203778     0.408889    -0.268139
NBEV  0.002995  0.090104     -0.077747     0.796339    -0.356098
TRTC -0.002544  0.081239     -0.154405     0.470588    -0.300000
CANN -0.002204  0.066023     -0.184838     0.461404    -0.370235
MJ   -0.000878  0.029951     -0.363179     0.100909    -0.125220

      Median Returns  Total Return
ABBV        0.001478     -2.229985
BUD        -0.000360     -6.103648
MO          0.001163     -2.255825
TAP         0.000220     -3.871481
SMG         0.001494     -1.781241
CGC        -0.003133     -3.074250
GWPH       -0.001091     -2.656000
CRON       -0.004667     -2.297092
ACB        -0.006305      0.662740
TLRY       -0.005014     -4.789729
CRBP        0.000000     -2.331283
CTST        0.000000      0.000000
NBEV       -0.006292     -7.407408
TRTC        0.000000      0.000000
CANN       -0.011137     -3.948599
MJ         -0.001668     -2.876109
```

[33]:
```
table['Average Return Days'] = (1 + total_return)**(1 / days) - 1
table
```

[33]:
```
       Returns      Risk  Sharpe Ratio  Max Returns  Min Returns  \
ABBV  0.000553  0.020498     -0.460876     0.087174    -0.162524
BUD  -0.001157  0.023911     -0.466629     0.108361    -0.160081
MO   -0.000263  0.019894     -0.515883     0.100220    -0.100296
TAP  -0.000762  0.022924     -0.469473     0.108333    -0.111761
SMG   0.001381  0.025713     -0.335198     0.146244    -0.182526
CGC   0.000400  0.050582     -0.189792     0.304224    -0.200276
GWPH  0.000103  0.032086     -0.308445     0.150662    -0.170612
CRON  0.001340  0.054711     -0.158285     0.217225    -0.284144
ACB  -0.001118  0.070286     -0.158187     0.686747    -0.188889
```

```
TLRY  0.001221  0.083543     -0.105087     0.567460    -0.322689
CRBP  0.001782  0.046494     -0.176764     0.536232    -0.159806
CTST -0.002506  0.061369     -0.203778     0.408889    -0.268139
NBEV  0.002995  0.090104     -0.077747     0.796339    -0.356098
TRTC -0.002544  0.081239     -0.154405     0.470588    -0.300000
CANN -0.002204  0.066023     -0.184838     0.461404    -0.370235
MJ   -0.000878  0.029951     -0.363179     0.100909    -0.125220

      Median Returns  Total Return  Average Return Days
ABBV        0.001478     -2.229985            -0.000025
BUD        -0.000360     -6.103648            -0.000070
MO          0.001163     -2.255825            -0.000025
TAP         0.000220     -3.871481            -0.000044
SMG         0.001494     -1.781241            -0.000020
CGC        -0.003133     -3.074250            -0.000035
GWPH       -0.001091     -2.656000            -0.000030
CRON       -0.004667     -2.297092            -0.000026
ACB        -0.006305      0.662740             0.000007
TLRY       -0.005014     -4.789729            -0.000054
CRBP        0.000000     -2.331283            -0.000026
CTST        0.000000      0.000000             0.000000
NBEV       -0.006292     -7.407408            -0.000085
TRTC        0.000000      0.000000             0.000000
CANN       -0.011137     -3.948599            -0.000045
MJ         -0.001668     -2.876109            -0.000032
```

[34]:
```
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  \
ABBV  0.000553  0.020498     -0.460876     0.087174    -0.162524
BUD  -0.001157  0.023911     -0.466629     0.108361    -0.160081
MO   -0.000263  0.019894     -0.515883     0.100220    -0.100296
TAP  -0.000762  0.022924     -0.469473     0.108333    -0.111761
SMG   0.001381  0.025713     -0.335198     0.146244    -0.182526
CGC   0.000400  0.050582     -0.189792     0.304224    -0.200276
GWPH  0.000103  0.032086     -0.308445     0.150662    -0.170612
CRON  0.001340  0.054711     -0.158285     0.217225    -0.284144
ACB  -0.001118  0.070286     -0.158187     0.686747    -0.188889
TLRY  0.001221  0.083543     -0.105087     0.567460    -0.322689
CRBP  0.001782  0.046494     -0.176764     0.536232    -0.159806
CTST -0.002506  0.061369     -0.203778     0.408889    -0.268139
NBEV  0.002995  0.090104     -0.077747     0.796339    -0.356098
TRTC -0.002544  0.081239     -0.154405     0.470588    -0.300000
CANN -0.002204  0.066023     -0.184838     0.461404    -0.370235
```

```
MJ   -0.000878  0.029951     -0.363179     0.100909    -0.125220

      Median Returns  Total Return  Average Return Days      CAGR
ABBV        0.001478     -2.229985            -0.000025  0.028927
BUD        -0.000360     -6.103648            -0.000070 -0.191453
MO          0.001163     -2.255825            -0.000025 -0.110096
TAP         0.000220     -3.871481            -0.000044 -0.186360
SMG         0.001494     -1.781241            -0.000020  0.068500
CGC        -0.003133     -3.074250            -0.000035 -0.114805
GWPH       -0.001091     -2.656000            -0.000030 -0.026709
CRON       -0.004667     -2.297092            -0.000026       NaN
ACB        -0.006305      0.662740             0.000007 -0.446040
TLRY       -0.005014     -4.789729            -0.000054       NaN
CRBP        0.000000     -2.331283            -0.000026  0.000350
CTST        0.000000      0.000000             0.000000       NaN
NBEV       -0.006292     -7.407408            -0.000085 -0.103526
TRTC        0.000000      0.000000             0.000000 -0.684544
CANN       -0.011137     -3.948599            -0.000045 -0.565101
MJ         -0.001668     -2.876109            -0.000032 -0.222094
```

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

[35]:
```
       Returns      Risk  Sharpe Ratio  Max Returns  Min Returns  \
NBEV  0.002995  0.090104     -0.077747     0.796339    -0.356098
BUD  -0.001157  0.023911     -0.466629     0.108361    -0.160081
TLRY  0.001221  0.083543     -0.105087     0.567460    -0.322689
CANN -0.002204  0.066023     -0.184838     0.461404    -0.370235
TAP  -0.000762  0.022924     -0.469473     0.108333    -0.111761
CGC   0.000400  0.050582     -0.189792     0.304224    -0.200276
MJ   -0.000878  0.029951     -0.363179     0.100909    -0.125220
GWPH  0.000103  0.032086     -0.308445     0.150662    -0.170612
CRBP  0.001782  0.046494     -0.176764     0.536232    -0.159806
CRON  0.001340  0.054711     -0.158285     0.217225    -0.284144
MO   -0.000263  0.019894     -0.515883     0.100220    -0.100296
ABBV  0.000553  0.020498     -0.460876     0.087174    -0.162524
SMG   0.001381  0.025713     -0.335198     0.146244    -0.182526
CTST -0.002506  0.061369     -0.203778     0.408889    -0.268139
TRTC -0.002544  0.081239     -0.154405     0.470588    -0.300000
ACB  -0.001118  0.070286     -0.158187     0.686747    -0.188889

      Median Returns  Total Return  Average Return Days      CAGR
NBEV       -0.006292     -7.407408            -0.000085 -0.103526
BUD        -0.000360     -6.103648            -0.000070 -0.191453
TLRY       -0.005014     -4.789729            -0.000054       NaN
CANN       -0.011137     -3.948599            -0.000045 -0.565101
TAP         0.000220     -3.871481            -0.000044 -0.186360
CGC        -0.003133     -3.074250            -0.000035 -0.114805
```

MJ	-0.001668	-2.876109	-0.000032	-0.222094
GWPH	-0.001091	-2.656000	-0.000030	-0.026709
CRBP	0.000000	-2.331283	-0.000026	0.000350
CRON	-0.004667	-2.297092	-0.000026	NaN
MO	0.001163	-2.255825	-0.000025	-0.110096
ABBV	0.001478	-2.229985	-0.000025	0.028927
SMG	0.001494	-1.781241	-0.000020	0.068500
CTST	0.000000	0.000000	0.000000	NaN
TRTC	0.000000	0.000000	0.000000	-0.684544
ACB	-0.006305	0.662740	0.000007	-0.446040