Q1.1 For each of the 5 years, compute the mean and standard deviation for the sets R, R− and R+ of daily returns for your stock for each day of the week:

See hw1.py

Q1.2: for my stock “D”

2016

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | 0.001608 | 0.010402689899163708 | 19 | -0.00772 | 0.007159 | 27 | 0.008175 | 0.006624 |
| Tuesday | 0.000667 | 0.009428 | 25 | -0.00731 | 0.005097 | 27 | 0.008055 | 0.005799 |
| Wednesday | -0.00112 | 0.010635666871349914 | 25 | -0.00907 | 0.009048 | 27 | 0.006243 | 0.00541 |
| Thursday | 0.001457 | 0.009911 | 19 | -0.00819 | 0.007921 | 32 | 0.007185 | 0.005587 |
| Friday | 0.001068 | 0.011689 | 21 | -0.00983 | 0.009053 | 30 | 0.008698 | 0.005792 |

2017

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | 0.000369 | 0.007396 | 21 | -0.00572 | 0.005745 | 25 | 0.00548 | 0.003963 |
| Tuesday | 9.967291072065193e-05 | 0.007945 | 26 | -0.00562 | 0.005309 | 25 | 0.006051 | 0.005476 |
| Wednesday | -0.00115 | 0.011074875339248341 | 25 | -0.00898 | 0.010925 | 27 | 0.0061 | 0.004047 |
| Thursday | 0.001581 | 0.006645 | 22 | -0.00429 | 0.004101 | 29 | 0.006037 | 0.004341 |
| Friday | 0.001174 | 0.005848 | 22 | -0.00405 | 0.002514 | 29 | 0.005139 | 0.004349 |

2018

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | -0.00109 | 0.013787638802847658 | 23 | -0.01172 | 0.012350000499179883 | 25 | 0.008697 | 0.00499 |
| Tuesday | 0.000111 | 0.010147325718894547 | 25 | -0.00799 | 0.006676 | 26 | 0.007904 | 0.005937 |
| Wednesday | -0.00396 | 0.010953 | 32 | -0.01024 | 0.007762 | 18 | 0.007203 | 0.005599 |
| Thursday | 0.001845 | 0.010783407951911652 | 20 | -0.00836 | 0.007793 | 31 | 0.008429 | 0.00645 |
| Friday | 0.001723 | 0.009855 | 22 | -0.00726 | 0.00456 | 29 | 0.008538 | 0.00688 |

2019

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | -0.00165 | 0.008704 | 26 | -0.00807 | 0.005966 | 22 | 0.005946 | 0.004098 |
| Tuesday | 7.905082391803781e-05 | 0.009626 | 21 | -0.00892 | 0.007404 | 31 | 0.006173 | 0.005131 |
| Wednesday | 0.000856 | 0.009237 | 26 | -0.00594 | 0.006465 | 25 | 0.007922 | 0.005715 |
| Thursday | 0.002501 | 0.008029 | 20 | -0.00524 | 0.003634 | 30 | 0.007659 | 0.005666 |
| Friday | 0.002181 | 0.008666 | 20 | -0.0057 | 0.006215 | 31 | 0.007266 | 0.005716 |

2020

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | -0.00276 | 0.036002 | 19 | -0.0288 | 0.040451 | 29 | 0.014305322707105104 | 0.018378 |
| Tuesday | 0.005826 | 0.031658 | 23 | -0.01279 | 0.012686209494354762 | 29 | 0.020589777220749124 | 0.034302282763629184 |
| Wednesday | 0.00181 | 0.020101165722622622 | 26 | -0.01185 | 0.012729 | 26 | 0.015474066774338909 | 0.016512971783027325 |
| Thursday | -0.00402 | 0.027321045161758165 | 25 | -0.02138 | 0.026106313692164863 | 26 | 0.012669896840222931 | 0.015513763897722382 |
| Friday | -0.0006 | 0.022489364401586474 | 27 | -0.01369 | 0.014246023772891466 | 22 | 0.015469 | 0.020224 |

Q1.3

From the python script hw1 output, we got:

Negative earning days count: 580

Non-negative earning days count: 678

There are more days with non-negative returns.

Q1.4

Looking at the table, and from the script:

The overall average loss is slightly more than the average gain on a down day vs a up day.

(about .955% loss vs .886% gain when taking the average)

Q1.5

Well, Tuesday seems to be a good day for this stock as the overall average across the years seems to always be in the positive.

Thursday and Fridays seem to do pretty well as well (in the positive).

It does varies slightly from weekday to weekday. However, I don’t think weekday is the only faction at play here, and there are many hidden variables.

Honestly, I would say it’s too close to tell the difference between each weekday considering the variance, and we are only using 5 years of data. Since we are bunching the data up into 25 data points in the table, I don’t think we got a large enough ‘sample’ to say anything for certain.

Q2.1:

Not a strong pattern. One can argue that the Thursday and Tuesday the stock tends to go up, Friday is usually quiet, and it tends to dip a little bit on Mondays.

Q2.2:

Across the years:

Monday: negative trend (as time move on, the Mondays seem to dip into the negatives).

Tuesday: overall small gain.

Wednesday: dipped in 2018 but coming back positive.

Thursday: gain seems to increase until 2020 when covid hit.

Friday: similar to Thursday, gain seems to increase until 2020 killed it.

Q2.3:

2016:

Worst day: Wednesday

Best day: Monday

2017:

Worst day: Wednesday

Best day: Thursday

2018:

Worst day: Wednesday

Best day: Thursday

2019:

Worst day: Monday

Best day: Thursday

2020:

Worst day: Thursday

Best day: Tuesday

Q2.4

Yes those days have some change from year to year, especially for the worst day.

Q3:

Table for SPY:

2016

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | 0.000777 | 0.007134 | 20 | -0.00482 | 0.005124 | 26 | 0.005081 | 0.00522 |
| Tuesday | 0.001052 | 0.00837 | 20 | -0.00699 | 0.004894 | 32 | 0.006077 | 0.005764 |
| Wednesday | 0.000642 | 0.00756 | 24 | -0.00543 | 0.005622 | 28 | 0.005849 | 0.004509 |
| Thursday | 0.000419 | 0.00679 | 23 | -0.00478 | 0.005407 | 28 | 0.004686 | 0.004426 |
| Friday | -0.00018 | 0.010318400813954834 | 26 | -0.00685 | 0.00858 | 25 | 0.006746 | 0.006814 |

2017

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | 0.00134 | 0.003886 | 20 | -0.00179 | 0.00155 | 26 | 0.003748 | 0.003397 |
| Tuesday | 0.000417 | 0.004415 | 23 | -0.00317 | 0.002971 | 28 | 0.003367 | 0.002992 |
| Wednesday | 0.001082 | 0.004456 | 19 | -0.00258 | 0.003918 | 33 | 0.00319 | 0.003208 |
| Thursday | -0.00021 | 0.00493 | 25 | -0.00377 | 0.00407 | 26 | 0.003219 | 0.002789 |
| Friday | 0.001376 | 0.002995 | 20 | -0.00157 | 0.000941 | 31 | 0.003279 | 0.002225 |

2018

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | -0.00085 | 0.011864875417625934 | 21 | -0.01067 | 0.010195206978394069 | 27 | 0.006787 | 0.006006 |
| Tuesday | 0.000143 | 0.009288 | 21 | -0.00769 | 0.007639 | 30 | 0.005628 | 0.005721 |
| Wednesday | 0.001055 | 0.012015 | 24 | -0.0068 | 0.008063 | 26 | 0.008305 | 0.010397236293458319 |
| Thursday | -9.12E-05 | 0.01008 | 27 | -0.0069 | 0.00894 | 24 | 0.007573 | 0.003879 |
| Friday | -0.00092 | 0.010007221355605575 | 23 | -0.00913 | 0.008121 | 28 | 0.005827 | 0.00523 |

2019

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | -0.00015 | 0.008068 | 22 | -0.00617 | 0.007396 | 26 | 0.004939 | 0.004162 |
| Tuesday | 0.000819 | 0.007827 | 24 | -0.0054 | 0.005013 | 28 | 0.006145 | 0.005548 |
| Wednesday | 0.000686 | 0.007184 | 19 | -0.00592 | 0.006905 | 32 | 0.004608 | 0.003558 |
| Thursday | 0.00178 | 0.006984 | 19 | -0.00466 | 0.005691 | 31 | 0.005728 | 0.00422 |
| Friday | 0.002361 | 0.008874 | 18 | -0.00611 | 0.006703 | 33 | 0.006983 | 0.006056 |

2020

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | µ(R) | σ(R) | |R−| | µ(R−) | σ(R−) | |R+| | µ(R+) | σ(R+) |
| Monday | 0.001475 | 0.026051 | 16 | -0.02254 | 0.028710018827926415 | 32 | 0.013483089371706572 | 0.013164127244035324 |
| Tuesday | 0.003607 | 0.020234394846577443 | 24 | -0.01032 | 0.009601 | 28 | 0.015543900660923744 | 0.019304470887156987 |
| Wednesday | 0.001068 | 0.018546588939880385 | 20 | -0.0163 | 0.016097875069905787 | 32 | 0.011925 | 0.009514 |
| Thursday | -0.00197 | 0.021259260166259463 | 23 | -0.01547 | 0.022954 | 28 | 0.009117 | 0.010853 |
| Friday | 0.000128 | 0.017999 | 24 | -0.0115 | 0.010166061088320974 | 25 | 0.011290928674683984 | 0.016771766514581857 |

Q3.1:

For mine(D):

Best: Thursday

Worst: Monday

For SPY:

Best: Tuesday (largest overall average)

Worst: Thursday (overall average is negative, the other days are positive)

Q3.2:

They are not the same days!

Q4: from the hw1.py script, each time the value is rounded to 2 decimal points due to the nature of money.

1. My stock: 37456.05
2. S&P 500: 11984.79

Q5: similar to Q4

1. My stock: 135.63
2. S&P 500: 203.78

Q6:

1. From HW1.py script

for a, my stock: 17093.99

for a, SPY: 6843.31

for b, my stock: 15383.92

for b, SPY: 6329.95

for c, my stock: 12667.93

for c, SPY: 5642.19

1. I gain more by missing the best days
2. Yes it’s different