SPY:

Question 1 :

2.

SPY:

﻿The probability that next is UP day is: 0.5350993377483444

JPM:

﻿The probability that next is UP day is: 0.5178807947019868

3.

Spy:

﻿for k= 1, the probability of '-' then '+'is 0.5914285714285714

for k= 2, the probability of '-' '-' then '+'is 0.6433566433566433

for k= 3, the probability of '-' '-' '-'then '+'is 0.6274509803921569

JMP:

﻿for k= 1, the probability of '-' then '+'is 0.5564738292011019

for k= 2, the probability of '-' '-' then '+'is 0.5838509316770186

for k= 3, the probability of '-' '-' '-'then '+'is 0.5970149253731343

4.

SPY:

﻿for k= 1, the probability of '+' then '+'is 0.48514851485148514

for k= 2, the probability of '+' '+' then '+'is 0.46938775510204084

for k= 3, the probability of '+' '+' '+'then '+'is 0.4673913043478261

JPM:

﻿for k= 1, the probability of '+' then '+'is 0.48081841432225064

for k= 2, the probability of '+' '+' then '+'is 0.5159574468085106

for k= 3, the probability of '+' '+' '+'then '+'is 0.5154639175257731

Question 2:

2.

SPY:

﻿the accuracy for w2 plus is 0.6443661971830986

the accuracy for w2 minus is 0.3165137614678899

the accuracy for w3 plus is 0.5633802816901409

the accuracy for w3 minus is 0.48623853211009177

the accuracy for w4 plus is 0.4084507042253521

the accuracy for w4 minus is 0.5458715596330275

﻿total accuracy for w2 0.9608799586509885

total accuracy for w3 1.0496188138002327

total accuracy for w4 0.9543222638583796

JPM:

﻿the accuracy for w2 plus is 0.7414448669201521

the accuracy for w2 minus is 0.24267782426778242

the accuracy for w3 plus is 0.7718631178707225

the accuracy for w3 minus is 0.24267782426778242

the accuracy for w4 plus is 0.6730038022813688

the accuracy for w4 minus is 0.2510460251046025

total accuracy for w2 0.9841226911879345

total accuracy for w3 1.014540942138505

total accuracy for w4 0.9240498273859713

3.

﻿ #w3 is highest accuracy for S&P-500

#w3 is highest accuracy for JPM

Question 3:

2.

SPY:

﻿the accuracy for ensemble labels plus is 0.4894366197183099

the accuracy for ensemble labels minus is 0.4954128440366973

JPM:

﻿the accuracy for ensemble labels plus is 0.8250950570342205

the accuracy for ensemble labels minus is 0.11297071129707113

﻿ 3.

Did not improved in spy. For plus label, w2 is highest.

It does improve in JPM. For plus label, ensemble label is the highest one.

4.

Did not improved in spy. For minus label, w4 is highest

Did not improved in JPM. For minus label, w4 is highest.

Question 4 :

7.

Spy:

MAX, MIN

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| w | ticker | TP | FP | TN | FN | Accuracy | TPR | TNR |
| 2 | S&P-500 | 183 | 149 | 69 | 101 | 0.275 | 0.644 | 0.32 |
| 3 | S&P-500 | 160 | 112 | 106 | 124 | 0.422 | 0.563 | 0.486 |
| 4 | S&P-500 | 116 | 99 | 119 | 168 | 0.474 | 0.408 | 0.546 |
| ensemble | S&P-500 | 139 | 110 | 108 | 145 | 0.43 | 0.489 | 0.495 |

JPM:

MAX, MIN

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| w | ticker | TP | FP | TN | FN | Accuracy | TPR | TNR |
| 2 | JPM | 195 | 181 | 58 | 68 | 0.231 | 0.74 | 0.2426 |
| 3 | JPM | 203 | 181 | 58 | 60 | 0.231 | 0.77 | 0.2426 |
| 4 | JPM | 177 | 179 | 60 | 86 | 0.24 | 0.63 | 0.251 |
| ensemble | JPM | 217 | 212 | 27 | 46 | 0.108 | 0.83 | 0.11 |

8.

For spy,

W=2 has the highest TP and FP at same time. This means w=2 have too much positive.

W=4 has the highest accuracy rate.

All of the measure’s Accuracy is less than 0.5. This means that the accuracy rate is not as good as a random coin flip to decide.

For JPM, W=4 has the highest accuracy rate. Ensemble has the lowest accuracy.

However, Ensemble have the highest TPR.

Question 5:

1. .

SPY:

Chart

Description automatically generated

JPM:

Chart, line chart

Description automatically generated

2.

For SPY, the trend of the images is very similar, roughly going up together or down together. But the magnitude of the rise and fall does not seem to be the same. Although the starting points are the same, the green line is highest at the end and the orange line is lowest.

For JPM, In the image, from the beginning until near 900 days, all three methods earn about the same amount of money. But from 1000 days onwards, the green line starts to clearly distance itself from the two below.