**Task 1**

1. **Simulating geometric Brownian motion**

* Calculate the expectation value of S(3)

The expectation value of S(3) is calculated by using build-in function

“ np\_mean( )” on the a new matrix, S(3) formed by the last column value from each different row.

* Calculate the variance of S(3)

The variance of S(3) is calculated by using build-in function “ np\_var( )” on the a new matrix, S(3) formed by the last column value from each different row.

* Calculate P[S(3) > 39]

P[S(3) > 39] is calculated by summing up the value of S(3) which is greater than 39 using command “sum( )” and divide the result with the length of column,1000.

* Calculate E[S(3) | S(3) > 39]

Due to the given condition of S(3) > 39, I first sum up the prices which is greater than 39 by first multiplying the value of S(3) which is greater than 39 with the original final price matrix and sum them up using command “sum( )”. Then, I divide them with the sum of value of S(3) which is greater than 39.

1. **Simulating mean reversal process**

* Calculate the expectation value of R(1)

The expectation value of R(1) is calculated by using build-in function

“ np\_mean( )” on the a new matrix, R(1) formed by the last column value from each different row.

* Calculate P[R(1) > 2]

P[R(1) > 2] is calculated by summing up the value of R(1) which is greater than 2 using command “sum( )” and divide the result with the length of column,1000.

**Task 2**

1. FTSE Bursa Malaysia KLCI Index

* How many components stocks are there?

There are 30 components stocks.

* Create a table list of all the component stocks (See next page)

1. Downloading data

* I have chosen Sime Darby for my component of FTSEKLCI.
* The 5-day moving average is calculated by using build-in function “pd.rolling\_mean( )” to obtain the mean close price for the pass 5 days.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| No. | Stock Name | Stock Code | Stock Sector | Weightage in FTSEKLCI | P/E Ratio | Net Market Capital |
| 1 | AMMB | 1015 | Banks | 2.38 | 8.82 | 16.97B |
| 2 | Astro Malaysia | 6399 | Broadcasting & Entertainment | 1.22 | 28.22 | 15.76B |
| 3 | Axiata | 6888 | Mobile Telecommunications | 5.62 | 24.25 | 55.35B |
| 4 | British American Tobacco | 4162 | Tobacco | 1.7 | 20.05 | 18.45B |
| 5 | CIMB | 1023 | Banks | 5.76 | 17.52 | 46.694B |
| 6 | DiGi.Com | 6947 | Mobile Telecommunications | 4.16 | 21.01 | 41.83B |
| 7 | Genting | 3182 | Hotels | 3.68 | 19.85 | 30.96B |
| 8 | Genting Malaysia | 4715 | Hotels | 2.5 | 20.21 | 25.24B |
| 9 | Hong Leong Bank | 5819 | Banks | 1.67 | 11.18 | 25.68B |
| 10 | Hong Leong Financial | 1082 | Banks | 0.64 | 9.97 | 16.25B |
| 11 | IHH Healthcare | 5225 | Health Care Providers | 3.28 | 63.46 | 48.76B |
| 12 | IOI Corp | 1961 | Farming & Fishing | 2.99 | 73.65 | 27.26B |
| 13 | KLCC Property | 5235SS | Real Estate Holding & Development | 0.63 | 13.65 | 12.73B |
| 14 | Kuala Lumpur Kepong | 2445 | Farming & Fishing | 2.28 | 29.21 | 24.04B |
| 15 | Malayan Banking | 1155 | Banks | 9.32 | 12.42 | 88.04B |
| 16 | Maxis | 6012 | Mobile Telecommunications | 3.45 | 30.15 | 49.41B |
| 17 | MISC | 3816 | Marine Transportation | 2.45 | 16 | 35.26B |
| 18 | Petronas Chemicals | 5183 | Commodity Chemicals | 3.55 | 21.82 | 50.64B |
| 19 | Petronas Dagangan | 5681 | Integrated Oil & Gas | 1.21 | 37.02 | 20.45B |
| 20 | Petronas Gas | 6033 | Exploration & Production | 3.4 | 22.79 | 42.74B |
| 21 | PPB | 4065 | Food Products | 1.8 | 18.13 | 18.23B |
| 22 | Public Bank | 1295 | Banks | 11.6 | 15.22 | 73.76B |
| 23 | RHB Capital | 1066 | Banks | 1.06 | 9.18 | 19.13B |
| 24 | Sapurakencana Petrol | 5218 | Oil Equipment & Services | 1.98 | 12.08 | 14.32B |
| 25 | Sime Darby | 4197 | Diversified Industrials | 5.51 | 22.82 | 52.67B |
| 26 | Telekom Malaysia | 4863 | Fixed Line Telecommunications | 2.96 | 32.42 | 24.92B |
| 27 | Tenaga Nasional | 5347 | Alternative Electricity | 9.28 | 9.15 | 69.30B |
| 28 | Westports | 5246 | Transportation Services | 0.93 | 26.84 | 14.05B |
| 29 | UMW | 4588 | Automobiles | 1.37 | 20.61 | 11.99B |
| 30 | YTL Corp | 4677 | Multiutilities | 1.63 | 14.75 | 17.27B |