**UECM 3763 Assignment 2-REPORT**

**Task 1**

1. Using the solution to SDE- GBM, we find the ***Expectation Value & Variance*** of S(3) using the formula below:

Given, S(0)=39, μ=0.1, t=3;

= **52.6444935**

1. Variance of S(3) :

Given, σ =0.26;

= **623.0964723**

**Note:** We can check the value using theoretical value calculated from python coding.

1. Explanation on the methods and value obtained:
2. **Expectation**
3. From the ***Variable Explorer***, we look for the ***S*** variable, which is on the array form. Then, pick up **only the last column** of the array “S” which represent **stock price at time 3**.
4. Sum up the values and divide by 5 as the requirement is only for **5 runs**.
5. **Variance**
6. For each term in array “S3”, we have to **minus 1**.
7. Calculate variance using **np.var** function.
8. **P[S(3)> 39] and E[S(3) | S(3) > 39]**
9. For the question requiring piecewise function, we use special function called it ***mask***.
10. For the all the term in array S(3) which exceed 39, we set mask as it count will increase by 1. This continue for 5 runs.
11. We sum up the mask and divide it by ***len*** of mask as it return the number of element in the mask and we obtain P[S(3)> 39].
12. For E[S(3) | S(3) > 39], we multiply the mask with S3 and sum it as above. Then the final value of total divide by sum of the mask itself which represent total number of term in S3 that is bigger than S0=39.
13. Explanation on method and value obtained:
14. **Expectation value of R(1)**
15. We obtain only the last row of the array “R” which represent stock price at time 1 for each of the 5 run. Then, we assign the values to variable “R1”.
16. Sum up the values and divide by 5.
17. **P[R(1)>2]**
18. Set mask function for the last row of array which exceed by 2.
19. We sum the total numbers exceed by 2 and divided by number of path which is 5 and obtain the value for P[R(1)> 2].

**Task 2**

1. There are **30** component stocks in FTSE Bursa Malaysia KLCI Index.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Stock Name | Code | Stock Sector | Weightage(%) | PE Ratio | Net Market Capital (B) |
| Public Bank Bhd | 1295 | Banks | 11.6 | 15.2 | 73.29 |
| Malayan Banking | 1155 | Banks | 9.32 | 12.39 | 87.75 |
| Tenaga Nasional | 5347 | Alternative Electricity | 9.28 | 9.31 | 69.76 |
| CIMB Group Holdings | 1023 | Banks | 5.76 | 17.51 | 46.52 |
| Axiata Group Bhd | 6888 | Mobile Telecommunications | 5.62 | 24.31 | 55.43 |
| Sime Darby Bhd | 4197 | Diversified Industrials | 5.51 | 20.8 | 52.09 |
| Digi.com | 6947 | Mobile Telecommunications | 4.16 | 20.81 | 42.06 |
| Genting | 3182 | Hotels | 3.68 | 16.5 | 30.86 |
| PETRONAS Chemicals Group Bhd | 5183 | Commodity Chemicals | 3.55 | 22.07 | 51.2 |
| Maxis Bhd | 6012 | Mobile Telecommunications | 3.45 | 29.73 | 48.88 |
| Petronas Gas | 6033 | Exploration & Production | 3.4 | 22.51 | 42.23 |
| IHH Healthcare | 5225 | Health Care Providers | 3.28 | 63.12 | 48.25 |
| IOI | 1961 | Farming & Fishing | 2.99 | 66.31 | 27.24 |
| Telekom Malaysia | 4863 | Fixed Line Telecommunications | 2.96 | 32.79 | 24.88 |
| Genting Malaysia Bhd | 4715 | Hotels | 2.5 | 20.14 | 23.99 |
| MISC | 3816 | Marine Transportation | 2.45 | 16.28 | 35.89 |
| AMMB Holdings | 1015 | Banks | 2.38 | 9.22 | 17.67 |
| Kuala Lumpur Kepong | 2445 | Farming & Fishing | 2.28 | 29.83 | 24.49 |
| SapuraKencana Petroleum | 5218 | Oil Equipment & Services | 1.98 | 11.97 | 14.15 |
| PBB Group | 4065 | Food Products | 1.8 | 17.74 | 17.83 |
| British American Tobacco (Malaysia) | 4162 | Tobacco | 1.7 | 20.67 | 19.02 |
| Hong Leong Bank | 5819 | Banks | 1.67 | 11.01 | 23.66 |
| YTL Corp | 4677 | Multiutilities | 1.63 | 14.81 | 16.67 |
| UMW Holdings | 4588 | Automobiles | 1.37 | 20.4 | 11.87 |
| Astro Malaysia Holdings | 6399 | Broadcasting & Entertainment | 1.22 | 28.41 | 15.81 |
| Petronas Dagangan Bhd | 5681 | Intrgrated Oil & Gas | 1.21 | 37.12 | 20.5 |
| RHB Capital | 1066 | Banks | 1.06 | 9.47 | 19.58 |
| Westports Holdings | 5246 | Transportation Services | 0.93 | 27.44 | 14.36 |
| Hong Leong Financial | 1082 | Banks | 0.64 | 10.21 | 16.62 |
| KLCC Prop & Reits - Stapled Sec | 5235SS | Real Estate Holding & Development | 0.63 | 26.42 | 12.64 |

(Details at 22 June 2015)

***TABLE 1: FTSE Bursa Malaysia KLCI Index***

1. Explanation for method to calculate the **5-day moving average**:

A 5-day moving average is the 5-day **sum of closing prices divided by 5**.

1. We choose Tenaga Nasional counter for this part.
2. We create a matrix function and calculate the moving average manually.
3. We take the sum of the first 5-days of closing price and divide by 5. This is the first moving average. For the second moving average, we drop the first day and sum 2,3,4,5, & 6 day of the closing price and then divide by 5. This continues till the end (from 2010-2013).