MA323(Lab-09)

Jatin Dhingra
Roll no. 180123060
Mathematics and Computing

For Part A, Payoff of an average Asian Put option is calculated using Formulae given in Assignment pdf. Stock Value is calculated using $S(t_{i+1}) = S(t_i)\exp\left(\left(\mu - \frac{1}{2}\sigma^2\right)(t_{i+1}-t_i) + \sigma\sqrt{t_{i+1}-t_i}\,Z_{i+1}\right)$ Then, Mean, Variance and 95% Confidence Interval is calculated.

For Part B, First of all b is calculated using formulae given in Lecture 9. Then Yi is calculated to reduce variance.
Then Mean, Variance and 95% Confidence Interval is calculated.
All these values are tabulated in table shown below:

Payoff of an average price Asian put option	Mean	Variance	95% Confidence Interval
Part A	17.724014	0.810867	[17.673756, 17.774272]
Part B(Using Control Variates)	17.724014	0.810536	[17.673776, 17.774251]

Screenshot of Code is shown on right side:

```
jatin@jatin-Lenovo-ideapad-330-15IKB:~/Desktop/Sem/MonteCarlo/9$ python 180123060_JATIN_Code.py
    Part 1
    Mean: 17.724014
    Variance: 0.810867
    95Percent Confidence Interval: [17.673756, 17.774272]


    Part 2 (Using Control Variables)
    Value of b: 0.001057
    Mean: 17.724014
    Variance: 0.810536
    95Percent Confidence Interval: [17.673776, 17.774251]
```