Group D

1. The code compile successfully. I wrote two generic functions and integrate them into the TestMC.cpp.
2. Run the MC program again with data from Batches 1 and 2. Experiment with different values of NT (time steps) and NSIM (simulations or draws). How do SD and SE react for these different run parameters, and is there any pattern in regards to the accuracy of the MC (when compared to the exact method)?

Ans:

Batch 1 Call:

Exact solution is 2.13337



Batch 1 Put:

Exact solution is 5.84628



Batch 2 Call:

Exact solution is 7.96557



Batch 2 Put:

Exact solution is 7.96557



In general, the difference at NT = 1000 is smaller than at NT = 500. This situation implies that increasing the number of time steps (NT) is associated with a reduction in the difference between the Monte Carlo estimates and the exact solution.

The consistency of Standard Deviation at similar levels when NSIM increases implies that the variability or spread of the Monte Carlo estimates remains stable with a higher number of simulations. This suggests that the method stabilizes and converges to a consistent level of accuracy.

The gradual decrease in Standard Error (SE) when NSIM increases is a positive sign. A lower SE indicates that the estimate of the mean becomes more precise with more simulations. This situation aligns with the Law of Large Numbers, where a larger sample size leads to a more accurate estimation of the population mean.