Introduction to Financial Engineering and Algorithms
Programming Assignment 3 (Spring 2016)

Unless you can provide your own demonstration platform, please specify the programming language you will use and tell the TA. This will be critical for demonstration purpose. The maximum score for this exercise is 100 points.

1. (60 points) Write a computer program that implements Monte Carlo simulation to price European-style call options. A sample test data from the previous homework is $S_0 = 90$, $X = 95$ (strike price), $T = 0.5$ (6 months), $\sigma = 0.30$ (30%), and $r = 2\%$. The call price is 5.9111. You may want to observe the convergence by setting the path numbers from $N = 100, 1000, 10000, 100000$ or even more if you have the computation resource.

2. (40 points) Write a computer program that implements Monte Carlo simulation to price European-style Asian call options. A sample test data is $S_0 = 100$, $X = 100$, $T = 1.0$, $\sigma = 10\%$, and $r = 5\%$. The price is approximately 3.6413864. Another test data is $S_0 = 100$, $X = 105$, $T = 1$, $\sigma = 50\%$, and $r = 9\%$. The price is approximately 10.929736.