Homework 2

For plain vanilla calls and puts, implement the following option pricing methods:

- Basic requirement (80 points):

  $$\begin{cases} \text{Black-Scholes formulas (for European options)} \\ \text{Monte Carlo simulation (for European options)} \\ \text{CRR binomial tree model (for both European and American options)} \end{cases}$$

  (Inputs: S_0, K, r, q, σ, T, number of simulations, number of repetitions, n. Outputs: Option values for all methods and 95% confidence interval for Monte Carlo simulation.)

- Bonus 1 (5 points):

  Implement the CRR binomial tree with one column vector.

- Bonus 2 (5 points):

  Implement the combinatorial method to price European options.