

# Assignment 2

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

- Basic requirement (80 points):

- Black-Scholes formulas (for European calls and puts)
- Monte Carlo simulation (for European calls and puts)
- CRR binomial tree model (for both European and American calls and puts)

(Inputs:  $S_0$ ,  $K$ ,  $r$ ,  $q$ ,  $\sigma$ ,  $T$ , 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 calls and puts.