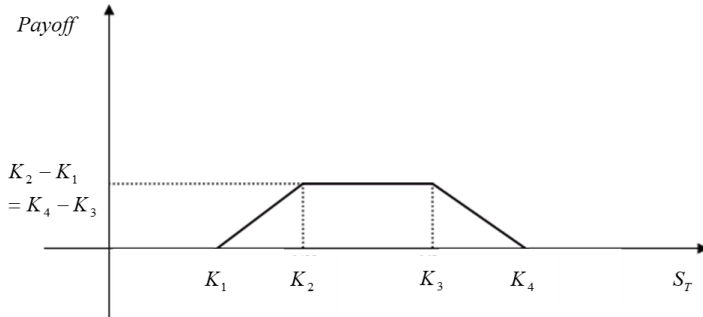


## Hw2 Martingale

### Description:

A derivative has a payoff structure which is shown in Figure 1. Use the martingale pricing method to derive its Black-Scholes formula first, and then calculate its price with the formula and Monte Carlo simulation, respectively.

Figure 1



### User Manual:

Double click “Hw2 Martingale.exe”

→Click “Input” at the upper left corner of the window

→Input the following parameters in the dialogue box:

S: Current stock price

r: One-year risk-free interest rate (e.g., 10%  $\Rightarrow r = 0.1$ )

T: Expiration date (e.g., 6 months  $\Rightarrow T = 0.5$ )

Sigma: One-year volatility (e.g., 30%  $\Rightarrow \text{Sigma} = 0.3$ )

q: One-year dividend yield (e.g., 2%  $\Rightarrow q = 0.02$ )

K1: The first strike price

K2: The second strike price

K3: The third strike price

Pricing Method: Use Black-Scholes formulas (Black-Scholes) or Monte Carlo simulation (Monte Carlo). If “Monte Carlo” is checked, specify the number of outer simulation (m).

→Click “OK” at the lower right corner of the dialogue box (or “Cancel” if you would like to exit the dialogue box)

→Calculation result will be shown on the display area of the window

→If you would like to perform another calculation, click “Input” at the upper left corner and repeat the process above. (The dialogue box will save the parameters you input last time.) Or you can click “X” at the upper right corner of the window to exit the program.