Homework 2:

1. For a BAPM with $N = 2$, $r = \frac{1}{5}$, $u = 2$, $d = \frac{1}{2}$, and $S_0 = 8$, determine the arbitrage free price of a European put option with strike $K = 10$ and its replicating strategy.

2. For a BAPM with $N = 3$, $r = .1$, $u = 1.5$, $d = .9$, and $S_0 = 7.43$, determine the arbitrage free price of a floating strike Lookback option $(S_{\max} - S_N)$ and its replicating strategy.

3. For a BAPM with $N = 3$, $r = .1$, $u = 1.5$, $d = .9$, and $S_0 = 7.43$, determine the arbitrage free price of an Asian call option ($V_N = (S_{ave} - S_N)_+$, with S_{ave} being the arithmetic average, and payoff only at maturity) and its replicating strategy.

4. For a BAPM with $N = 3$, $r = \frac{1}{5}$, $u = 2$, $d = \frac{1}{2}$, $p = \frac{1}{2}$, and $S_0 = 8$, express the following:

   (a) $\mathbb{E}[S_N]$ and $\widetilde{\mathbb{E}}[S_N]$

   (b) $\mathbb{E}_2[S_N]$

   (c) $\widetilde{\mathbb{E}}_1[S_3]$

   The following problems come from Shreve Volume 1:

5. Problem 1.6

6. Problem 1.8

7. Problem 2.4

8. Problem 2.11