Homework 6:

For this homework, you'll be working with two binomial interest rate models, one which follows Ho-Lee and one which follows Black-Derman Toy. The risk-neutral probabilities for both will be $\tilde{p} = \tilde{q} = \frac{1}{2}$, with the other parameters given by

For the Ho-Lee

n	a_n	b_n
0	.04	
1	.036	.008
2	.032	.006
3	.028	.006

and for the BDT

n	a_n	b_n
0	.04	
1	.035	1.5
2	.03	1.5
3	.025	1.5

1. For a fixed rate of $K = .04$, using both models, determine the values of Cap_2 and Floor_2

2. Using the BDT model, express the 4-forward measure, $\widetilde{\mathbb{P}}^4$ for every $\omega_1\omega_2\omega_3$ (so for three tossings of the coin).

3. Let $S_2 = B_{2,4}$ be the value of a zero-coupon bond issued at time 2 that matures at time 4 (for a face value of 1). For the Ho-Lee model, what is $\text{Fut}_{0,2}$? For 10 bonus points, answer the same question for the BDT model.

