Assignment 2
(Due on June 10, 2015)

Please solve the following questions. Please make sure that you **write down the names of all of your group members**. The assignment is due at the **beginning of class** on the due date. Please show all the intermediate steps and calculations when solving the problems and state your assumptions (if any). Please **type** your answers.

1. Draw the expiration date payoff diagrams for the following investment strategies: (You can draw by hand.)

   (a) Buy a put option with a strike price of $30, sell a put option with a strike price of $80 and borrow the present value of $50 at the risk-free rate.
   (b) Buy a call option with a strike price of $100, sell a call option with a strike price of $150 and buy a share of stock.

2. ABC Corp's stock is currently trading at $51. Over the next year, the stock can either increase by 10% with 60% probability or it can decrease by 10% with 40% probability. Using the portfolio replication approach, compute the current put option premium on ABC Corp's stock assuming the following: the exercise price on the put option is $53 and it expires in one year. T-bills yield 7%.

3. Consider a 3-month American call option on a non-dividend-paying stock when the stock price is $100, the strike price is $95, the risk-free interest rate is 8% per annum, and the volatility is 30% per annum. Suppose that we divide the life of the option into three intervals of length 1 month for the purposes of constructing a binomial tree. Determine the price of this call option today using "binomial approach".

4. ABC Corp. is considering an investment project over the next period. It has an equal chance of success and failure. If it succeeds, the firm's assets will have a market value of $40 million, and if it fails, the market value will drop to $10 million. The current market value of the firm's asset is $25 million. Also, the firm currently has bonds outstanding with $15 million of promised payment to bondholders at their maturity, which is the end of the period. What is the firm's equity value? Assume that the risk-free rate over the next period is 10%. (Hint: Use the binomial approach)

5. XYZ Corp.'s stock is currently selling at $13 per share. There are 1 million shares outstanding. The firm is planning to raise $2million to finance a new project. What is the ex-right stock price, the value of a right, and the appropriate subscription prices, if
   (a) Two share of outstanding stock are entitled to purchase one additional share of the new issue.
   (b) Four shares of outstanding stock are entitled to purchase one additional share of the new issue.
   (c) How does the stockholders' wealth change from a to b?

6. ABC Corp. stock is currently selling for $30 per share. It is expected that the stock price will be either $25 or $35 in six months. Treasury bills that will mature in six months yield 5 percent. What is the price of ABC Corp. put option per share that has an exercise price of $32? ABC Corp. put is a European option.

7. XYZ LTD., is undertaking a new project. If the project is successful, the value of the firm in a year will be $650 million, but if it turns out to be a failure, the firm will be worth only $250 million. The current value of the firm is $400 million. The firm has outstanding bonds due in a year with a face value of $300 million. The T-bill rate is 7 percent. What is the value of the equity? What is the value of the debt?

8. ABC Corp. has 4 million shares of common stock outstanding. The company has 500,000 warrants being traded in the market. Each warrant has the right to buy one share of common stock at $20 per share. The warrant will expire one year from today. ABC Corp. stock is selling for $22 per share and the volatility of the return on stock is 0.005. The risk-free rate is 5 percent. Estimate the warrant value.