FE-620 – Assignment 3

Problem 1.

The one-year LIBOR rate is 3% and the forward rate for the one- to two-year period is 3.2%. The three-year swap rate for a swap with annual payments is 3.2%. What is the LIBOR forward rate for the 2 to 3 year period if OIS zero rates for one, two, and three year maturities are 2.5%, 2.7%, and 2.9%, respectively. What is the value of a three-year swap where 4% is received and LIBOR is paid on a principal of $100 million. All rates are annually compounded.

Problem 2.

In an interest rate swap, a financial institution has agreed to pay 3.6% per annum and to receive three-month LIBOR in return on a notional principal of $100 million with payments being exchanged every three months. The swap has a remaining life of 14 months. Three-month forward LIBOR for all maturities is currently 4% per annum. The three-month LIBOR rate one month ago was 3.2% per annum. OIS rates for all maturities are currently 3.8% with continuous compounding. All other rates are compounded quarterly. What is the value of the swap?

Problem 3.

Company A, a British manufacturer, wishes to borrow U.S. dollars at a fixed rate of interest. Company B, a U.S. multinational, wishes to borrow sterling at a fixed rate of interest. They have been quoted the following rates per annum (adjusted for differential tax effects):

	Sterling	*US Dollars*
Company A	*11.0%*	*7.0%*
Company B	*10.6%*	*6.2%*

Design a swap that will net a bank, acting as intermediary, 10 basis points per annum and that will produce a gain of 15 basis points per annum for each of the two companies.

Problem 4.

A trader writes five naked put option contracts, with each contract being on 100 shares. The option price is $10, the time to maturity is six months, and the strike price is $64.
(a) What is the margin requirement if the stock price is $58?
(b) How would the answer to (a) change if the rules for index options applied?
(c) How would the answer to (a) change if the stock price were $70?
(d) How would the answer to (a) change if the trader is buying instead of selling the options?

Problem 5.

The price of a stock is $40. The price of a one-year European put option on the stock with a strike price of $30 is quoted as $7 and the price of a one-year European call option on the stock with a strike price of $50 is quoted as $5. Suppose that an investor buys 100 shares, shorts 100 call options, and buys 100 put options. Draw a diagram illustrating how the investor's profit or loss varies with the stock price over the next year. How does your answer change if the investor buys 100 shares, shorts 200 call options, and buys 200 put options?