The Big Picture of Finance and how 510-A fits in.

Financial markets provide a rich source of information to enable decision makers to maximize monetary worth or value. You need a key to unlock this information.

You should envision financial markets (the stock market, the market for bonds, options markets, futures markets, . . .) as complex algorithms that translate everything known about the future into a current dollar value. A big part of becoming financially literate is developing an appreciation of this fact and everything that it entails.

Because of the richness of this information and the complexity of this algorithm, we spend a lot of time developing an understanding of specific markets. There are two conventions in US markets that I will provide as examples: settlement and dealers' bid-ask spread. Suppose you want to buy 100 shares of 3M stock.

We look the stock up on a financial information provider such as Bloomberg or our broker's screen. We may see a single price, which is likely the price at which the previous transaction took place. But there are in fact 2 different prices – one for a buyer and one for a seller. For example: Bid: 213.19 Ask: 213.24. If you submit a market order to buy 100 shares, a dealer is standing ready to sell to you at $213.24 per share. If you submit an order to sell 100 shares a dealer is standing ready to buy from you at $213.19 per share.

Let's say we buy 100 shares. We will receive an immediate notice that we bought 100 shares at $213.24 per share. There is a 2-business day settlement period in US equities. That means that we will not receive the shares and the money will not be taken from our cash account for 2 days.

Another extremely important feature of financial markets is that you do not have to own something in order to sell it. Why would we want to sell 3M stock without owning it? This is called short-selling, and there are several motivations. The simplest is that you think the stock price will fall, and you want to profit when it does. In this case you submit an order to short sell 100 shares of 3M stock, and you receive immediate notification that your order is executed. Now you have to borrow the shares from someone who owns them in order to deliver the shares to the buyer on the settlement day. You will post the cash that you receive in return with the firm that loaned you the stock, as collateral. You close a short position by buying the stock and returning the shares to the firm that loaned them to you. As an example, suppose that after one month, 3M is quoted at $233.67 bid and $233.75 ask. You close your short position by buying 100 shares. After 2 days $23,375 in cash will be taken from your account, and 100 shares will be deposited into your account. You then return these 100 shares to the firm who loaned you the shares to close out your short position. In this example, your cash results are as follows:

Initial Settlement Date	1 month later
Receive Cash: $21,319	Pay Cash: $23,375
Deposit Cash with Securities Lender	Return stock to securities lender

Profit / Loss: 21,319 – 23,375 = -$2,056

Depending on market conditions, we may earn interest on our cash collateral, which would reduce our loss by a small amount. (Technically the exchange of our cash for the borrowed stock is a repurchase transaction (repo). The interest rate we earn on our cash is the repo rate. Repo markets are a large part of our Fixed Income elective.)

Why do we look at the market in such detail in an introductory finance class?

1. Financial markets are where transactions take place – these transactions are similar in some ways to going to Fry's and buying a gallon of milk, but different in important ways.
2. The fact that we can buy and short-sell with equal facility is one of the reasons that the market as (information-processing) algorithm analogy works.
3. Dealership is an important financial function.
4. We will look at arbitrage examples where we buy one financial security and sell another security simultaneously. This will require you to be comfortable with the idea of short selling.
5. In the news this month Elon Musk is vigorously complaining that short-selling should be illegal. Why? Is he right? Why not?

Only one thing generates value: cash. The value of anything is the discounted expected value of the expected (future) cash flows that the thing generates. This statement highlights the importance of cash and it has rich layers of subtlety. One of the thorny details is *how* we discount. Discounting has to account for three things:

1. The passage of time;
2. The probability distribution of the cash flows;
3. Compensation for risk.

Our goal in FIN 510-A is to develop an understanding of how discounting works, and how it accomplishes these 3 things.

Our first backward engineering of the complex algorithm that is the market looks at the market for US Treasury securities. Here a promise from the US Treasury to pay cash in the future is given a value. We assume that there is no risk that the promised cash flows will not be made so that the only reason that the price of a US

Treasury contractual obligation to pay $100 in one year is not $100 today is the passage of time.