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# Stock Market Simulation

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# Stock Market Simulation

An Interactive Qualifying Project Report Submitted to the faculty of the

WORCESTER POLYTECHNIC INSTITUTE

In partial fulfillment of the requirements for the

Degree of Bachelor of Science

By

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Muxun Zhao

Date:

June 2006

Approved by:

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Professor Dalin Tang, Project Advisor

## **Abstract**

During this project, a short-term stock market trading simulation was performed based on the information and resources obtained from books as well as from the internet. As the simulation proceeded, it was slowly realized that stock trading in general is a worrying job. It is very hard to “time the market”, i.e., to decide when is the perfect time to buy or sell. The experiences gained will definitely help me to become a better investor in the future.

## **Acknowledgement**

I would like to offer my appreciation first to Dalin Tang, Professor, Mathematical Science Department, Worcester Polytechnic Institute, who gave me precious advice for the project. I would also like to thank my parents for the essential support they provided.

# Table of contents

## **Chapter 1 Introduction**

<b>1.1 Goals .....</b>	<b>6</b>
<b>1.2 Introduction to stocks .....</b>	<b>6</b>
1.2.1 Definition of stocks .....	6
1.2.2 Identifying and Classifying Stocks .....	8
<b>1.3 Stock Market .....</b>	<b>9</b>
1.3.1 Definition of Stock Market .....	9
1.3.2 History of Stock Market .....	10
1.3.3 Today's Stock Market .....	10
1.3.4 Risks in Stock market .....	16
1.3.5 Stock price and quote .....	17

## **Chapter 2 Investment Strategies**

<b>2.1 Investment overview .....</b>	<b>19</b>
2.1.1 Bonds .....	19
2.1.2 Mutual bonds .....	20
2.1.3 Cash .....	22
2.1.4 Real estate .....	22
<b>2.2 Long-term trading strategies .....</b>	<b>23</b>
<b>2.3 Short-term trading strategies .....</b>	<b>25</b>

**Chapter 3 Selecting Companies**

**3.1 How to choose stocks? ..... 28**

    3.1.1 Fundamental analysis ..... 28

    3.1.2 Technical analysis ..... 34

**3.2 Selected-company profiles ..... 40**

**Chapter 4 Simulation**

**4.1 Trading dairy and data ..... 57**

**4.2 Analysis ..... 60**

**Chapter 5 Conclusion ..... 70**

**References .....72**

## **Chapter 1: Introduction**

### **1.1 Goal of the project**

My primary goal of this project is to achieve a basic understanding of the stock market through learning from books and the internet and trading stocks through a short-term stock market simulation. To achieve this primary goal, several objectives were set up based on the timetable following which the project was performed. First, to have a brief understanding of the stock market, terminology and definition are required and were obtained and studied from books and internet resources. After achieving this objective, short-term trading method in stock market was reviewed and studied to gain a reasonable understanding before I actually started the investment. Visiting local stock exchange places might help to learn more about the trading method. The final objective was to accumulate trading experience which was achieved through the simulation. The simulation performance was analyzed at the end of the trading period. With the accomplishment of the goals and objectives above, the stock market simulation project would definitely help me to become a better investor in the future.

### **1.2 Introduction to stocks**

#### **1.2.1 Definition of stocks**

Owners of corporations always need money to hire more employees and build more factories. In order to attract money, corporations issue shares of stock to the public, which may be understood as selling part of the corporation. Investors who believe the stocks

would worth more than the price they were sold for willing buy the stocks. If the corporation is successful, the price of the stock will go up. On the contrary, stock price will go down if the corporation is not well operated. The corporation may also pay out dividends to the investors if it has made profits.

Though most people use the terms “stock”, “security”, and “equity”, they all mean the same thing. The word “stock” originally came from the word “livestock”. [1 p4] However, instead of trading sheep and cows, people trade pieces of paper— shares — which represent a claim on a corporation's assets and earnings. Holding stocks of a corporation means that you are one of the many owners. You may also be referred to as a shareholder. Therefore, the more shares of stock you own of this corporation, the more you can control of this corporation. Usually, individual investors don't hold enough amounts of stocks to control how the corporation is managed. It has to be the billionaire entrepreneurs who own millions of shares of stock to make the decisions.

When you buy the stock of a corporation, you will receive a fancy-looking piece of paper that proves you have invested in this corporation—stock certificate. Most of the time, people let a brokerage firm keep the stock certificates for them instead of keeping by themselves. Brokerage firms usually keep the records in computers. This made stock trading a lot easier—people don't need to bring the paper certificates to the brokerage. A call or a click on the mouse can solve all the problems.

## **1.2.2 Identifying and Classifying Stocks**

### **1.2.2.1 “Sectors”**

The word “Sector” is closely related to stocks. Stocks are usually divided into several different groups called sectors. Basically, corporations in each sector provide same services, product or belong to the same industry. Sectors become rather important when deciding which stock to buy. The reason behind is that no matter the economy appears good or not, there will always be sectors that are earning money and are doing poorly. Choosing the up-going sectors will provide more opportunity for the investment to be profitable.

### **1.2.2.2 Different kinds of stocks**

Some corporations sell their stocks at a relatively low price compared with their true value. These stocks are called value stocks. [1, p31] The prices of value stocks are likely to increase in the future but not as fast as other hot corporations. Nevertheless, low price stocks do not always indicating they are actually value stocks. Many research work need to be done before determining whether a stock is a real value stock.

As mentioned above, low price stocks do not have to be value stocks. Penny stocks—as their name show—are stocks with prices usually lower than a dollar. These corporations often don’t meet the requirements to trade on major exchanges. Almost everyone can afford to buy penny stocks, but not everyone can make money out of it. Penny stocks’ prices are low for certain reasons—there aren’t enough people want the

stocks because of maybe poor operation or earning too little. With few buyers, the prices of penny stocks are extremely easy to be affected by only one trade.

Growth stocks are the stocks of corporations that are constantly earning money and are highly expected to grow faster than the competition. [1, p31] Due to the fact that enough investors believe the corporation will make outstanding business achievement, the prices of growths stocks are still high even if the corporations are not earning significant amount of money.

Many corporations pay out the profits to the shareholders, which are also known as dividends. Stocks of these corporations are called income stocks or dividend stocks. Usually, the prices of dividend stocks are featured with fewer fluctuations.

## **1.3 Stock Market**

### **1.3.1 Definition of Stock Market**

Many people are confused by the word “Stock Market”. Does “Stock Market” actually refer to a physical place or it is just an abstract idea? In fact, the purpose of a stock market is just to link up buyers and sellers. Most stocks can be traded on exchanges, where buyers and sellers can meet and discuss the prices. Some exchanges are the physical locations that contain trading floors. While there is also another kind of exchanges which are composed of computers that trades electrically. [2 sec4] Conclusively, we can say that Stock Market is the place where buyers and sellers meet.

### **1.3.2 History of Stock Market**

Buyers and sellers meet in the street before the stock market was formed. The founding of the first stock exchange actually took place in Philadelphia in 1790. [4 sec3] At the same time, in New York, people met every weekday under a button wood tree on Wall Street. Wall Street was named after the wooden wall Dutch colonists built in this area in 1653 to defend themselves from the British and Native Americans. [4 sec2] In 1792, a group of 24 brokers and merchants met and agreed to open a similar exchange in New York. This is the humble beginning of the New York Stock Exchange (NYSE). [3 sec1] The brokers and merchants managed to move their offices into the New York Stock Exchange building, which still sits on Wall Street today.

From 1920 to the 1929, the level of stock prices increased more than three times. [5 sec1] But the stock market crashed on Tuesday, October 29, 1929. Shareholders panicked and sold their stocks no matter how much they could get. The market crashed again in 1987 when the Dow Jones suffered the largest single-day loss in the stock market history—fell from 2246 to 1738. [6 sec8] After these crashes, efforts have been made to reduce the possibility of another crash.

### **1.3.3 Today's Stock Market**

#### **1.3.3.1 Three Major Stock Exchanges**

Stock Market has been regarded as the symbol of commerce in today's world. Stock exchanges are located in almost every country of the world. Among all the stock

exchanges, there are three major stock exchanges: New York Stock Exchange (NYSE), American Stock Exchange (AMEX), and National Association of securities Dealers Automated Quotation System (NASDAQ).

New York Stock Exchange's (NYSE) is a listed exchange because most of the trading is done face-to-face on the trading floor. It is the market where big corporations trade, such as General Electric, Wal-mart, Coca-Cola, Walt Disney, Johnson & Johnson, and Hewlett-Packard.

After the New York Stock Exchange was formed, brokers who were trading stocks not good enough for New York Stock Exchange established another stock exchange--American Stock Exchange (AMEX).

In 1971, the first electronic stock exchange-- National Association of securities Dealers Automated Quotation System (NASDAQ) -- was established. It has no trading floor. It is also known as the over-the-counter market where stocks can be bought and sold through licensed brokers online. In order to compete more effectively with NYSE, National Association of Securities (NASD), who owns Nasdaq, bought the AMEX. Nasdaq now has many big technology corporations such as Microsoft, Cisco, Inter, and Dell, which made Nasdaq extremely competitive against NYSE. [1 p6]

### **1.3.3.2 Different traders**

There are three types of people who investing in the stock market today.

Individual investors are the investors that buy stocks they believe will worth more

and hold their stocks for a long term, a year or longer. These people usually don't worry about the daily market's rise and fall.

Opposite to individual investors, short-term traders are people who take advantage and make money from the daily stock price fluctuation. These people don't care about corporation's business at all. All they care is the price of stocks. They might even sale the stock 10 minutes after the purchase. Why do they need to worry whether the corporation is making money or not in the long term?

The third type of traders is professional traders, who use other people's money to trade. Professional traders include people who work in the brokerages or stick exchanges and also other institutional trader. [1, p8-10]

### **1.3.3.3 Do you know how the market did today?**

It is quite obvious if a stock is going up and down. Stock prices change from time to time because of supply and demand. When there is more people willing to buy the stock, the price will go up, and opposite wise, when people don't want the stock, the price will go down. But is there a way for people to tell how the market do generally? The answer is yes.

Usually people look at Dow Jones Industrial Average (DJIA) to see how the market is doing. The Dow Jones Industrial Average is basically the average of numbers of stocks' prices of the day. At first, only 12 railroad stocks were included in the average and the average was called Dow Jones transportation average. Later, Dow Jones Industrial

Average was launched. The Dow Jones Industrial average was consisted of 12 biggest and most powerful stocks of the time, for example, General Electric. Today, the number of stocks contained in Dow Jones Industrial Average has been increased to 30. Therefore the index is also called Dow 30. Stocks in Dow 30 which all come from important sectors of the market are Alcoa, American express Co., AT&T Corp., Boeing CO., Caterpilla, Inc., Citigroup, Inc., Coca-Cola Co., DuPont Co., Eastman Kodak Co., ExxonMobil Corp., General Electric Co., General Motors Corp., Hewlett-Packard Co., Home Depot, Honeywell International Inc., Intel Corp, International Business machines Corp., International Paper Co., J.P. Morgan Chase, Johnson & Johnson, McDonald's Corp, Merck & Co, Microsoft, Minnesota Mining and Manufacturing Co., Philip Morris and Co., Procter & Gamble Co., SBC Communications, United Technologies Corp., Wal-Mart Stores, Inc., and Walt Disney Co.. [1 p16-17] It is easy to find out how the Dow did each day. You may find it from internet, television, and from newspaper. Therefore, when people report that the market is going up, what they really refer to is the 30 stocks that includes in the Dow. There are times that your stock is still going down when the Dow is up.

Other indexes have been created to track the stock market as well. The second popular index after Dow is the Nasdaq composite Index which includes more than 5000 stock listed on the NASDAQ. The third most popular index is S & P 500. There are 500 stocks that Standard & Poor's Corporation uses to show the market's performance. Russell 2000 index and Wilshire 5000 are also useful index that many people and

professional managers prefer.

In the history of stock market, the market had experienced constant stock prices-declining several times. During these periods, the major indexes—Dow, Nasdaq and S&P 500 are all declining. Officially market of these times is called bear market. Generally, the economy is also weak. Many corporations are losing money. The bear market is so depressing that even many brokerages begin to lay off employees. If the bear market lasts a long time, usually it suggests that the recession is coming.

On the other way, there are times when the market is very profitable. People then are quite optimistic about stock and are flushing to Wall Street to buy. This is when the market is called a bull market. All the indexes go up due to the large demand. It is really a good chance to make money.

Sometimes, the indexes try to go up or down but just always stop at where it starts. The market is so called sideways market. In the history, the indexes didn't go any higher or lower after the 1929's crash. Started from 1966, the Dow spent 16 years to break 1000. [1 p27] People were holding their money and chose not to buy any stocks during those periods.

#### **1.3.3.4 Types of order you can place**

When trading in stock market, there are several ways that you can buy stocks.

Market order is the most common type of order. It is filled very fast. What you pay for the stock is what listed there. If you want to buy stock quickly, you use market order

and pay the market price.

The second type of order is call limit order. It is a little more complex than the market order mentioned above. When you use limit order, you decide the price at which you want to buy the stock. But of course the limit order takes more time to fill. If you think you can get a stock at a better price than what is listed now, you can place a limit order at the price you want. If the stock fall to the price you placed the order, then the order will be filled. However, there is possibility that your order may never be filled, since the stock price may never fall to your price. You also need to choose how long you want the limit order to be valid. The order could be good for the day only or good until you cancel it, which is called good-till-canceled order (GTC). If the stock doesn't make your price today, your order will be automatically canceled if a good for the day order was placed. With a GTC, you have the advantage that you can go and do your other business, since it will always be valid unless you cancel it.

There is also an order that can help you lose less money or protect your profits—stop - loss order. Stop-loss order can make brokerage sell your stock at the certain price you specify when the price drops. Many people, including many professional managers, do not prefer this stop-loss order. They believe that if the price of the stock drops, it is a good time to buy the stock rather than sell it. Of course this stop-loss order can't satisfy everybody, but the good thing about it is that it really can protect you from losing everything.

### **1.3.4 Risks in Stock market**

Stock market is very complicated and confusing. Many investors find it hard to decide which stock to buy, how many shares to buy, when to sell it, and when to buy more. The market is also unpredictable that nobody can tell when the price rises, how much it rises or how long the rise would last. Many people tried to reduce the risk and uncertainty with study more about the market and the stock. They might success in minimizing the risk but they can never avoid it.

There are several kinds of risks that exist in the market today. The first type of risks that many people would first think of should be the market risk. It is closely related to the fluctuation of the stock prices. Since many factors can result in the changes of the prices, such as start new business, in debt, and general attitude about the stock market, the market risk can easily affect the value of investment. To reduce the risks, either diversify your investment or invest for long-term profits will work. [7, sec1]

Inflation risk is defined as a persistent increase in prices, is a serious risk for any long-term investor. A good way to reduce the risk is to invest in growth assets. [7, sec 2]

Business risk is the risk that you lose your money in the investments that seemed like a winner but wasn't. Also diversifying your investments can reduce the risk. [7, sec 3]

Currency Risk is the risk brought up by the price fluctuation in the dollar value due to the exchange rates. If the exchange rates drop and the dollar worth less, of course that your stock will be worth less. [7, sec 4 &5]

People may think that if they don't invest in the stock market, then there will be no

risks that need to be worried about. In fact, risks are always existing, no matter you invest in stock market or not. Therefore, do not be scared to invest. After all, stock has been the best type of investment over the last 75 years. [1, p14]

### 1.3.5 Stock price and quote

A stock quote is the current price of a stock. It is the most important information for most of the investors. Stock quotes also have big impact on when to buy and sell the stocks.

GM detailed pricing and financial information.

<b>Metric</b>	<b>Value</b>
<b>Bid:</b>	N/A
<b>Ask:</b>	N/A
<b>Day's Low &amp; High:</b>	26.13 - 27.10
<b>Open:</b>	27.00
<b>Previous Close:</b>	26.90
<b>Volume:</b>	3,975,000
<b>Avg. Volume:</b>	12,951,803
<b>Market Capitalization:</b>	14,913.84 M
<b>52-week range:</b>	18.33 to 37.70
<b>1 week change:</b>	↓6.08%
<b>1 month change:</b>	↑13.76%
<b>1 year change:</b>	↓15.58%
<b>P/E:</b>	-1.70

**Figure 1-1 an example stock quote of GM [8]**

Bid is the price you will receive if you sell the stock at this moment. Ask is the price you need to pay if you want to buy the stock. Usually, the bid price is lower than the ask price. The difference between the bid and ask prices is called the spread. Previous Close is the price at which the stock closed the previous day. Day's low and high is the highest and lowest prices of the day. Open is the price at which the stock opened. Ranges provide information on how much the stock has risen or fallen in certain periods. Volume is the amount that has been traded. Market capitalization can tell you how large the corporation is. The Market Capitalization is calculated by multiplying the number of outstanding shares and the stock price. P/E ratio stands for price-earnings ratio. Earnings here are all after taxes. Companies which are expected to grow in the future should have a relatively high P/E ratio. A detailed stock quote may also include outstanding shares.

## **Chapter 2 Investment Strategies**

### **2.1 Investment overview**

There are numbers of other kinds of investment besides stocks, for example, bonds, real estate, and mutual funds.

#### **2.1.1 Bonds**

Corporations do not only issuing stocks to raise the money they need. They also issue bonds to the public. Technically, a bond is a fixed-income investment issue by a corporation or the government that gives you a regular or fixed rate of interest for a specific period. [1 p19] A bond indeed is nothing more that a loan for which you are the lender. The organization that sells a bond is known as the issuer. [9 sec 2] The interest rate is referred to as coupon. The end of the period that you agreed to lend your money is called maturity date. On this day, you will not only have you original amount of money back, which is also called principal but also the interest you have made out of it. The longer the time of maturity is, the higher the interest rate will be. All things being equal, long time maturity are more risky than a short time maturity bond. The difference between bonds and stocks is obvious: investing in bonds does not give investors ownership of the corporation. Bondholders will not share the profits of the company. What's more, when the corporation has bankrupted, the bondholders will get paid before the shareholders. As a result, people take bonds as a less risky investment than stocks. However, your yield, the amount that you earn from the bond, will be less, too.

Bonds can be classified in to three categories according to the length of the periods before maturity: bills, notes, and bonds. Bills' maturity dates are less than one year, which is the shortest among the three. Notes' maturity date range from one to ten years. Bonds have the longest maturity dates, which are 10 years or longer.

There are three types of bonds: treasuries, munis, and corporate. The bonds that are issued by the U.S. government are called treasuries. Treasures are considered to be extremely safe because it is issued by the government. Munis are the municipal bonds. This type of bonds is issued by the state and local governments. A major advantage is that they are usually tax-free. Since the state and local governments seldom go bankrupt, the munis are quite safe, too. Corporate bonds are the bonds that issued by a corporation like stocks. Corporate bonds are the most risky type of bonds because the corporations are at a higher possibility of defaulting than governments. However, because of this, corporate bonds usually have a higher yield. [10 sec1-3]

Usually, people who are nearing to retire prefer bonds better than stocks. But bonds are not perfect, either. There is always possibility that the corporations go out of business. You can buy bonds through brokerage as well. Brokers will not charge a commission for buying bonds but will increase price instead.

### **2.1.2 Mutual funds**

Mutual funds is another way that corporation raise money. But instead of trading in stock market directly, you are investing in an assortment of stocks, bonds, or cash. Each

investor owns shares.

Mutual funds have several advantages that attract people. First, mutual funds can save people's time. For the people who do not have enough time to read profiles or journals, choosing mutual funds is like hiring a money manager. This money manager will help you make decisions on which to buy. Another good thing about the mutual funds is that mutual funds provide you diversification, which means that you don't need to put your all money into one basket. Suppose that you are the shareholder of only one stock. Unfortunately, the stock price drop nearly 75 percent in one day, because of which you will lose 75 percent of your money. But if you invest in mutual fund, for the same case you might only lose 5 percent of your money.

There are also some disadvantages about mutual funds that people need to be aware of before making decisions. Although mutual funds are not as risky as stocks, it earns less than stocks. If your mutual funds contain a stock, of which the price increased, you might make 5 percent out of your mutual funds. But if all your used all money buying stocks, you probably have made 20 percent out of your money. Also there is nobody can guarantee that a professional manager is better at picking stocks than you. Even if your funds are losing money, the professional managers will still make their profits from your money. [11 sec 2]

There are three types of mutual funds that people can buy. Equity funds, fixed-income, and money market funds. Equity funds are funds that invest in stocks, which is the largest category of mutual funds. Generally, the investment objective is

long-term capital growth with some income. [11 sec 3] Fixed-income funds can provide current income on a steady basis. These funds are mostly invested in government and corporate debt. Money market funds are consists of short-term debt instruments, mostly treasury bills. [11 sec 3]

When buying mutual funds, investors also need to be aware of the fact that mutual funds have many fees. Mutual funds advertisement can be deceiving, too.

### **2.1.3 Cash**

If it is bull market now, it seems silly to put money in cash or in deposit. On the other hand, cash is popular when the market is not doing well. At least you will not lose money like what might happen in stock market. Keeping some of your money in cash will help you survive in the bear market. It will always be nice if you have some cash for emergencies.

### **2.1.4 Real estate**

Many people spend money on their houses. Buying your own home also make you a real estate investor.

Many people invest in real estate. They might either by a house for their own family, or they might buy a house then rent it to some one else later.

The negative aspect of paying for your home is that the real estate you have is an illiquid investment. You can not buy or sell it as quickly as you do for stocks and funds.

Another disadvantage is that you will be charged what is called property taxes and insurances also.

## **2.2 Long-term trading strategies**

Many investors use their money investing for a long period. If you do not mind making money slowly, you can always try the strategies below.

Buy and hold is the most popular strategy for investors. In buy and hold strategy, investors buy a stock of a fundamentally good company, and then hold it for a long time waiting for the price to rise and make money. Since the corporation will be earning money constantly, investors do not need to worry about the daily stock price, which saves time and efforts. Many investors who invested in big corporations like Microsoft and IBM have made huge amount of money from them. This strategy works really well during the bull market. The only time that the investors should start thinking about selling the stock is when some fundamental changes occurred in the corporation.

Buy on the dip strategy is a strategy in which you buy more shares if you find the stock you want is dropping and you believe is only temporary. These low price shares will increase eventually since the market always goes up over time. The problem is that sometimes, several dips could appear before it drops permanently. Therefore, it is so hard to tell when the right time to buy is.

Investors look for stocks that have hit their bottom in bottom fishing strategy. Since the stock prices are so low, they can only go up. However this strategy has the same

buying- time problem as buy on the dip strategy. Investors never know for sure that the stock has reached its bottom. The price might keep dropping after people invested. The corporation might even go bankrupt eventually! Even if investors did make a good buy, it might take years for the stock price to grow.

Value investing is to buy good quality companies at a rather cheap price. Value investors are long-term investors, and are willing to wait for the price to grow. Usually the companies that value investors pick are the companies have low P/E ratios.

Growth investing is the strategy in which the investors pick stocks that are growing faster than the economy and other competitors. These stocks do not pay dividend usually. For many years, technology and internet companies are popular among growth investors.

There are also many other long-term strategies that many investors use. Momentum investing is to buy a stock that is already at high price and sell it at a higher price, which is a quite risky strategy. This is also a difficult strategy to apply because the stock might drop suddenly. Contrarian investing is a strategy in which people doing exactly opposite of everyone else. Investors using this strategy buy the stocks that no one else wants. Investors apply dollar-cost averaging strategy to buy stocks they owned when they are dropping using a set amount of money each time. This is a good strategy because the market is always fluctuating. There is always chance that the price will be up again. Averaging down strategy is almost the same with dollar-cost averaging except that the stock can be bought whenever you like and without a set amount of money. [1, p 70-74]

## **2.3 Short-term trading strategies**

Different from long-term trading investors, short-term investors want to make money fast.

Day trading is a very common strategy. Investors buy and sell the stock within hours, minutes, and even seconds. Usually, day traders move all their money back to cash everyday. They try to decide where the stock will go in a short period of the day and make money from it.

Similar with day trading, many people buy the stock in the beginning of the week and sell it a few days after. This trading strategy is called swing trading. There is another strategy called position trading, in which people buy the stocks and hold it for months. Day trading, swing trading, and position trading are extremely hard when applying it in the reality. At least many investors do not have the patience waiting just to see the price changes all day long.

Market timing is a strategy that you move before the market. This requires the investor to predict what the market will react ahead of time. If the stock price will rise next week, investors will put their cash in to the market. When the market is about to drop, they will get their cash back.

Trading on news is also a short-term strategy that works. It is all based on news. And it can be a strategy that day traders use. Since there are so many ways that investors can get news, it is quite confusing which piece is true. There are people that spread out rumors all the time. Therefore, for this strategy to work well, investors need to know how

the stock will react to the news very well.

Exchange-traded funds are an investment that is similar to mutual funds. Investors can sell exchange-traded funds on exchanges just like stocks. These funds are usually index funds. Since numbers of stocks' performance can affect the exchange-traded funds, it could change rapidly. It is also new to stock market. Therefore, it takes a while to know how to earn money from exchange-traded funds. [1, p79]

Option is also good way make money in short time. But it is quite hard to understand without practicing. An option is a contract that gives the buyer the right, but not the obligation, to buy or sell an asset at a specific price on or before a certain date. People do not need to own options to trade them. [12] A stock option contract is the option to buy 100 shares. There are two types of options: the call and the put. A call option gives people right to buy a stock at a specified price. Buyers hope the price will go up before it expires. A put option gives people right to sell a stock at a specified price. Buyers hope the price will go down before it expires. [1, p 81] There are four types of participants in options markets: buyers of calls, sellers of calls, buyers of puts, and sellers of puts. Buyers are often referred to as holders and sellers are also referred to as writers. The price at which an underlying stock can be purchased or sold is called the strike price. The total cost of an option is called the premium. If you decide to write call option, you are expecting that the price of this stock will increase to a price you specified before the expiration date. If the stock makes it, your option's price will increase and you

will make money after sell it. If it does not make it, you will lose your investment in this option. If you believe the price will drop to a certain price you specified, you write the put option. No matter you want to write a call or a put option, do as many research as you can before you write it. According to studies, nearly ninety percent of options contracts did not earn money.

Strategies mentioned above do help earning money. However, keep in mind that no strategies could guarantee success. No matter how good the strategy looks, there is still chance that you lose money. If you feel one strategy might work, you have to do more research before applying it.

## **Chapter 3     Selecting Companies**

### **3.1 How to choose stocks?**

Different people prefer different stocks. Different investors use different methods to decide what to buy. However, there are several popular stock-picking ways that are applied by many investors. In this chapter, two major strategies for finding good stocks will be introduced.

#### **3.1.1 Fundamental analysis**

Fundamental analysis is the study of the underlying data that affects a corporation. [1, p89] The goal of fundamental analysis is to find a stock's intrinsic value—how much stock really worth. If the stock's intrinsic value is more than the market price, investors should definitely choose to buy the stock. [13]

The study of a corporation's financial condition include many parts, such as total asset, liability, earning, debt. However, the first thing investors should learn about in fundamentals analysis is industry. Usually the industries that bring the market higher are what investors should buy. After determining the industry, the next thing investors need to look for is the leading companies. There will always be companies that are earning more than other competitors in their fields. These companies are what investors want to buy because they are more profitable. They are also called industry leaders.

What to look to find out the industry leaders? The answer is the financial statements of these leaders. Usually, a balance sheet, an income statement, and a statement of cash flows, an auditor's report and a relatively detailed description of the company's operations

and prospects for the upcoming year are what need to be concerned. [15]

A balance sheet is a report of financial condition that summarizes a company's assets, liabilities and shareholders' equity at a specific point in time. [14] The balance sheet must follow the formula below:

$$\text{Assets} = \text{Liabilities} + \text{Shareholders' Equity}$$

It's called a balance sheet because a company has to pay for all the things it has (assets) by either borrowing money (liabilities) or getting it from shareholders (shareholders' equity). [14]

### General Motors Corporation (GM) Balance Sheet

	All numbers in thousands		
<b>PERIOD ENDING</b>	<b>31-Dec-05</b>	<b>31-Dec-04</b>	<b>31-Dec-03</b>
<b>Assets</b>			
Current Assets			
Cash And Cash Equivalents	30,726,000	35,993,000	32,554,000
Short Term Investments	19,726,000	-	22,215,000
Net Receivables	15,578,000	21,236,000	20,532,000
Inventory	33,384,000	12,247,000	10,960,000
Other Current Assets	-	-	-
<b>Total Current Assets</b>	<b>99,414,000</b>	<b>69,476,000</b>	<b>86,261,000</b>
Long Term Investments	205,949,000	241,271,000	198,778,000
Property Plant and Equipment	78,401,000	73,234,000	72,594,000
Goodwill	3,203,000	3,874,000	3,790,000
Intangible Assets	1,136,000	1,051,000	970,000
Accumulated Amortization	-	-	-
Other Assets	58,086,000	64,456,000	58,924,000
Deferred Long Term Asset Charges	29,889,000	26,559,000	27,190,000
<b>Total Assets</b>	<b>476,078,000</b>	<b>479,921,000</b>	<b>448,507,000</b>

(continued to next page)

**Liabilities**

## Current Liabilities

Accounts Payable	113,973,000	107,170,000	99,352,000
Short/Current Long Term Debt	-	-	-
Other Current Liabilities	-	-	-
<b>Total Current Liabilities</b>	<b>113,973,000</b>	<b>107,170,000</b>	<b>99,352,000</b>
Long Term Debt	285,750,000	300,279,000	271,756,000
Other Liabilities	56,242,000	37,637,000	44,316,000
Deferred Long Term Liability Charges	4,477,000	7,078,000	7,508,000
Minority Interest	1,039,000	397,000	307,000
Negative Goodwill	-	-	-
<b>Total Liabilities</b>	<b>461,481,000</b>	<b>452,561,000</b>	<b>423,239,000</b>
<b>Stockholders' Equity</b>			
Misc Stocks Options Warrants	-	-	-
Redeemable Preferred Stock	-	-	-
Preferred Stock	-	-	-
Common Stock	943,000	942,000	937,000
Retained Earnings	3,880,000	15,402,000	13,421,000
Treasury Stock	-	-	-
Capital Surplus	15,285,000	15,241,000	15,185,000
Other Stockholder Equity	(5,511,000)	(4,225,000)	(4,275,000)
<b>Total Stockholder Equity</b>	<b>14,597,000</b>	<b>27,360,000</b>	<b>25,268,000</b>
<b>Net Tangible Assets</b>	<b>\$10,258,000</b>	<b>\$22,435,000</b>	<b>\$20,508,000</b>

Figure 3.1 General Motors Corporation (GM) Balance Sheet [16]

Above is the balance sheet of General Motors Corporation (GM). It is a list of everything a company owns and owes. Current Assets includes cash, accounts receivable, and other assets that can be converted into cash relatively quickly. Property Plant and Equipment could be described as long term operating assets. Goodwill is the excess of the purchase price over the fair market value of an asset. Current Liabilities is a

company's liabilities that maturing within the next 12 months. Long-Term Liabilities is debt not maturing in the next 12 months. Stockholders' Equity shows how the remainder of the company's assets is financed, including common and preferred stock, treasury stock and retained earnings. [18]

Investors will get a good idea about how the company is doing by comparing balance sheet with other competitive companies. They can also compare balance sheet from last year to see whether the company is making more profits. One thing that investors should be aware of is that companies might be hiding their liabilities and exaggerating their earnings. If investors cannot notice the company is hiding its real financial condition on time, investments could be nothing more than failures.

One way to tell how much a company earns is to look at its income statement. An example of income statement from General Motors Corporation (GM) is shown below. The top line is the company's revenue. Investors would like to see the preferred company's revenue is increasing every year. Next line is the costs of doing business, such as cost of the product, advertising, salaries. Gross profit is the revenue minus cost of revenue. Interest expense is the payments made on the company's outstanding debt. Net income is how much money the company earns after paying all the expenses. Net income per share is the net income divided by the number of shares owned by the public, known as earnings per share (EPS). [17] The income statement might be arranged different from what is shown below. The information presented depends on the type of business the company is doing. Some companies will break down their operating expenses into

various categories; some companies list depreciation expense as a separate line item.[17]

### General Motors Corporation (GM) Income Statement

All numbers in thousands

PERIOD ENDING	31-Dec-05	31-Dec-04	31-Dec-03
<b>Total Revenue</b>	<b>192,604,000</b>	<b>193,517,000</b>	<b>185,524,000</b>
Cost of Revenue	171,033,000	159,957,000	152,071,000
<b>Gross Profit</b>	<b>21,571,000</b>	<b>33,560,000</b>	<b>33,453,000</b>
Operating Expenses			
Research Development	-	-	-
Selling General and Administrative	22,734,000	20,394,000	21,008,000
Non Recurring	-	-	-
Others	-	-	-
Total Operating Expenses	-	-	-
<b>Operating Income or Loss</b>	<b>(1,163,000)</b>	<b>13,166,000</b>	<b>12,445,000</b>
Income from Continuing Operations			
Total Other Income/Expenses Net	-	-	612,000
Earnings Before Interest And Taxes	(1,163,000)	13,166,000	12,445,000
Interest Expense	15,768,000	11,980,000	9,464,000
Income Before Tax	(16,931,000)	1,186,000	2,981,000
Income Tax Expense	(5,878,000)	(916,000)	731,000
Minority Interest	595,000	-	-
Net Income From Continuing Ops	(10,458,000)	2,804,000	2,862,000
Non-recurring Events			
Discontinued Operations	-	-	960,000
Extraordinary Items	-	-	-
Effect Of Accounting Changes	(109,000)	-	-
Other Items	-	-	-
<b>Net Income</b>	<b>(10,567,000)</b>	<b>2,804,000</b>	<b>3,822,000</b>
Preferred Stock And Other Adjustments	-	-	-
<b>Net Income Applicable To Common Shares</b>	<b>(\$10,567,000)</b>	<b>\$2,804,000</b>	<b>\$3,822,000</b>

Figure 3.2 General Motors Corporation (GM) Income Statements [19]

The cash flow statement is also part of the fundamental analysis. It does not present any non-cash items and tells only how much actual money the company generated. Many of the information could be found from income statement. But it will provide a sharper view of how well the company is doing in finance growth.

### Cash flow of General Motors Corporation (GM)

	All numbers in thousands		
<b>PERIOD ENDING</b>	<b>31-Dec-05</b>	<b>31-Dec-04</b>	<b>31-Dec-03</b>
<b>Net Income</b>	<b>(10,567,000)</b>	<b>2,804,000</b>	<b>3,822,000</b>
<b>Operating Activities, Cash Flows Provided By or Used In</b>			
Depreciation	15,769,000	15,827,000	15,580,000
Adjustments To Net Income	7,398,000	(7,892,000)	(13,470,000)
Changes In Accounts Receivables	-	-	-
Changes In Liabilities	-	-	-
Changes In Inventories	-	-	-
Changes In Other Operating Activities	(29,565,000)	(1,383,000)	2,903,000
<b>Total Cash Flow From Operating Activities</b>	<b>(16,856,000)</b>	<b>9,356,000</b>	<b>7,875,000</b>
<b>Investing Activities, Cash Flows Provided By or Used In</b>			
Capital Expenditures	(8,179,000)	(7,753,000)	(7,330,000)
Investments	25,540,000	(14,981,000)	(48,878,000)
Other Cash flows from Investing Activities	(8,796,000)	(5,329,000)	716,000
<b>Total Cash Flows From Investing Activities</b>	<b>8,565,000</b>	<b>(28,063,000)</b>	<b>(55,492,000)</b>
<b>Financing Activities, Cash Flows Provided By or Used In</b>			
Dividends Paid	(1,134,000)	(1,129,000)	(1,121,000)
Sale Purchase of Stock	-	-	60,000
Net Borrowings	(1,416,000)	17,881,000	58,663,000
Other Cash Flows from Financing Activities	6,030,000	4,723,000	1,320,000
<b>Total Cash Flows From Financing Activities</b>	<b>3,480,000</b>	<b>21,475,000</b>	<b>58,922,000</b>
Effect Of Exchange Rate Changes	(456,000)	671,000	929,000
<b>Change In Cash and Cash Equivalents</b>	<b>(\$5,267,000)</b>	<b>\$3,439,000</b>	<b>\$12,234,000</b>

Figure 3.3 Cash flow of General Motors Corporation (GM) [20]

In fundamental analysis, there are several ratios that many investors prefer to study about. Price-earnings ratio (P/E) can show quickly how whether the stock is fairly valued. Price-earnings-growth takes the future earnings potential into consideration. It can be calculated by dividing P/E by the earning growth. A stock that has a PEG less than 0.5 is a good buy. When its PEG goes higher than 1, the stock price of this company is over priced. Return on equity help investors to determine how effectively the company is being managed. [1, p103] It can be calculated by dividing net income by net worth. The higher the ROE, the more effective the company is. Other ratios that might also help include return on investment return on assets, price-to-sales ratio. Do not rely on just one ratio to decide whether a stock is a good buy. Use more tools to examine whether the stock is worth the price.

### **3.1.2 Technical analysis**

Generally speaking, technical analysis is the study of stock prices. Investors who apply this analysis look for patterns and indicators that might reveal the up or down of the stock price. Therefore stock chart is the most important tool in technical analysis.

Line charts shows the closing price of a stock over a specific period. It does not provide enough information because only closing price is involved. Therefore, it is not popular among short-term traders. Bar chart is more popular than line charts. A bar is the range of price for the period. The top is the highest price of the day and the bottom is the lowest of the day. The short line on the right side of the bar is the closing price and the

short line on the left side of the bar is the opening price. A Example of bar charts is shown below.

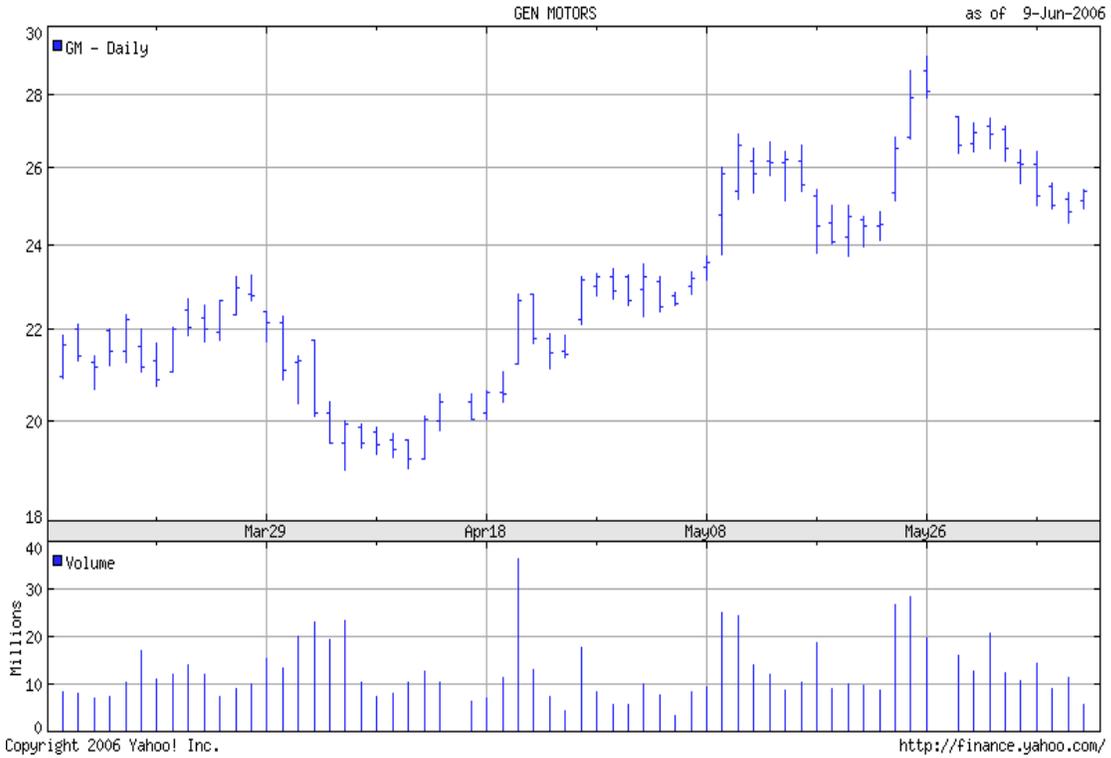


Figure 3.4 Bar chart of General Motors Corporation (GM) [21]

Candle stick Charts are popular because they show so much information. The information it contains can be well explained by the picture below:



Figure 3.5 Candle stick chart [22]

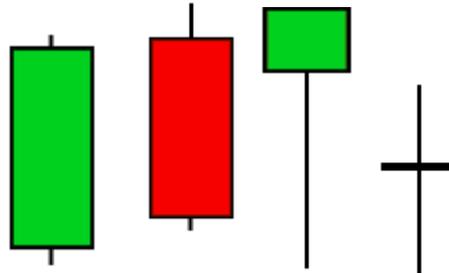


Figure 3.6 Candle stick patterns [22]

According to the different position of the rectangular relatively to the lowest and highest price, there are many patterns a candle stick can have. As figure 3.6 shows, the first candle stick is a bullish pattern and the second is a bearish pattern. The third candle is also called hammer. It is a bullish pattern only if the stock price has dropped for several days before it appears. The fourth candle is a star. It indicates there might be a reversal in the current trend. [22] Trend is simply the direction the stock price is moving in. It includes uptrend, downtrend, and sideways trend. Avoid downtrend and join in the uptrend is the goal of investors.

Support and resistance always appear on stock charts. Support is the price level at which a stock price has stopped falling and either is going sideways or in reverse direction. Resistance is the price level at which a stock price has stopped rising and either is going sideways or in reverse direction [1, p117-p118].

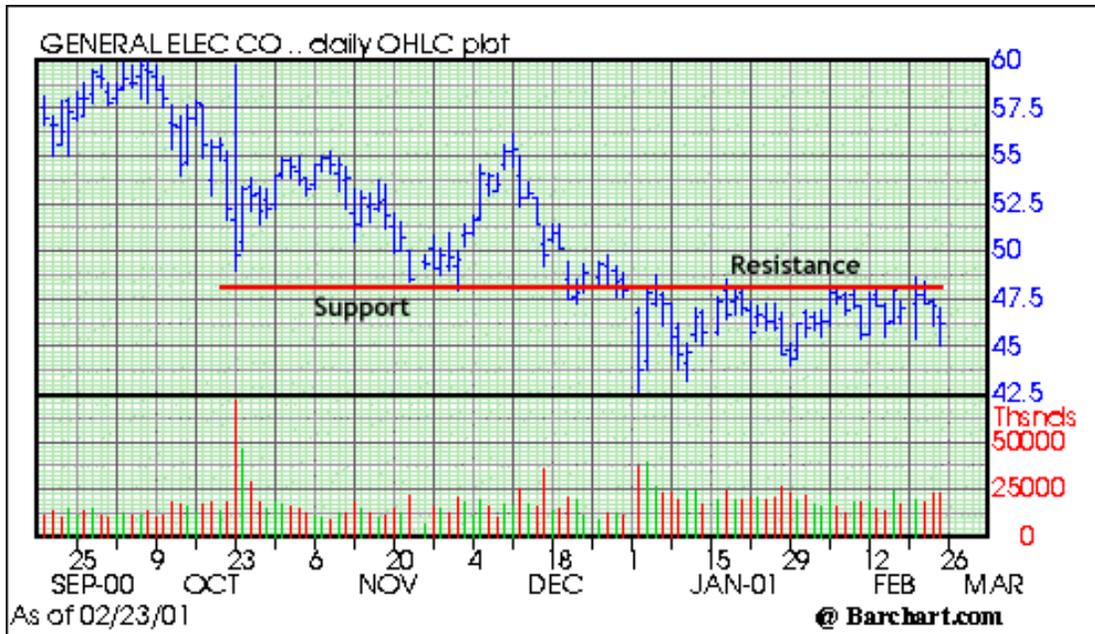


Figure 3.7 Example of support and resistance [23]

Support usually appears when there is enough demand for the stock to stop the price from falling further. Resistance usually appears when the demand for the stock is not strong enough to raise the stock price. When the stock price breaks the support, it is a sign to sell the stock; when the stock breaks through the resistance, it is a good sign to buy. In a bull market, stocks prices often raise much higher after broke through resistance.

Technical analyst use stock patterns to predict what might happen to the stock price. There are signs that technical analyst look for to decide whether to buy or sell the stock. Head and shoulders pattern is a bearish indicator, while the reverse head and shoulders pattern is a bullish indicator.

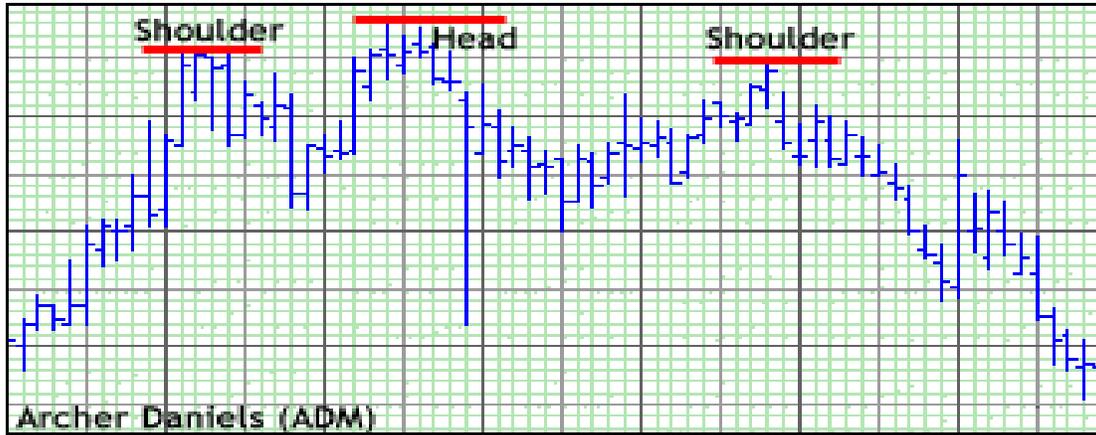


Figure 3.8 Example of Head and shoulders pattern [24]

Head and shoulders pattern shows that the demand to buy the stock was not strong and has stopped at the “head”, which indicates that the price is about to drop. The reverse of head and shoulder patterns shows that the demand is strong enough and the price is about to rise.

Double top pattern is a common bearish pattern (looks like an M), while double bottom (looks like a W) is a common bullish pattern. An example of double bottom pattern is shown below. It is strongly recommended that when the price passes the highest point in the handle, investors should buy the stock.



Figure 3.9 Example of double bottom pattern [24]

There are some advanced technical indicators and oscillators that short-term trader prefers. The moving average is the average price of a stock over a period. Short-term traders usually choose to use 50-day MA to determine the support and resistance. When a stock price moves below its moving average, it is a bad sign and signal to sell. If the price is above the MA, it is a good sign to buy. The relative strength indicator measures the relative strength or weakness of a stock compared to itself. Relative strength means that a stock is strong compared to another stock or an index. [1, p 135] The RSI can help investors to tell whether the stock is overbought or oversold. The overbought- stock price will drop while the oversold-stock price will move higher. Bollinger bands are another kind of oscillator. It has three lines: the upper, the lower and the simple moving average (SMA) in the middle. If the upper and lower bands move close to each other and almost touching, it indicates that there will be a sudden move in the stock price. Also if the stock price move to the upper band, the more overbought the stock is. If the price move to the lower band, the more oversold it is. [25]

Both technical analysis and fundamental analysis have disadvantages. For example, fundamental analysis relies on the data provided by the corporation. Therefore, it is hard to avoid misleading analysis based on the fake financial condition. Technical analysis relies on the data collected from the past. It might not be right to predict tomorrow by looking at old data. What is a clever way is to use both technical analysis and fundamental analysis. By studying about the company and the stock price, more

information will be gathered, which will definitely increase the possibility to make profits.

### **3.2 Selected-company profiles**

Using what I learned in the previous period of the project, I picked ten stocks to perform my simulation. These ten stocks come from different sectors and belong to various industries. Their profiles are listed below.

#### **3.2.1 Wal-Mart Stores Inc. (WMT)**

**Sector: Services**

**Industry: Discount, Variety stores**

Wal-Mart Stores, Inc. operates retail stores in various formats worldwide. It operates in two segments, Wal-Mart Stores and SAM'S CLUB. The Wal-Mart Stores segment comprises super centers, discount stores, and neighborhood markets, as well as an online retail format, Walmart.com. It offers apparel for women, girls, men, boys, and infants; domestics, fabrics, and notions; stationery and books; shoes; house wares; hardware; electronics; home furnishings; small appliances; automotive accessories; horticulture and accessories; sporting goods; toys; pet food and accessories; cameras and supplies; health and beauty aids; pharmaceuticals; jewelry; and optical, as well as photo processing services. The neighborhood markets include dry grocery, meat, produce, deli, bakery, dairy, frozen foods, pharmaceuticals, photo processing, health and beauty aids, household chemicals, paper goods, general merchandise, and pet supplies departments. The SAM'S

CLUB segment comprises the warehouse membership clubs in the United States and samsclub.com. It offers hard goods, soft goods, software, electronics, jewelry, sporting goods, toys, tires, stationery and books, grocery items, and selected private labels. As of January 31, 2006, the company operated 1,209 discount stores, 1,980 supercenters, 567 SAM’S clubs, and 100 neighborhood markets in the United States and internationally. It operated 11 units in Argentina, 295 in Brazil, 278 in Canada, 88 in Germany, 398 in Japan, 774 in Mexico, 54 in Puerto Rico, 16 in South Korea, and 315 in the United Kingdom, as well as 56 stores through joint ventures in China, as of the above date.

Wal-Mart Stores was founded in 1945 and is based in Bentonville, Arkansas. [26]



Figure 3.10 Basic Chart of WMT for past 12 months [26]

### 3.2.2 American Express Co. (AXP)

**Sector: Financial**

## **Industry: Credit Services**

American Express Company, together with its subsidiaries, operates as a payments, network, and travel company worldwide. The company issues cards to consumers, small businesses, and corporations through its own network, as well as by third party banks and other institutions in approximately 45 currencies. American Express offer individual consumer charge cards, revolving credit cards, and various cards sponsored by and co-branded with other corporations and institutions. In addition, American Express issues travelers checks; various prepaid products, including gift cards, gift cheques, dining cards; and various incentive prepaid products. American Express also provides expense management services to approximately 100,000 firms through its corporate card program, corporate purchasing solutions, and business travel services. Its travel services include travel reservation advice and booking transaction processing; travel expense management policy consultation; supplier negotiation and consultation; management information reporting, data analysis and benchmarking; and foreign exchange and international payment services. The company, through American Express Bank, offers various investment management, trust, estate planning, and banking services; saving and investment products; various correspondent banking products, including international payments processing, trade-related payments and financing, cash management, loans, extensions of credit, and investment products; distributes mutual funds; provides treasury and capital market products. In addition, the company publishes luxury lifestyle magazines; travel and business resources; various general interest, cooking, wine,

financial, and time management books; international magazine editions. American Express also operates various Web sites, such as [travandleisure.com](http://travandleisure.com), [foodandwine.com](http://foodandwine.com), [departures.com](http://departures.com), [tlgolf.com](http://tlgolf.com), [tlfamily.com](http://tlfamily.com), and [skyguide.net](http://skyguide.net). American Express was founded in 1850 and is headquartered in New York City. [26]



Figure 3.11 Basic Chart of AXP for past 12 months [26]

### 3.2.3 Tata Motors Ltd. (TTM)

**Sector: Consumer Goods**

**Industry: Auto Manufacturers- Major**

Tata Motors Limited engages in the design, manufacture, assembly, and sale of commercial automotive vehicles primarily in India. It operates through two segments, Automotive and Others. The Automotive segment designs, manufactures, assembles, and sells trucks and buses, passenger cars, utility vehicles, and related parts and accessories.

The company also provides financing for its vehicles. The Others segment operations include information technology related business, construction equipment manufacturing, automotive vehicle components and supply chain activities, machine tools and factory automation solutions, high-precision tooling and plastic and electronic components for automotive and computer applications, automotive retailing and service operations, and real estate and investment. The company sells its products through its regional and sub-regional offices, as well as dealer outlets. As of March 31, 2005, it operated 29 regional and 36 sub-regional offices, as well as 500 dealer outlets. The company was incorporated in 1945 as Tata Locomotive and Engineering Company Limited and changed its name to Tata Engineering and Locomotive Company Limited in 1960. Subsequently, it changed its name to Tata Motors Limited in 2003. Tata Motors is based in Mumbai, India. Tata Motors Limited is a part of Tata Group. [26]



Figure 3.12 Basic Chart of TATA for past 12 months [26]

### **3.2.4 Pepsi Bottling Group Inc. (PBG)**

**Sector: Consumer Goods**

**Industry: Beverages-Soft Drinks**

The Pepsi Bottling Group, Inc. engages in the manufacture, sale, and distribution of beverages worldwide. It offers its products under the names of Pepsi-Cola, Diet Pepsi, Mountain Dew, Aquafina, Lipton Brisk, Sierra Mist, Diet Mountain Dew, Tropicana Juice Drinks, SoBe, and Starbucks Frappuccino. The company also sells beverages under the names 7 up, Kas, Aqua Minerale, Mirinda, and Manzanita sol, as well as under the trademarks Dr Pepper, Squirt, Electropura, Epura, and Garci Crespo. It operates in the United States, Canada, Spain, Greece, Russia, Turkey, and Mexico. It sells its products through direct store distribution system, wholesalers, as well as through third-party distributors. The Pepsi Bottling Group was incorporated in 1999 and is headquartered in Somers, New York. [26]



Figure 3.13 Basic Chart of PBG for past 12 months [26]

### 3.2.5 GOOG

**Sector: Technology**

**Industry: Internet Information Providers**

Google, Inc. offers advertising and Internet search solutions, as well as intranet solutions through an enterprise search appliance. The company, through Google.com, provides Google Web Search that offers access to Web pages; Google Image Search, a searchable index of images found across the Web; Google Groups that enable participation in Internet discussion groups; Google News that gathers information from news sources and presents news in a searchable format; Froogle, a shopping search engine; Google Local that allows users to find driving directions and local businesses; and Google Desktop that enables users to perform a text search on the contents of their own computer. Its Web and content search products include Google Scholar to search for

scholarly literature; Google Book Search to bring print information online; Google Base to upload, store, and describe online or offline content; and Google Video to exchange video content between consumers and producers. These products also comprise personalized search and homepage, alerts, Web directory, and music search. The company's communication and collaboration products and services comprise Gmail, an email service; orkut that enables users to search and connect to other users; and Blogger, a Web-based publishing tool. Google also provides downloadable applications for computers; ability to search and view mobile Web, and a downloadable Java client application for mobiles; and Google Labs that operate as test beds for its engineers and users. Further, the company offers Google AdWords, an advertising program that presents ads to people; Google AdSense program that allows Web sites in the Google Network to serve targeted ads from AdWords advertisers; and search technology for enterprises through the Google Search Appliance and Google Mini. Google was founded by Larry Page and Sergey Brin in 1998. The company is headquartered in Mountain View, California. Google acquired dMarc Broadcasting, Inc. in February 2006. [26]



Figure 3.14 Basic Chart of GOOG for past 12 months [26]

### 3.2.6 Walt Disney Co. (DIS)

**Sector: Services**

**Industry: Entertainment – Diversified**

The Walt Disney Company, together with its subsidiaries, operates as a diversified entertainment company worldwide. It operates in four segments: Media Networks, Parks and Resorts, Studio Entertainment, and Consumer Products. The Media Networks segment operates television networks that broadcast programs in dayparts; and radio networks, which produce and distribute news network programming, syndicated talk and music programs, music formats, and other programs. It also produces and distributes cable television programming; licenses programming; invests in foreign television broadcasting, production, and distribution entities; and operates Internet Web site businesses. The Parks and Resorts segment owns and operates the Walt Disney World

Resort, which includes theme parks, hotels, a sports complex, conference centers, golf courses, and water parks; other recreational facilities; and Disneyland Resort. It also operates ESPN Zone facilities in the United States; Disneyland Resort Paris in France and Hong Kong Disneyland in Hong Kong; and licenses the operations of the Tokyo Disney Resort in Japan. The Studio Entertainment segment produces and acquires live-action and animated motion pictures for distribution to the theatrical, home entertainment, and television markets; and produces stage plays and musical recordings. The Consumer Products segment licenses Walt Disney characters, and visual and literary properties to manufacturers, retailers, show promoters, and publishers; and publishes books and magazines for children and families, as well as film, video, and computer software products for the educational marketplace. The company distributes its products through its Disney Stores and online. As of October 1, 2005, it owned and operated 104 stores primarily in Europe and 315 stores in North America. The company was founded in 1923 and is based in Burbank, California. [26]



Figure 3.15 Basic Chart of DIS for past 12 months [26]

### 3.2.7 Interactive Intelligence Inc. (ININ)

**Sector: Technology**

**Industry: Business Software & Services**

Interactive Intelligence, Inc. provides business communications software solutions for contact center automation, enterprise Internet protocol telephony, unified communications, and self-service automation. It provides Customer Interaction Center (CIC), a software communications application suite, which enables organizations to combine various customer interactions, such as phone, fax, email, and Web contact; Communité, a unified messaging/unified communications solution that connects to an existing PBX switching architecture and replaces legacy voice mail systems; Interaction Recorder, a product that enhances CIC's on-demand recording capabilities by providing multimedia recording and recording file management for organizations; and Interaction

Dialer, an outbound campaign management solution. In addition, the company's software applications include e-FAQ, an email response management, knowledge management, and Web self-service solution; Vocalite, a speech-enabled interactive voice response software application; Interaction Session Initiation Protocol (SIP) Proxy server software compliant, which supports SIP methods and status codes; and Interaction Media Server, a device that provides the ability to offload audio processing functions from the CIC server. Interactive Intelligence's software applications are also preintegrated into business applications, such as financial, customer relationship management, and enterprise resource planning software, to automate and track business transactions to customer interactions. It also provides technical support, education, and professional services. The company sells its products to customers in the financial, healthcare, government, retail, technology, education, and retail industries worldwide, through direct sales force and value-added resellers. Interactive Intelligence was founded in 1994 by Donald E. Brown and is headquartered in Indianapolis, Indiana. [26]



Figure 3.16 Basic Chart of ININ for past 12 months [26]

### 3.2.8 PCOP

**Sector: Healthcare**

**Industry: Biotechnology**

Pharmacopeia Drug Discovery, Inc., a biopharmaceutical company, engages in the discovery and development of novel therapeutics primarily to address significant medical needs. Using proprietary technologies and processes, Pharmacopoeia identifies, optimizes, and develops novel drug candidates through its internally-funded drug discovery programs and in collaborations with pharmaceutical and biotechnology companies. Pharmacopeia's product pipeline includes three compounds in human clinical trials (Phase I) with various partners, including a compound targeting rheumatoid arthritis in collaboration with Bristol Myers Squibb; a compound targeting asthma and allergies in collaboration with Daiichi Pharmaceutical Corporation; and a compound targeting

inflammation in collaboration with Schering-Plough. The company also has 6 additional partnered compounds in preclinical development and 4 internal (nonpartnered) drug candidates. In addition, Pharmacopoeia has an alliance with GlaxoSmithKline (GSK) to deliver clinically validated therapeutic candidates to GSK's global research and development organization; and an alliance with Cephalon, Inc. to discover, develop, and commercialize therapeutic products. The company was co-founded by Paul A. Bartlett in 1993 and is based in Princeton, New Jersey. [26]



Figure 3.17 Basic Chart of PCOP for past 12 months [26]

### 3.2.9 Altair Nanotechnologies Inc. (ALTI)

**Sector: Basic Materials**

**Industry: Industrial Metals & Minerals**

Altair Nanotechnologies, Inc. engages in the development and commercialization of

nonmaterial and titanium dioxide pigment technologies. It also provides contract research services on selected projects. The company operates in two segments, Life Sciences and Performance Materials. The Life Sciences segment produces pharmaceutical products, cosmetics, drug delivery products, dental materials, and other medical products. The Performance Materials segment produces materials for paints, coatings, sensors, alternative energy devices, and materials for improving process technologies. It also focuses on advanced materials for alternative energy, such as high performance batteries, fuel cell, and photovoltaic; and other high performance material applications. The company was incorporated in 1973 under the name of Diversified Mines Limited and changed its name to Tex-U.S. Oil & Gas, Inc. in 1981. It changed its name to Orex Resources, Ltd. in 1986; Carlin Gold Company, Inc. in 1988; Altair International Gold, Inc. in 1994; and Altair International, Inc. in 1996. Further, the company changed its name to Altair Nanotechnologies, Inc. and redomesticated from the Ontario Business Corporations Act to the Canada Business Corporations Act in 2002. The company is headquartered in Reno, Nevada. [26]



Figure 3.18 Basic Chart of ALTI for past 12 months [26]

### 3.2.10 Nike Inc. (NKE)

**Sector: Consumer Goods**

**Industry: Textile – Apparel Footwear & Accessories**

NIKE, Inc. and its subsidiaries engage in the design, development, and marketing of footwear, apparel, equipment, and accessory products worldwide. It designs athletic footwear for running, cross training, basketball, soccer, sport inspired urban shoes, and children’s shoes. The company also offers shoes and sports apparel for tennis, golf, baseball, football, bicycling, volleyball, wrestling, cheerleading, aquatic activities, hiking, outdoor activities, and other athletic and recreational uses primarily under the ‘NIKE’ brand name. In addition, it sells sports inspired lifestyle apparel, as well as athletic bags and accessory items. Further, NIKE sells a line of performance equipment, including golf clubs, sport balls, eyewear, timepieces, electronic media devices, skates, bats, gloves,

swimwear, cycling apparel, children's clothing, school supplies, and eyewear. Additionally, the company sells a line of dress and casual footwear, apparel and accessories for men and women. As of May 31, 2005, it operated 184 stores in the United States and 190 stores internationally. The company sells its products to retail accounts, through its owned retail stores, and through a mix of independent distributors and licensees. NIKE was co-founded by Philip H. Knight. The company was founded in 1964 and is headquartered in Beaverton, Oregon. [26]



Figure 3.19 Basic Chart of NKE for past 12 months [26]

## **Chapter 4 Simulation**

### **4.1 Trading dairy and data**

My starting amount of cash was 150,000 dollars. After paying attention to the stock price for several days, I made my first trade on May 23<sup>rd</sup>, 2006. 150 shares of WMT were bought, at the price of 47.95 dollars per share. Right after this trade, I used 10,491.99 dollars to purchase 200 shares of AXP, including 19.99 dollars of commission.

I traded more stocks on the following day. Several stocks' price dropped and seemed good to buy. I decide to trade 100 shares GOOG when it dropped to 374.49 dollars. It is a relatively low price comparing with its historical prices. I traded 500 shares of TTM at the price of 16.33 dollars per share. PBG seems low enough to buy though it is not the lowest price of the day. I spent 9,184.99 dollars on 300 shares of PBG and believed it could go up in the following trading days. 250 shares of DIS were bought at the price of 30.19 dollars. I spent another 2,123.99 dollars trading 200 shares of ININ, which cost less money comparing with my other trades.

On May 25<sup>th</sup>, another three stocks seemed good to buy to me. NKE dropped to 79.14 per share. I traded 200 shares. POCP and ALTI are the 2 stocks I picked that have prices lower than 5 dollars. I trade 2000 shares of each. PCOP was 4.78 dollars per share and ALTI was 3.14 dollars per share. Some of t he stocks I hold at this time went up. But because it was only 2 days since I bought them, I decide to hold them longer, so that the prices might go higher. By the end of that day, I was hold 10 different stocks in my hand and had 36,054.09 dollars cash left.

The next following days all I did was watching the prices for all my stocks. I was hoping the prices could go up high enough to sell but many of them just go sideways. There were times that the prices were attempting to rise, but dropped then went back to where it started. ININ was the one that dropped 4.18% that day. Instead of just holding, I bought in more shares to lower down the price of ININ. I bought another 600 shares of ININ.

The first stock I sold out was ALTI. During the past days, the fluctuation of ALTI was not big and the highest price it reached was 3.29 dollars per share. I felt it wouldn't make a big jump in next several days, either. Therefore I sold them at the price of 3.26 dollars per share on June 1st, which was close to the highest price of previous day.

On June, 2nd, five stocks went up to a price good to sell. PBG was sold at the price of 31.47 dollars per share. TTM went to 17.54 dollars per share, which made me able to earn more than 500 dollars. NKE was sold at the price of 82.07 dollars per share, making about another 500 dollars. PCOP, one of the two stocks I bought under five dollars, went up to 5.07 dollars.

I sold DIS on June, 5<sup>th</sup>. This is a stock whose price does not fluctuate much recently. It is not realistic to expect earning a lot from this stock. I sold it at 30.92 dollars per share. ININ went up to 11.02 dollars. Since I bought another 600 shares when the price was low, I own 800 shares of ININ, which were 10.19 dollars per share. I made nearly 650 dollars from ININ.

GOOG's price went above 390 dollars again on June, 7<sup>th</sup>. Though I had only 100

shares of GOOG, which was a relatively small amount, each share went up nearly 20 dollars. I sold it at 394.17 dollars per share and earned about 2000 dollars.

WMT is the last stock that I sold out. I lost about 130 dollars for this stock. The price was once up to 50 dollars at the end of May. But I was thinking that the price might go up higher and decided not to sell it. Unfortunately the price dropped later. I sold WMT at 47.34 dollars per share, lost about 60 cents each share.

The table below is my trading record.

Date	Symbol	Trade Type	Price	Quantity	Net cost/proceeds	Total Cash	Total asset
5/23/2006	WMT	Buy	47.95	150	7,212.49	142,807.50	150,000.00
5/23/2006	AXP	Buy	52.36	200	10,491.99	132,315.51	150,000.00
5/24/2006	TTM	Buy	16.33	500	8,184.99	124,130.52	150,202.01
5/24/2006	PBG	Buy	30.56	300	9,187.99	114,942.53	150,180.52
5/24/2006	GOOG	Buy	374.49	100	37,468.99	77,473.54	150,274.03
5/24/2006	DIS	Buy	30.19	250	7,567.49	69,906.05	150,930.04
5/24/2006	ININ	Buy	10.52	200	2,123.99	67,782.06	150,897.55
5/25/2006	PCOP	Buy	4.78	2000	9,579.99	58,202.07	152,177.06
5/25/2006	ALTI	Buy	3.14	2000	6,299.99	51,902.08	152,237.07
5/25/2006	NKE	Buy	79.14	200	15,847.99	36,054.09	152,257.08
5/30/2006	ININ	Buy	10.08	600	6,067.99	29,986.10	150,820.09
6/01/2006	ALTI	Sell	3.26	2000	6,500.01	36,486.11	152,631.61
6/02/2006	TTM	Sell	17.54	500	8,750.01	45,236.12	152,795.62
6/02/2006	PBG	Sell	31.47	300	9,421.01	54,657.13	152,784.63
6/02/2006	NKE	Sell	82.07	200	16,394.01	71,051.14	152,820.64
6/02/2006	PCOP	Sell	5.07	2000	10,120.01	81,171.15	153,320.65
6/05/2006	AXP	Sell	54.67	200	10,914.01	92,085.16	152,708.66
6/05/2006	DIS	Sell	30.92	250	7,710.01	99,795.17	152,733.67
6/05/2006	ININ	Sell	11.02	800	8,796.01	108,591.18	153,113.68
6/07/2006	GOOG	Sell	394.17	100	39,397.01	147,988.19	155,044.19
6/09/2006	WMT	Sell	47.34	150	7,081.01	155,069.20	155,069.20

Figure 4.1 Trading record

## 4.2 Analysis

Three of the stocks I chose to buy belong to sector consumer goods. They are NKE, TTM, and PBG. This is a sector close related to people's daily life, because of which, consumer goods should be a good sector to invest.

An important reason for choosing NKE is because of the World Cup in Germany. The big impact soccer bring to the whole world is obvious. NKE, close related to the top soccer teams, is the sponsor of Brazil and seven other teams in 2006 World cup, including the US soccer team. As the confidence of Brazil winning the World cup builds up, the "check mark" on Brazil soccer team's shirts will quite likely impress the whole world once again. One more wave of purchasing Brazil's soccer team shirts will for sure boost up NKE's profit. Also looking at NKE's chart for the past year, its lowest price was around 78 dollars per share. Looking at the prices of NKE in May, I found that the highest it reached was 83.10 dollars per share. So I decide to sell NKE if the price could reach 82 dollars per share. As I expected, the price of NKE went above 82 dollars on June, 2<sup>nd</sup>. I made 546 dollars out of NKE.

Date	Open	High	Low	Close	Volume	Adj Close*
16-May-06	81.81	82.09	80.51	80.67	1,609,900	80.36
15-May-06	81.00	81.69	81.00	81.64	1,226,600	81.33
12-May-06	81.00	81.91	80.93	81.50	1,289,300	81.19
11-May-06	82.93	83.10	81.14	81.31	1,085,000	81.00
10-May-06	82.40	82.92	82.20	82.33	914,500	82.01
9-May-06	82.35	82.85	82.14	82.20	865,700	81.88
8-May-06	81.60	82.44	81.52	82.25	979,200	81.93

Figure 4.2 Historical prices for NKE [27]

TTM is a foreign company of manufacturing automotive vehicles in India. Transportation is one of the key restricting factors for most developing countries. The constant growing demand of more efficient transportation brings great opportunity in transportation industry in India. On the other hand, the victory of automotive vehicles over trains seems inevitable after having seen the wheelers in the U.S. occupying almost every inch of the high-ways. This guarantees a great potential market for TTM, the largest wheeler manufacturer of India. After having studied the recent performance of the stock price, I found the price dropped to 15.50 dollars, nearly dropped 10 percent on May, 22nd, which I believe should be a good chance to buy. I planed to sell it at the price up to 19 dollars. The next following days, the price of TTM went sideways around 17 dollars, which made me change my mind to sell it above 17.50 dollars per share.



Figure 4.3 Line chart of TTM for the past 3 months [27]

Pepsi's new idea of associating the trend with its drink products was able to promote Pepsi's products to a never-before good sales condition. In almost every country, Pepsi was able to find the country's best pop-star, musicians or comedians to represent Pepsi products and therefore lead those VIP's fans directly into buying and drinking Pepsi. With the 2006 World Cup coming, Pepsi is expecting to boost up its sales by a series of commercial campaign associating Pepsi with various world-class soccer players. It is reasonable to believe that Pepsi will keep up its competition against Coca Cola during the coming couple of decades. The price reached 32 dollars per share in the first half of May but then dropped. It has not reached to 32 dollars in the past year. On May 24<sup>th</sup> and 25<sup>th</sup>, the lowest prices were only about 30 dollars. Since the prices of Pepsi do not fluctuate much, the price around 31.50 dollars per share should be a good price to sell.



Figure 4.4 technical analysis charts of PBG for the past 3 months [27]

As a recently rising financial cooperation, American Express Co. is working its way to achieve the world's third largest credit/debit card provider. Profit in financial industry is remarkably high, which lead more companies into starting business in credit card issuing, including JCPenny, Lowe's and etc. However, it's really that large cooperation with formalized service that makes the most money. American Express, becoming more well-known recently, should be able to get a reasonable share from this pie. The corporation also announced to the public that the dividend will be increased by 25 percent and plans to repurchase 200million additional shares on May, 22<sup>nd</sup>, which indicated a good business performance and the price of stock might going up. For AXP, 51.90 dollars per share was its lowest price in May. Therefore on May, 23<sup>rd</sup>, the first day of my simulation, I bought AXP at the price of 52.35 dollars per share, which sounds like a reasonable price to me. The prices went up two days after I made the purchase. I was hoping the price could continue going up. However, it did not reach 55 dollars in the past

three months, shown in Figure 4.5. On Jun, 2nd, when I saw that the prices went really close to 55 dollars, I took the price as the highest it could reach, at least in short term, and sold the stocks I hold. Though I have earned little, it is better than losing money.

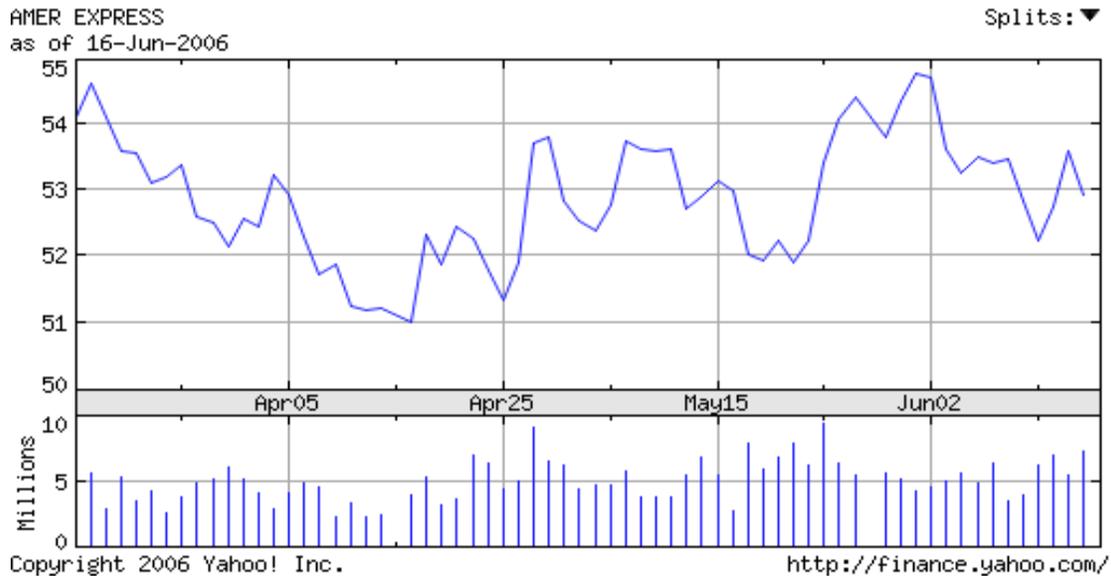


Figure 4.5 technical analysis charts of AXP for the past 3 months [27]

Google, the world's most frequently visited website, with numerous associated newly developed branch websites, such as the new Google library and Google map, is already and will continue to be representing the world's leader in informative communication. After Microsoft built the 20<sup>th</sup> century's miracle of benefiting billions of dollars out of Windows, it is quite reasonable to expect Google to build another miracle out of the fast developing website industry. The great confidence people put into Google started long ago, resulting in Google holding its high stock value of about 400 dollars per share. However, Google will keep going up as long as people keep clicking on "I'm feeling lucky". Looking at its

historical prices, shown in Figure 4.7, I found that GOOG's prices could change as much as 10 dollars everyday! A good way to make money in GOOG in short term is to buy at its low price and wait to sale at the high price of the day. I considered the prices around 374 dollars as a low price to buy. Instead of holding GOOG just for one day, I held it longer to let the price grow. I waited till the price reached 390 dollars per share and sold them. I earned nearly 2000 dollars.

Date	Open	High	Low	Close	Volume	Adj Close*
7-Jun-06	393.24	394.86	386.50	386.51	8,911,300	386.51
25-May-06	379.08	383.00	372.31	382.99	8,194,600	382.99
24-May-06	377.35	383.44	371.61	381.25	9,553,800	381.25
23-May-06	374.21	383.88	373.56	375.58	8,983,000	375.58

Figure 4.7 historical stock prices of GOOG [27]

The good admittance condition of the new Disney World in Hong Kong once more ensured Walt Disney Co.'s brighter future. With more theme parks built and being built, Disney is benefiting greatly from its already-spread Disney culture and turning it directly into profit. With more attention drawn from the parents drawn into their children, Disney will for sure keep making money by providing a more realistic way of pleasing the kids. It will not be surprising to see Disney culture to become an essential part of almost everyone's youth life, including the Asians or Africans. Seeing all these fact, as a Disney products' fun, I decided to invest in Disney. The prices of DIS were relatively high

comparing with other time in the past 12 months. It might not be wise to wait for a big growth in DIS. After having studied about the prices, as shown in Figure 4.8, I decided to sell DIS after its price reach 31 dollars.



Figure 4.8 Technical Analysis Chart of DIS for the past 6 months [27]

The continuously building up demand of automated email replying and instant message responding solutions provides a vast market for IT companies such as the ININ. Concentrating mainly on interactive intelligence, ININ is providing many famous companies with its top-notch interactive intelligence products. Today, many of ININ's famous products could save a large company millions of dollars a year just by responding to customers' emails automatically, accurately and instantly. These entire good things about ININ made up my mind to invest in ININ. The price of ININ has increased constantly since the beginning of the year. After the first purchase of ININ, the price of

ININ dropped. Instead of selling them, I bought in more ININ and hoped the price could go up higher. I could make profit even the price just go up a little. The highest prices of ININ reached 11 dollars for several days, as shown in Figure 4.9. I thought that the price would not go up and break 12 dollars and sold m stocks at the price of 11.02 dollars.

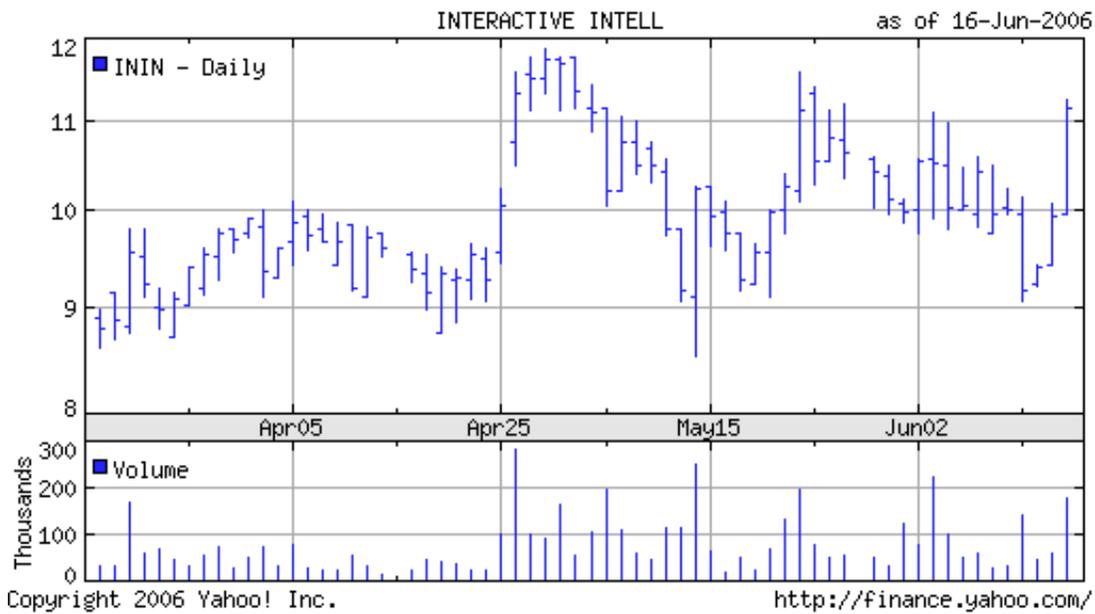


Figure 4.9 Technical Analysis Chart of ININ for the past 3 months [27]

Most of the stock I picked were in DOW 30 and were very expensive. Therefore, trading stocks that have a low price sounds different and attracting to me. A low price offer me the chance to buy more shares, from which I can make sever hundreds of money even if the price only go up several cents. I picked up PCOP and ALTI from the analyst opinion on yahoo.com. PCOP belongs to the sector healthcare, which I believe is acting an in important role in today's daily life. Also being the leading industry of the century,

biotechnology is developing very fast. ALTI is a corporation provides basic materials to the industry. No matter which industry is earning more money, they all need the essential materials to operate the factory. Thus I think buy basic materials is a good idea. The result of my trading proved what I thought was right. ALTI went up 12 cents and PCOP went up 29 cents by the time I sold them. These two stocks brought me about 800 dollars profit.

WMT is only stock from which I did not make any profit. As the wealthiest cooperation in today's world, Wal-Mart's lead in grocery dealing is indubitable. Wal-Mart's now strategy of expanding its market by opening more stores abroad, however, is not as unquestionable, since latest news spreads that Wal-Mart is closing its stores in Germany, as well as some other countries. An underestimation of the difficulties of entering another country might have led to this. After all, this is reflected in Wal-Mart's unstable stock performance. I thought WMT was in a uptrend since the end of April from reading figure 4.10. The price reached 50 dollars on May, 26. I decide to wait till it grows more but I made a mistake. The price went down after hitting 50 dollars. By the time I sold WMT, the price was already as low s 47 dollars. I found two reasons for losing money. One is I decide to buy the stock at a price not low enough without more research; the other is that I was thinking about earn more when is actually a good time to sell, thus miss the chance to earn money.

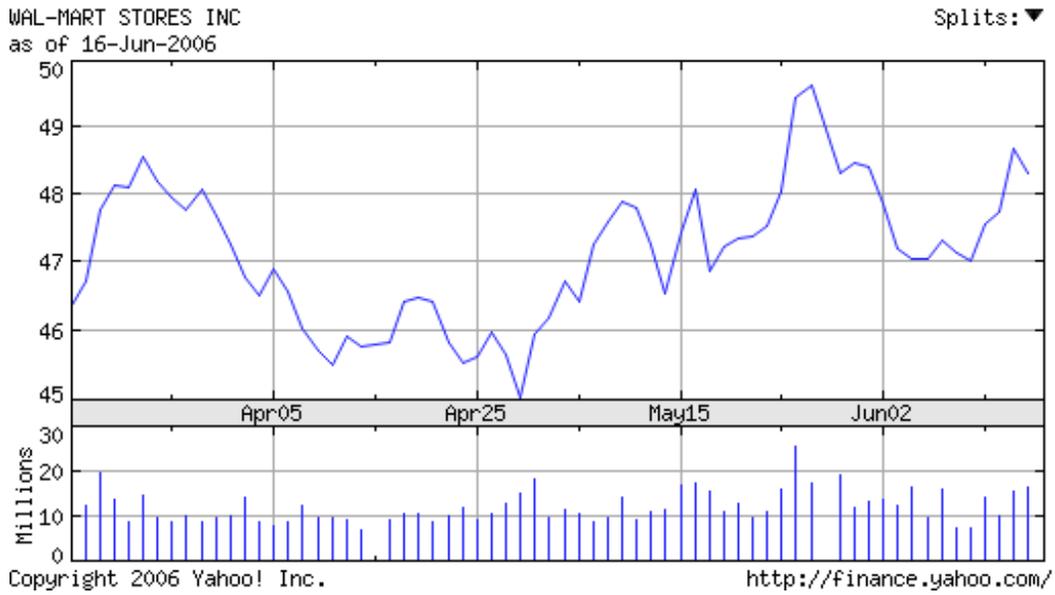


Figure 4.10 Technical analysis chart of WMT for the past 3 months [27]

## **Chapter 5 Conclusion**

The entire project was done during the summer vacation. This is a project that guides students how to invest in stock market. I read two books that talk about stock market carefully at the beginning of the project. A basic understanding about stock market and stock trading was established. There were also several useful website that helped me a lot in understanding the different ideas and definitions. After having studied the basic definition and ideas about stock and stock market, I started my short-term stock simulation. When the simulation was done, I analyzed and concluded about the simulation.

Even though all the trades were just a simulation, they made me feel as if they were all real. I got excited when the prices went up. When I found out that my stocks were losing money, I felt upset. At the beginning, I was worrying about the stocks that were dropping at certain moment. As the simulation proceeded, I slowly realized that stock trading in general is a worrying job. It is very hard to “time the market”, i.e., to decide when is the perfect time to buy or sell. Take the selling of a winning stock for example, one will never feel willing to sell it while the price is still rising, since the later higher price will make the decision of selling earlier seem rather stupid. Nor is it an easy decision to sell an earlier winning stock, since one will always hope that the stock will come back up real soon. In this simulation, I lost money on WMT for exactly the same reason. Stock trading is rational only after one has left those concerns behind. Also, one

should be prepared of all harsh experience that the stock market will give him/her. Losing half of one's wealth in a couple of days is no longer hardly-heard-of, only that those opposite stories are being spread more soundly.

Overall, the experience of this simulation is precious to me in two aspects: several weeks of thorough study of the stock market provided me with a better understanding of economy in both micro and macro ways; also that having written this long and complete report exercised my abilities of organizing and analyzing data and information. Those will help me greatly with my coming school years of researching and studying. And more realistically, this will help me to invest more wisely later in my life.

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