



# IIT School of Applied Technology

ILLINOIS INSTITUTE OF TECHNOLOGY

**information technology & management**

## **527 Data Analytics**

Final Project – Group3  
Apple Inc.

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# About Apple Inc.

- ◆ Apple Inc. is an American multinational technology company headquartered in Cupertino, California, that designs, develops, and sells consumer electronics, computer software, and online services.
- ◆ Apple was founded by Steve Jobs, Steve Wozniak and Ronald Wayne on April 1, 1976 to develop and sell personal computers.
- ◆ It was incorporated as Apple Computer, Inc. on January 3, 1977, and was renamed as Apple Inc. on January 9, 2007, to reflect its shifted focus toward consumer electronics.
- ◆ Some of their products are as follows:
  - iPhone smartphone
  - iPad tablet computer
  - Mac personal computer
  - iPod portable media player
  - Apple Watch smartwatch.
- ◆ Apple is the world's largest information technology company by revenue, the world's largest technology company by total assets, and the world's second-largest mobile phone manufacturer.

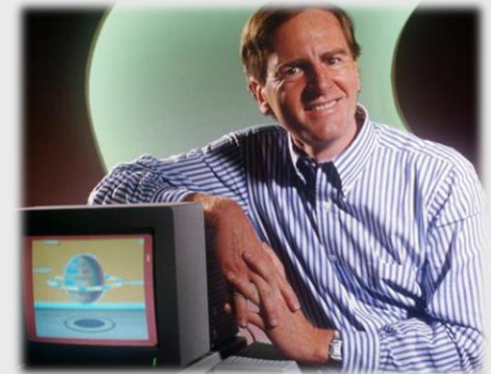
# List of CEO's



1977 to 1981 – Michael Scott



1981 to 1983 – Mike Markkula



1983 to 1993 – John Sculley



1993 to 1996 – Michael Spindler



1996 to 1997 – Gil Amelio



1997 to 2011– Steve Jobs

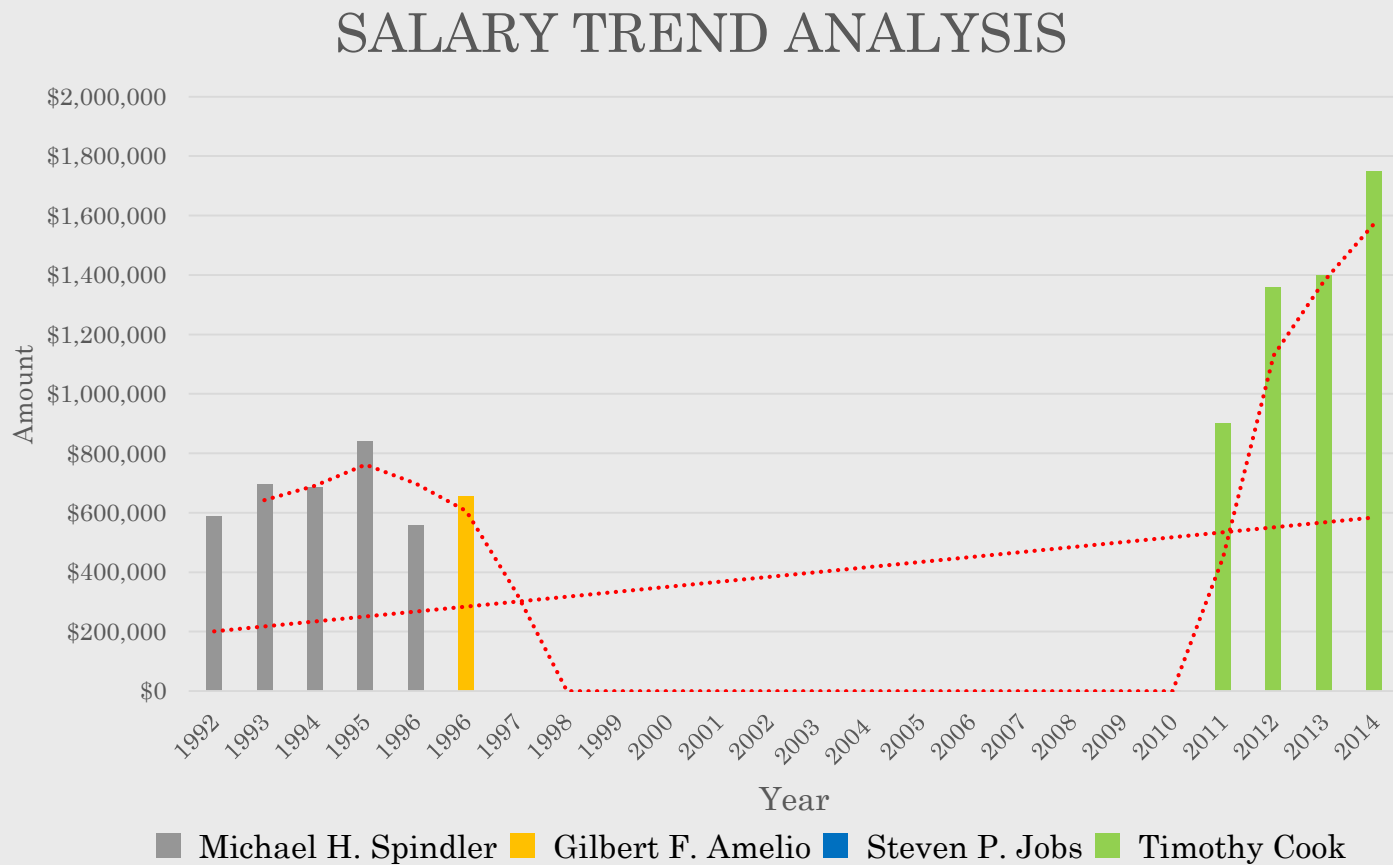


2011 – Present : Tim Cook

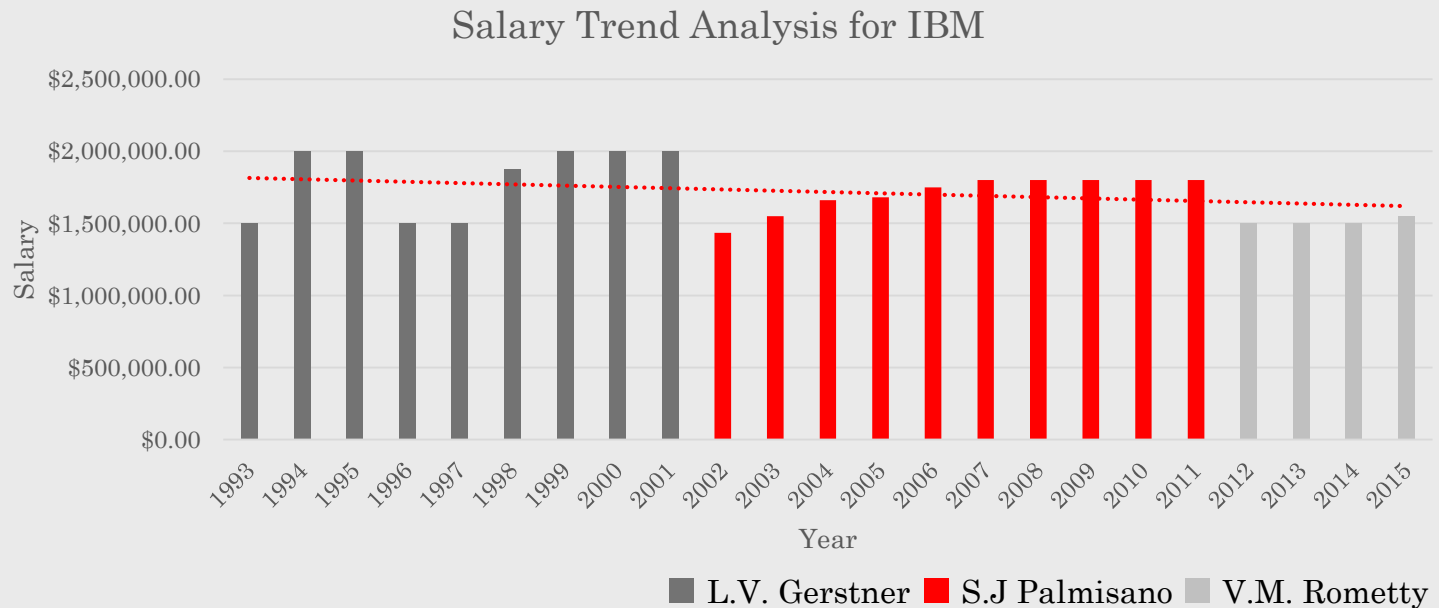
# About DEF 14A Filing

- ◆ A **proxy statement** is a statement required of a firm when soliciting shareholder votes.
- ◆ This statement is filed in advance of the annual meeting.
- ◆ The firm needs to file a proxy statement, otherwise known as a Form DEF 14A (Definitive Proxy Statement), with the U.S. Securities and Exchange Commission. This statement is useful in assessing how management is paid and potential conflict-of-interest issues with auditors.
- ◆ The statement includes:
  - Voting procedure and information.
  - Background information about the company's nominated directors including relevant history in the company or industry, positions on other corporate boards, and potential conflicts in interest.
  - Board compensation.
  - Executive compensation, including salary, bonus, non-equity compensation, stock awards, options, and deferred compensation. Also, information is included about perks such as personal use of company aircraft, travel, and tax gross-ups. Many companies will also include pre-determined payout packages for if an executive leaves the company.
  - Who is on the audit committee, as well as a breakdown of audit and non-audit fees paid to the auditor.
- ◆ Apple Inc. has 22 DEF 14 A filings on <https://www.sec.gov/> site

# Graph – Salary Trend (Apple Inc.)

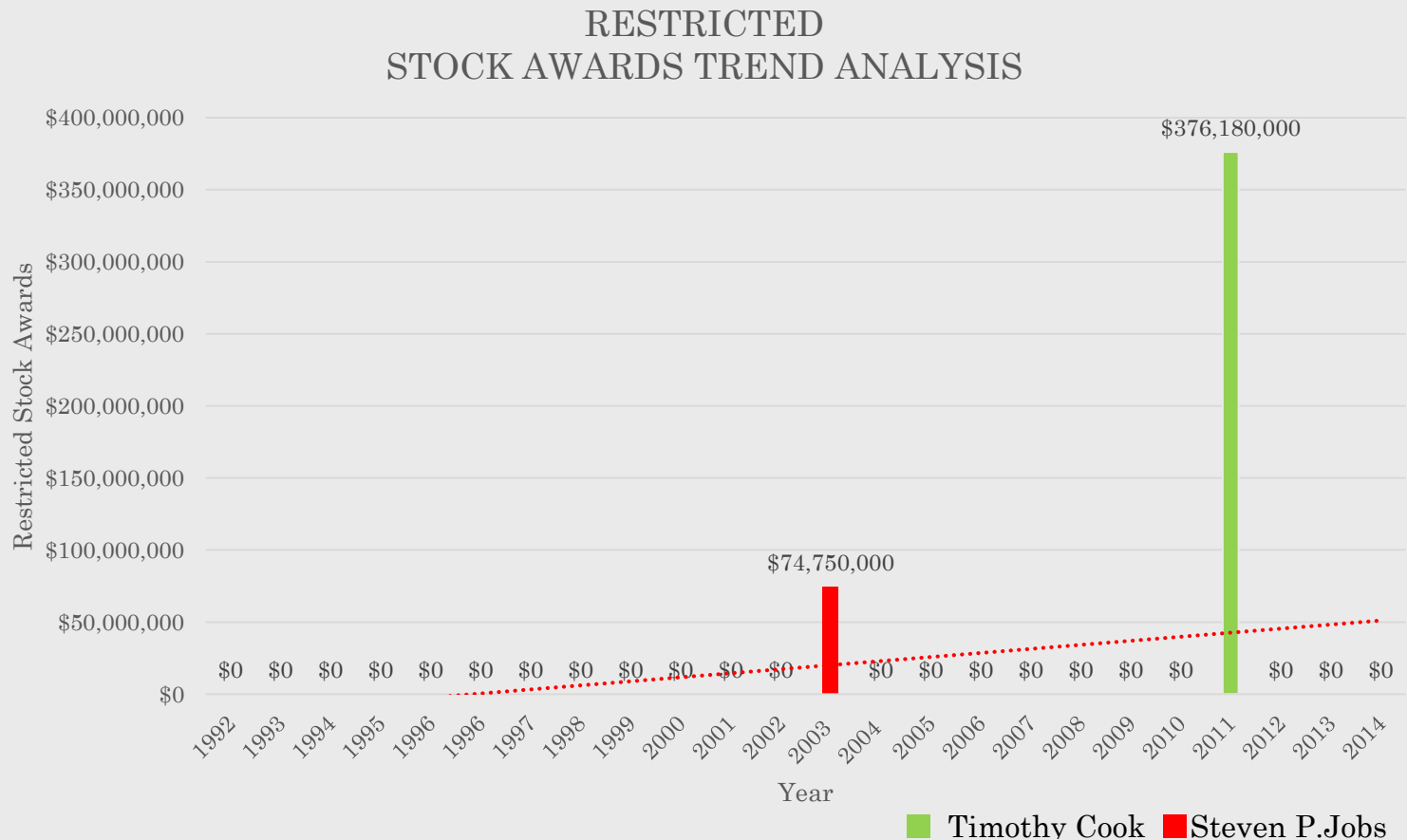


# Graph – Salary Trend (IBM)



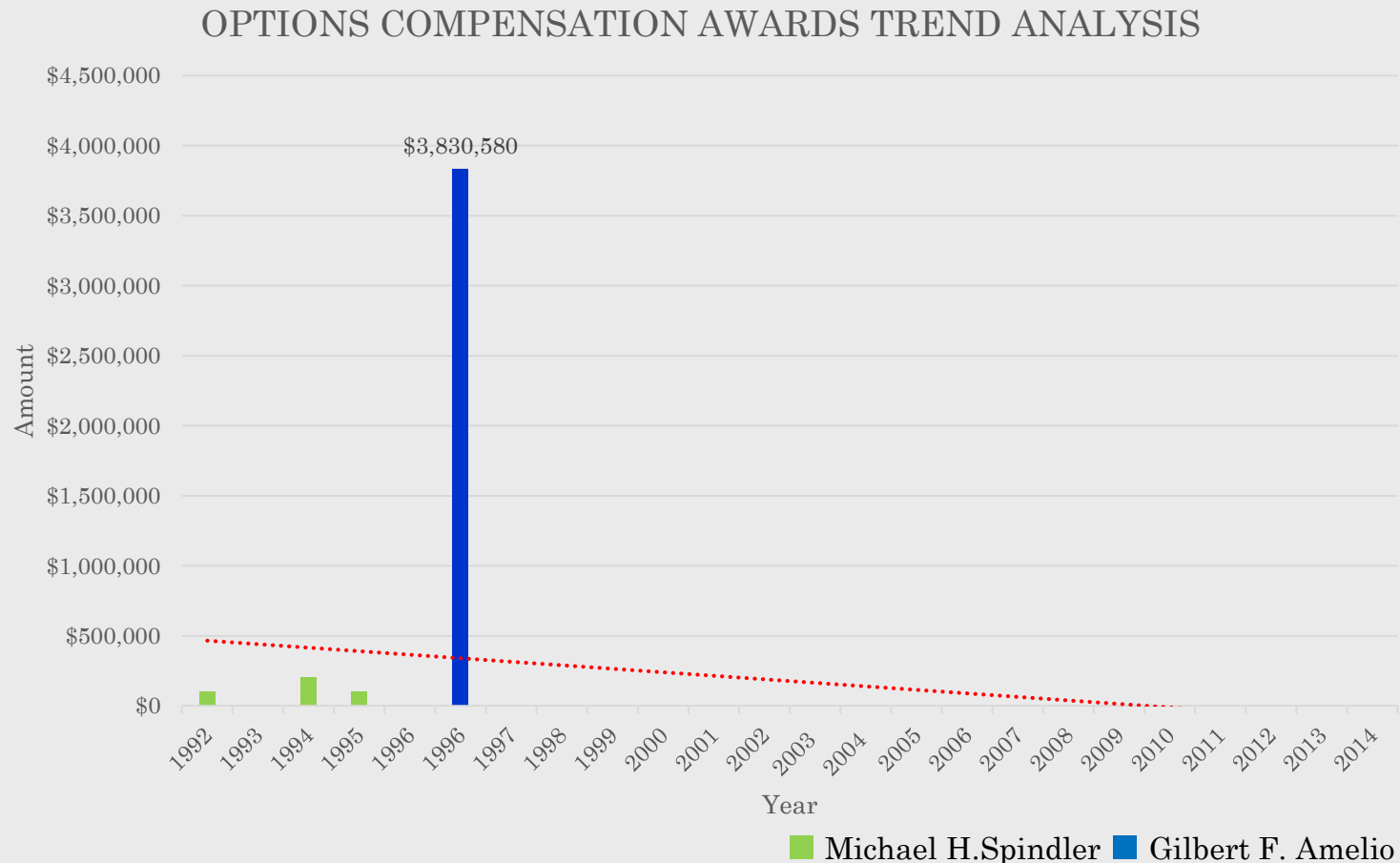
- ◆ There is a drop in the salary for every new CEO that is appointed. It can be seen here in the CEO salary trend for IBM.

# Graph - Stock Awards





# Graph – Option Awards

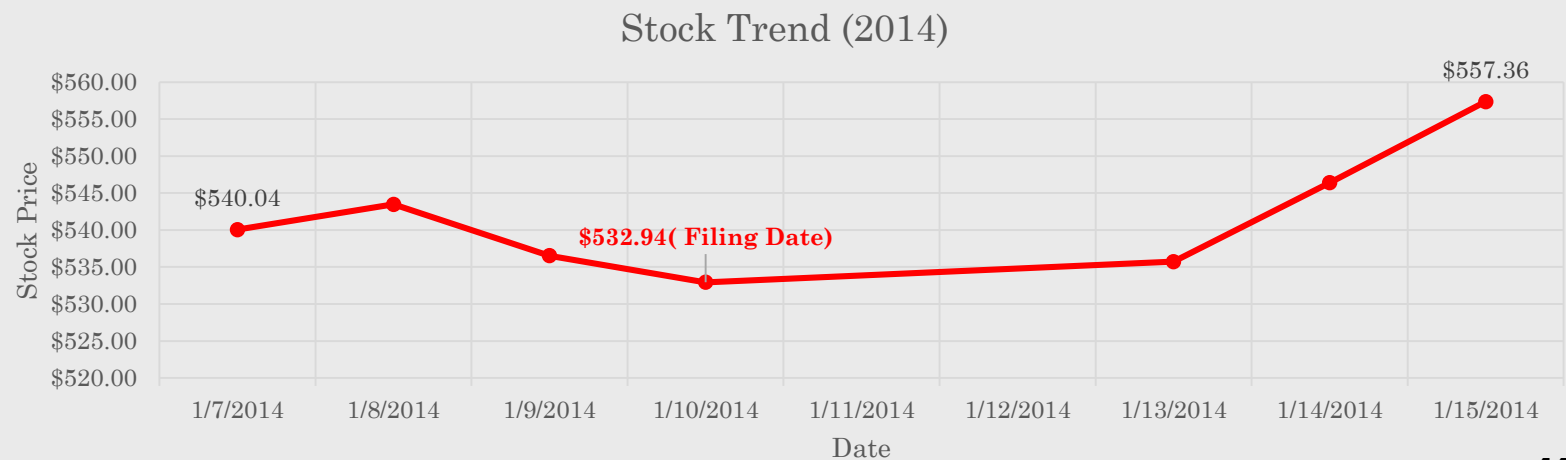
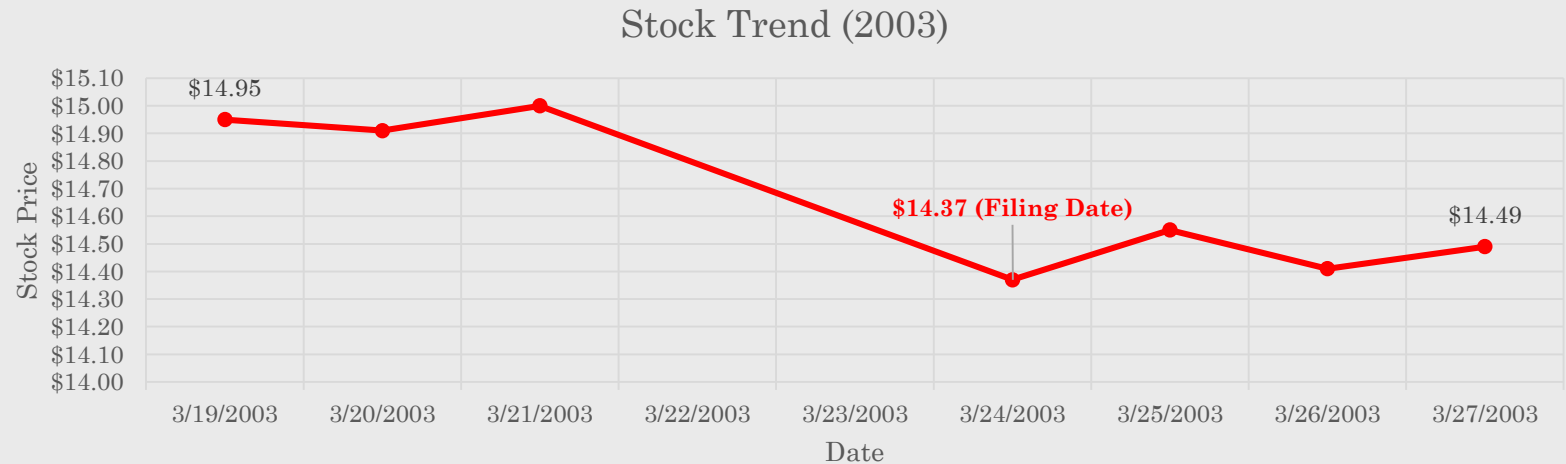


- Year 1996 in x-Axis is repeated because it includes the data for Michael H. Spindler, former president and CEO and Gilbert F. Amelio, Chairman of the Board and CEO

# Cumulative Analysis

- ◆ Salary Trend Analysis
  - Steven P. Jobs – \$1 salary as CEO.
  - We see that the salary of the CEO had a major fall in 1996 followed by the change in the then CEO; Michael H. Spindler to Gilbert F. Amelio. These events can be compared with the fall in stock price in that year (1996), where it reached a low of \$23 as seen in the Stock Trade Activity.
- ◆ Stock Awards Trend Analysis
  - In the year 2003 Steven P. Jobs was awarded the maximum amount of vested stocks, through his reign as the CEO. The stock price in 2003 was cited at a low of \$15 (seen in the Stock Trade Activity), which would have been an opportunity for Jobs to purchase maximum market shares.
- ◆ Option Awards Trend Analysis
  - In the year 1996, the then CEO, Gilbert F. Amelio was awarded a huge amount of stock options. The stock price in 1996 was cited at a low of \$18 (seen in the Stock Trade Activity), which would have been an opportunity for him to purchase maximum option awards.

# Stock Trading Activity Analysis



# Stock Trading Activity Analysis (Cont.)

- ◆ Intended to find trends in stock price, by recording stock activity, a few days before and after DEF 14a filing.
- ◆ For instance a set of data from an earlier year(2003), and a recent years data(2014) is considered.
- ◆ The stock price for the year 2003 has minor fluctuation which almost remained \$14 throughout.
- ◆ Whereas there is a plunge in the stock price for 2014 where it goes down from \$540 to \$532 and goes up to \$557.
- ◆ No recognizable pattern was observed among the stock trading activity and DEF 14a filing dates. We believe that this is because the stock price depends other factors and not the filing date.

# Stock Trading Activity Analysis (Cont.)

- ◆ An interesting fact which was identified during the process of finding trends in Stock Trading Activity is stock split.
- ◆ Apple was a trend setter who coined the term stock split in April 2014. During this process the stocks are split into 1:7 ratio and the stock prices plunge to a much lower price.
- ◆ It was a strategy to lure more investors and thereby gain a huge profit.



# Intro - Text Analytics

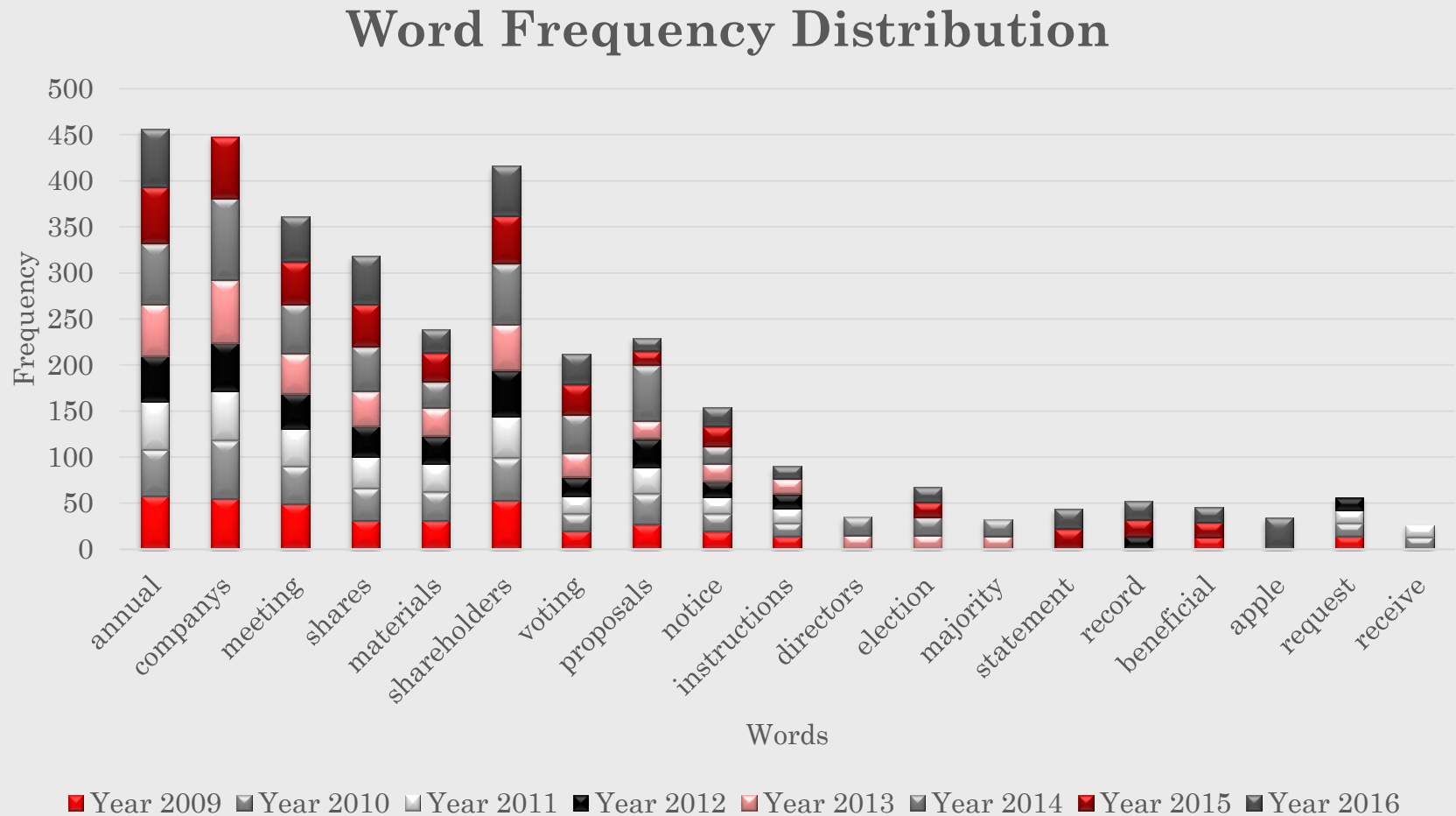
- ◆ We identified the Q&A Section from the DEF 14A filing over the years (General Information)
- ◆ Saved these sections to help form a Corpus
- ◆ Formed a Corpus of these sections using the “TM” package.
- ◆ Cleaned the Corpus
  - To Lower Case
  - Remove Punctuation
  - Remove Numbers
  - Remove Default & customized list of stop words. (Ex- the, most, here...)
  - “GSUB” to remove any unwanted signs and unwanted data
  - Remove Sparse Terms and Stemming (Optional)
- ◆ Created a Document Term Matrix
- ◆ Used “FindFreqTerms” function to find most frequent terms & their counts in the corpus
- ◆ Understood PATTERNS from these words which helped to make sense of the data.

# Table - Word Frequency Distribution

*findFreqTerms(dtm[dtm\$dimnames\$Docs=="Document Name"],2,100)*

Year	Frequency							
	2009	2010	2011	2012	2013	2014	2015	2016
annual	58	50	52	50	56	66	61	63
companys	55	63	54	52	68	89	67	60
shareholders	53	46	45	50	50	66	52	54
meeting	49	41	41	38	43	54	46	49
shares	31	35	34	34	37	49	46	52
materials	31	31	31	30	30	29	31	26
proposals	27	33	29	31	19	61	15	14
voting	20	18	20	20	26	42	33	33
notice	19	19	18	18	19	19	21	21

# Graph - Word Frequency Distribution





# Key Event Indicators

- ◆ KEI (Frequently Occurring Words):
  - “*annual*”, “*meeting*”, “*shares*”, “*material*”, “*shareholder*”, “*voting*”, “*proposal*” and “*notice*” occur in all filings.
  - These words can be used for PATTERN Matching to identify filings for Apple Inc..
- ◆ KEI (Flag Words):
  - “*directors*”, “*election*”, “*majority*” occur most frequently in the years 2013 and 2014.
  - Questions include “*how to vote?*”, “*When to vote ?*”, “*deadlines for voting ?*”.
  - Election was to be held for new board of directors which explains the high usage.
  - “*request*” occurs mostly in 2009, 2010, 2011, 2012.
  - Mostly used in the context of “*on request for the printed copy of the proxy document*”.
  - There was decrease in Volume of requests for proxy documents in the following years.

# Word Cloud



- ◆ This word cloud is formed by using a corpus which consists of Q&A sections from multiple DEF -14A filings.
- ◆ It displays only the most frequently occurring words from the corpus.

# Word Correlations Findings

- ◆ Used **FindAssocs()** function and found the word “*Shareholders*” has a 0.93 relation coefficient with “*annual*”, “*election*”, “*voting*”.
- ◆ Also the vice-versa holds true. “*Election*” has a 0.95 relation coefficient with “*shareholders*”.(seen below)
- ◆ Signifies that words are used in similar context.
- ◆ Multiple Correlations can be found depending on the objectives.

*findAssocs(dtm, “shareholders”, corlimit=0.93)*

```

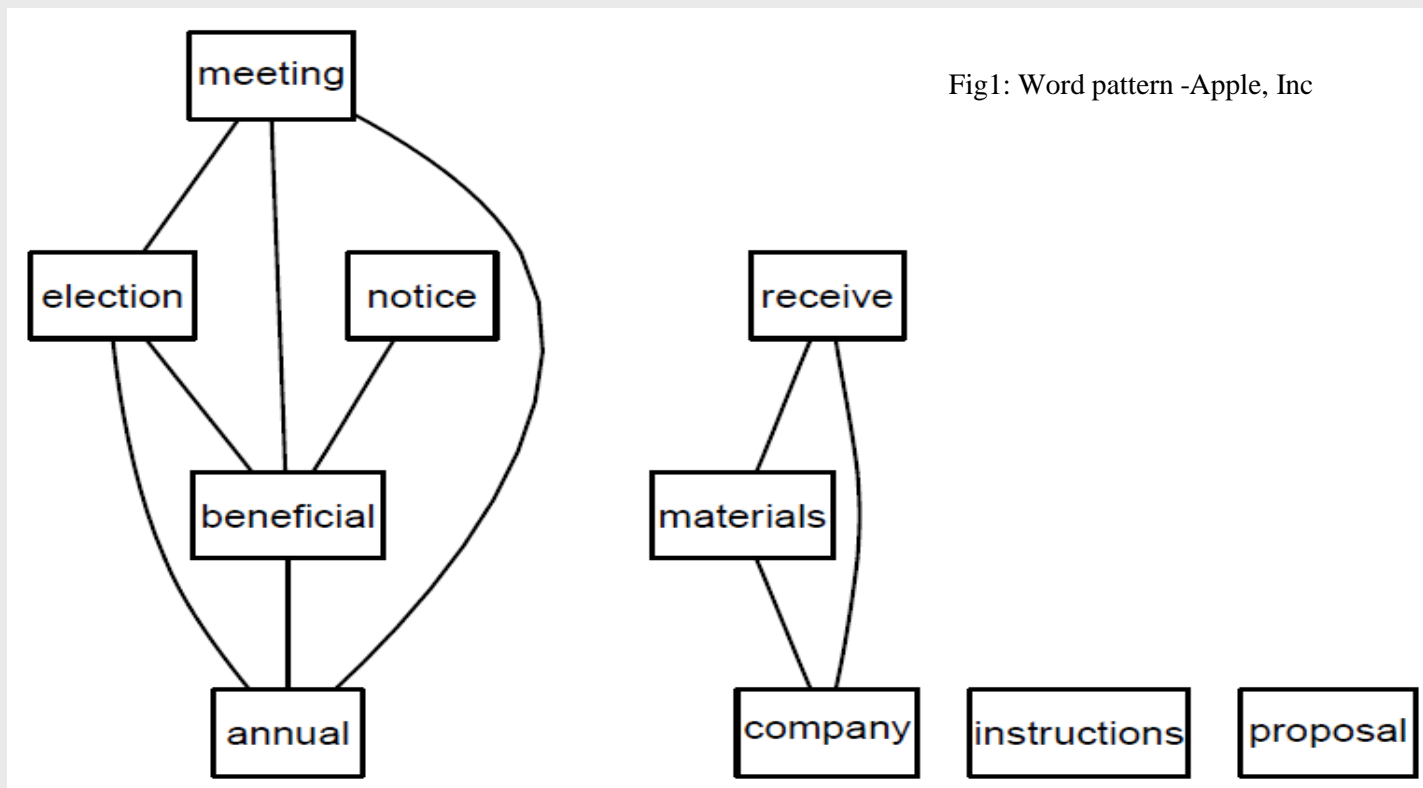
0.91      0.91      0.91      0.91      0.91      0.91      0.90      0.90
> findAssocs(dtm, "shareholders", corlimit = .93)
$shareholders
  annual    taking beneficial constitute  owners    change election represented    voting  accordance
    0.97     0.97     0.96     0.96     0.96     0.95     0.95     0.95     0.95     0.94
    ii      intends
    0.93     0.93

> findAssocs(dtm, "election", corlimit = .95)
$election
 candidates    intends    bruce    building    change    commission environmental    exceed    expiration
    0.99     0.98     0.96     0.96     0.96     0.96     0.96     0.96     0.96
  order    primary    quorum    returning    sewell    uses    voting    shareholders    taking
    0.96     0.96     0.96     0.96     0.96     0.96     0.96     0.95     0.95

```

# Correlation Plot (Rgraphviz)

```
plot(dtm, terms=findFreqTerms(dtm, lowfreq=100)[1:8], corThreshold=0.7)
```



# Correlation Plot – IBM

◆ Frequent words

*Intermediary*

*Broker*

*Bank*

Shown in Fig 1

◆ Words which form a pattern for IBM.

◆ Common words across companies.

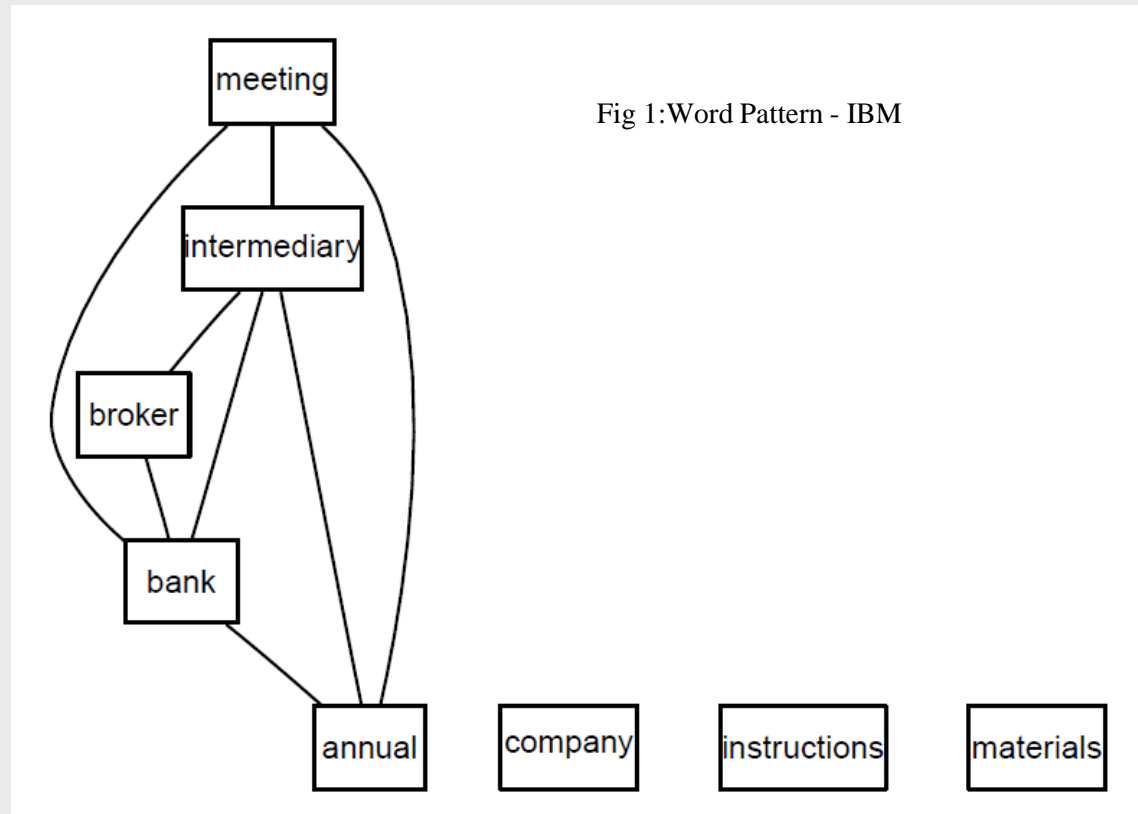
*Company*

*Instructions*

*Materials....*

◆ This shows the

Presence of similar words across companies, referring to similar questions.



# Conclusion & Future Uses

- ◆ Automated the Compensation data from the SEC site, which reduces time and effort.
- ◆ This Automation can be applied when gathering data, for different requirements.
- ◆ Understood the CEO compensation details over the history of the company with a click of a button.
- ◆ Text Analysis also helped understand and make sense of the data without going through it.
- ◆ Identified word patterns, understood their trends and found possible reasons for it.
- ◆ Other Uses -
  - Brand analysis
  - Marketing analysis
  - Customer reaction reviews
  - Used for Intelligence gathering (avoid any terror attacks)