Introduction to Business Analytics

* Technological advances
  + Scanner tech
  + Data collection through e-commerce
  + Social networks
* Businesses want to use these types of data to
  + Improve efficiency.
  + Increase profitability.
  + Better understand customers.
  + Gain competitive advantage.
* Ongoing Research has resulted in numerous methodological developments.
  + More effective approaches for visualizing data
* Better Computing Hardware
  + Cloud computing
  + Parallel computing
* Business Int -> Big Data -> Data-Enriched offerings
  + Data scientist jobs were developed.
* Business analytics
  + Scientific process of transforming data into insight for making better decisions
  + Used for data-driven or fact-based decision making, which is often seen as more objective than other alternatives for decision making
* Tools of analytics can aid decision making
  + Creating insights from data
  + Improving our ability to more accurately forecast for planning.
  + Helping us quantify risk.
  + Yielding better alternatives through analysis and optimization.
* Descriptive Analytics: Encompasses the set of techniques that describes what has happened in the past:
  + Data queries
  + Reports
  + Stats
  + Data visualization
  + Data-mining techniques
* Data query: A request for information with certain characteristics from a database
* Data dashboards: Collections of tables, charts, maps, and summary statistics that are updated as new data become available
  + Monitor performance
  + Summarize sales
  + Inform team of critical metrics
* Predictive analytics: use models from past data to predict the future or ascertain the impact of one variable on another.
  + Techniques used
    - Linear regression
    - Time series analysis
    - Data mining is used to find patterns or relationships among elements of the data in a large database; often used in predictive analysis
    - **Simulation** involves the use of probability and statistics to construct a computer model to study the impact of uncertainty on a decision.
* Prescriptive Analytics: Indicates a best course of action
  + Optimization models: Models that give the best decision subject to constraints of the situation
  + Simulation optimization: Combines use of probability and statistics to model uncertainty with optimization techniques to find good decisions in highly complex and high uncertain.
  + Decision analysis
    - Used to develop an optimal strategy when a decision maker is faced with several decision alternatives and an uncertain set of future events.
    - Employs utility theory, which assign values to outcomes based on the decision maker’s attitude toward risk, loss, and other factors.
* Big Data: A set of data that cannot be managed, processed, or analyzed with commonly available software in a reasonable amount of time
  + Opportunities
  + Present challenges in terms of data storage and processing, security, and available
  + Volume: TBs of data to process
  + Velocity: Streaming data
  + Variety: Type of data
  + Veracity: Uncertainty due to data inconsistency & incompleteness
* Positions in Business Analytics
  + Business Analyst
  + Data Scientist
  + Data Analyst/Data Manager
  + Strategy Analyst
  + Business Intelligence Analyst
  + Analytics Consultant
  + Database and Reporting Analyst
* Financial analytics
  + Use of predictive models
    - Forecast future financial performance
* Human Resources
  + Newer area of application for analytics
  + HR function is charged with ensuring that the organization
    - Has the mix of skill sets ecessary
    - Is hiring highest-quality talent
    - Achieves diversity goals
* Marketing analytics
  + A better understanding of consumer behavior through marketing analytics leads to:
    - Better use of advertising budgets
    - More effective pricing strategies
    - Improved forecasting of demand
* Health care analytics
  + Descriptive, predictive, and prescriptive analytics are used to improve:
    - Patient, staff, and facility scheduling
    - Patient flow
    - Purchasing
    - Inventory control
* Supply chain analytics
  + The core service of companies such as UPS and FedEx is the efficient delivery of goods, and analytics has long been used.
* Analytics for government to:
  + Drive out inefficiency
  + Increase the effectiveness and accountability programs
* Web analytics
  + Analysis of online activity, which includes visits to web sites and social media sites
  + Leading companies apply descriptive and advanced analytics to data collected in online experiments to determine the best way to:
    - Configure web sites
    - Position ads
    - Utilize social networks for the promotion of products and services