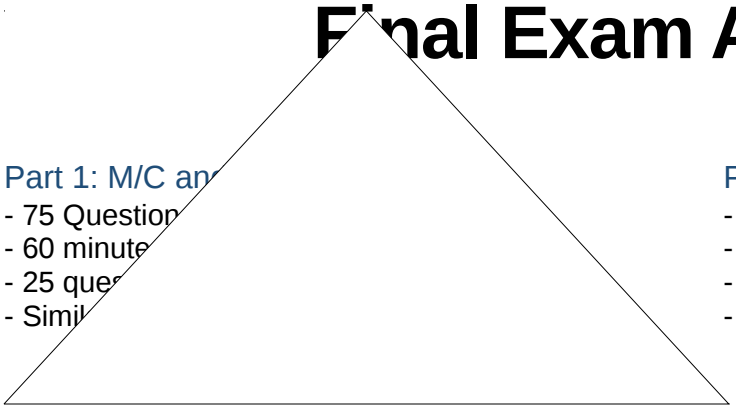
Final Exam ADM1370



Part 1: M/C an
- 75 Question
- 60 minute
- 25 que
- Simil

Part 2: Short Answer
- 6 short answer questions
- 2 questions per section
- 30 marks
- lecture notes and class discussions

Wiki:

- course pack units 1, 2 and 3
- not on technical part of wikis

Excel:

- course pack all units
- short answer will test:
  - theoretical concepts
  - types of business intelligence dashboards

You may be tested on your familiarity with concepts such as:
- Purpose of creating Excel tables
- Difference between conditional and logical functions
- Difference between structured, absolute and relative references
- Purpose of decision analysis / what-if analysis tools such as Data Tables, Goal Seek, and Solver

While you are required to know the purpose of various Excel features and functions that were discussed in class, you will not be asked to recall parameters for functions or their order:
- For example, you should know that VLOOKUP allows you to search for values in a table that correspond to a lookup value, you will not be asked to write the function or specify what parameters are required.

Access:

- course pack: the first chapter only “Data, Text, and Document Management”
- all slides
- Students won’t be tested on technical aspects of MS Access such as those from the lab assignment.

Wiki

- Information technology tools to support **operational, tactical and strategic** level processes and decision making in an organization

- What is an Information System?
  - Provides accurate, timely and useful information (all elements must be present to work together).
  - An Information System consists of **FIVE** PARTS, including:
    - ⇨ People, Procedures, Software, Hardware, and Data
- IT = hardware + software + data
- You cannot buy IS, only IT.

- IS aid the decision making process:
  - Improve productivity
  - Monitor Organizational Performance
  - Planning and Decision-Making
  - Enhance Competitive Advantage

- **Data**: symbols , raw facts, must be “put together” in order to form information
- **Information**: data that are processed to be useful; provides answers to "who", "what", "where", and "when" questions
- **Knowledge**: application of data and information; answers "how" questions
- **Understanding**: appreciation of "why"
- **Wisdom**: evaluated understanding.

- Three core activities of information systems:
  - **Input**: Captures raw data from organization or external environment
  - **Processing**: Converts raw data into meaningful form
  - **Output**: Transfers processed information to people or activities that use it

- E-business involves:
  - Consumers
  - Producers
  - Information
  - Connectivity
- Education in IS is a crucial skill that management must have now a days. Socialnomics is proof, that a new era has begun with all the available technology at fingertips end for a user. A good IS education is comprehensive across the skills listed below.

Robert Reich created this concept (listed from top to bottom of triangle scheme):

i. **Abstract Reasoning Skils:** The ability to analyze information, detect patterns and relationships, and solve problems on a complex and intangible level.

i. **Systems Thinking Skills:** Understanding how things, regarded as systems, influence one another within a whole.

i. **Collaboration Skills:** Specific ways in which students are expected to behave in order to achieve class norms. It is often associated with effective interactions and team work.

i. **Experimentation Skills:** The ability to effectively discover something unknown or to test a principle, hypothesis, etc.

- Business process involves MANNER, FLOW and COORDINATION
- Innovative Connectivity
  - Social media tools **connect** people to processes and information
  - Apps are simply the means of doing that to help prevent information indigestion
  - It **accelerates** the data to information cycle to make information acquisition more efficient
  - Business processes gain **new perspectives**

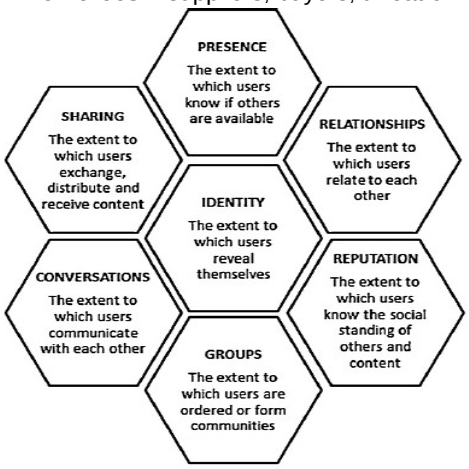
Exam Question: Gives a company and pitches situation of invention. How did it change nature of business to become more sustainable? Why did it give them an advantage? What was the game changer?

- **Digitalization**: the replacement of physical tasks by digital means
- **Digital Goods**: Goods that can be delivered over a digital network

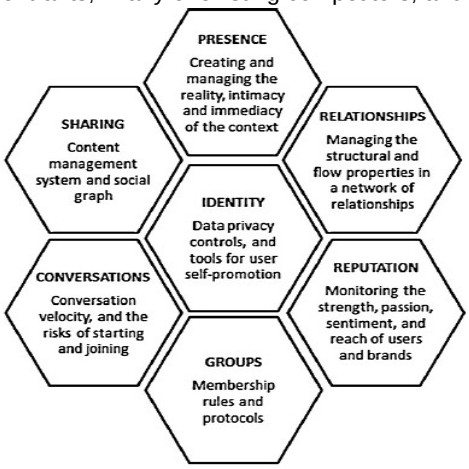
- ***Competitive advantage*** – a product or service that an organization's customers place a **greater value** on than similar offerings from a competitor

- ***First-mover advantage*** – occurs when an organization can significantly impact its market share by being **first to market** with a competitive advantage

- **Porter's Five Forces** = suppliers, buyers, threat of new entrants, rivalry of existing competitors, and substitutes



Social Media Functionality



Implications of the Functionality

- Three strategies for generating revenue from Web 2.0 applications:
  - Advertising
  - Subscriptions
  - Commissions
- **Wiki**: a website/online resource which allows users to **add** and **edit** content **collectively.** (A collaboration tool)

Globalization:

- Globalization 1.0 (1492 to 1800)
  - Globalization focused on countries
- Globalization 2.0 (1800 to 2000)
  - Globalization 2.0 focused on companies (searching labor and marketing)
- Globalization 3.0 (2000 to present)
  - Globalization 3.0 focused on groups and individuals (globalizing themselves with others around the world)
  - Worldwide Communication
  - Worldwide collaboration without barriers

10 Flatteners By Friedman:

- **1. Fall of the Berlin Wall**
  - After the end of the Cold War, this allowed people from other side of the wall to join the economic mainstream.
- **2. Netscape goes public**
  - Netscape and the Web broadened the audience for the internet from its roots as a communications medium for anyone. The digitization that took place meant that everyday occurrences such as words, files, films, music and pictures would be accessed and manipulated on a computer screen by all people across the world.
- **3. Development of workflow software**
  - The ability of machines to talk to other machines with no humans involved.
- **4. Uploading/ Open Sourcing**
  - Communities uploading and collaborating on online projects.
  - Ex: Wikipedia
-
- **5. Outsourcing**
  - Outsourcing has allowed companies to split service and manufacturing activities into components which can subcontracted and performed in the most efficient, cost-effective way. Process became easier with the mass distribution of fiber optic cables during the introduction of the World Wide Web.
- **6. Offshoring**
  - The internal relocation of a company's manufacturing or other processes to a foreign land to take advantage of less costly operations there. China's entrance into the World Trade Organization allowed for greater competition in the playing field. Other countries like Brazil must now compete against China to have businesses offshore to them.
- **7. Supply Chaining**
  - Friedman compares the modern retail supply chain to a river, and points to Wal-Mart as the best example of a company using technology to streamline item sales, distribution, and shipping.
- **8. In-Sourcing**
  - Friedman uses UPS as a prime example for insourcing, in which the company's employees perform services – beyond shipping – for another company. For example, UPS repairs Toshiba computers on behalf of Toshiba. The work is done at the UPS hub, by UPS employees.
- **9. In-Forming**
  - Individual's ability to build and deploy your own supply chain of information, knowledge and entertainment
  - Self-empowering; empowering individuals to do what they think best with the information they want.
  - The opportunity for people to have private, semiprivate, or public gatherings on the Internet regardless of geography and time
  - EX: Search Engines, RSS Feed

- **10. The Steroids**
  - Wireless, Voice over Internet, and file sharing.
    - The new technologies that are amplifying and turbo-charging all other flatteners.

- EX: Computing speed and capacity, Instant messaging, Videoconferencing, Computer graphics, Wireless technologies and devices, mobile phones, personal devices
- Keywords: digital, mobile, personal, virtual.

- What were the three specific examples of Digital Steroids cited by Friedman?
  - 1: Computing Speed / Storage / Portability ;
  - 2: Peer-to-Peer Features (IM, File Sharing);
  - 3: Voice over IP (e.g. Skype)

- **RSS** (Really Simple Syndication): standardized data format used to publish frequently updated content such as blog entries and news headlines
  - Website material is made available to end users or other sites through web feeds.
  - Content distributors syndicate a web feed, thereby allowing users to subscribe to it.
  - Revolutionary because it has the ability to deliver granular news on demand.

WEB 2.0 Concepts:

- **Definition of Web 2.0:** a second generation in the development of the World Wide Web, conceived as a combination of concepts, trends, and technologies that focus on user collaboration, sharing of user-generated content, and social networking.
  - Examples: Social Networking Sites, Video Sharing Sites, WIKIS, Blogs
  - Mash-ups and API's (Application Programming Interfaces)

- **Attributes:**
  - The ability to tap into the collective intelligence of users Data is made available in new or never-intended way.
  - Relies on user-generated and user controlled content and data.
  - Lightweight programming techniques and tools let nearly anyone act as a website developer
  - The virtual elimination of software-upgrade cycles make everything (continuous) a perpetual beta or work-in-progress. Applications can be designed quickly to meet changing needs.
- **Take note:**
  - Rapid and continuous creation of new business models.
  - Major emphasis on social networks and computing.
  - Users can access applications entirely through a browser.
  - Information sharing and collaborating is highly encouraged. Same for adding value to the application the user uses.

Web 1.0 vs. Web 2.0

Web 1.0	Web 2.0—the Social Web
Static pages	Dynamic pages
Author controlled content	User controlled content
Computers	Computers, cell phones, televisions, PDAs, game systems, car dashboards
Users view content	Users create content
Individual users	User communities
Marketing goal: *influence*	Marketing goal: *relationships*
Data: single source	Data: multiple sources, e.g., mashups

- **Social Media**: is a group of mobile and web-based applications (Listed below) that build on the *ideological and technological foundations of Web 2.0 (widgets, Mashups, Syndication, API's)* , and that allow individuals and communities to share, co-create, discuss and modify user-generated content.

  - Social Networks: Facebook, LinkedIn
  - Blogs: Tumblr
  - Microblogs: Twitter
  - Multimedia Sharing: Youtube

- **API (Application Programming Interface):** specifies a software component in terms of its operations, their inputs and outputs and underlying types. Its main purpose is to define a set of functionalities that are independent of their respective implementation, allowing both definition and implementation to vary without compromising each other.
- **Widgets:** Are standalone programs that can be embedded into web pages, blogs, profiles on social networking sites, and common desktops. A small application with limited functionality that can be used within a web page/mobile web.
- **Syndication:** Uses standardized protocols to permit end users to make use of a site's data in another context (such as another web site, a browser plug in or separate desktop application.)
- **Mash Ups:** A web application that combines data or functionality from more than one source into a single integrated interface or tool:
  - applications generated by combining content, presentation, or application functionality from disparate sources.
  - Revolutionary because of their ability to combine content to form new content.

- Web 2.0 is often called “the social web”

- Many consider it an extension of the old web, not necessarily something new.

- Web 2.0 Applications:

  - ⇨ **Blog**: Content marketing, where info is shared to users

  - ⇨ **Wikis**: many people can edit and update a site, contributions run it.

  - ⇨ **Social networking services**: defined by a *profile* (Facebook, Twitter, LinkedIn)

  - ⇨ **Sharing Sites**: upload and share various media (YouTube)

  - ⇨ **Widgets and Mash-ups**: stand-alone add-ons

  - ⇨ **RSS (really simple syndication)**: feed to allow users to view updates in real time.

  - ⇨ **Social Bookmarking**: Tracking sites that show favourite and most visited

  - ⇨ **AJAX Technologies**: respond to users’ actions without the whole page reloading (HTML, XML, CSS, Java)

  - ⇨ **Social Media**: Collectively all these apps are social media, because control has shifted from organizations to the users individually.

- Businesses have been integrating technologies in order to raise revenues; they risk irrelevancy if they don’t participate.

- Online communities have formed: interacting, collaborating and trading

  - ⇨ Associations, Ethnic communities, Gender communities, Affinity portals (organized by interest), Young People, B2B online (technology blogs and meetings and webcasts), Social networking sites (the mega communities)

- Social networking analysis has begun to build relationships with consumers as they use the tech.
- Facebook remains the most used SNS (social networking service)

Social Media Metric (4) :

- You cannot manage what you do not measure.
- Management depends on data-driven measurements, or metrics, to see the effectiveness of their activities.
- Metrics: evaluating the use and patterns of social media.
- We measure social media to identify key methods of measuring the effectiveness of social media efforts, but acknowledge that there are many variations on what we decide.
  - Managers are kept informed by using performance dashboard to summarize the effectiveness of activity and progress toward goals.
  - This data is continuously fed into dashboards.
- Businesses develop media objectives around various models called response hierarchies.
- Stages:
  - Awareness
  - Knowledge
  - Liking
  - Preference
  - Purchase
- Advertisers set measurable objectives for each stage.

Tool Based Metrics

- are metrics a company uses to determine what a company is trying to achieve.
  - Tool Based metrics are designed to identify information about a specific application. (Web 2.0)

Tactical Metrics

- Another way for organizations to select appropriate metrics is based on tactical objectives. (goals)
- Ex:
  - Increase traffic on website by 10%
  - Increase the number of profiles created on website by 25%.
- Using tactical metrics of this nature, they can determine the relative impact that each of these specific media activities is having on their tactical objectives.

Strategic Metrics

- Aim to fully capture the potential of social media than what is described by focusing on a specific Web 2.0 tool or tactical objectives.
  - 1. Listening: pay attention to what customers are saying online.
  - 2. Talking: Engage in conversations with your customer.
  - 3. Energizing: encouraging customers and fans to spread the word through ratings, reviews and positive "buzz".

- 4. Support: help customers solve problems with online resources and information.
- 5. Embracing: Embrace innovation by inviting customers to share their ideas for products and services.

- Organizations who seek to optimize their performance in ALL 5 areas will identify and implement social media tactics as well as track related metrics to evaluate their progress.
- Social Media monitoring services are purchasable.
- I.E.: Calculate how many posts were posted on their forums.

- Example:
- United Break Guitars.
- Dave Taylor has his guitar get trashed purposely by United American Airlines. They poorly handled the situation.
- Solution is to develop strategic, and tactical metrics to avoid problems like these.

Return On Investment Metrics(ROI)

- This approach attempts to monetize the return on the cost of implementing social media strategies.
- Very appealing because it addresses the need of the businesses organizations to engage in activities that will contribute to revenue goals.
- Example of ROI for social media:
  - If an online retailer can increase traffic to its website by publishing a blog, then the company can track how many of these customers ultimately make a purchase offer reading the blog.

- **Crowd sourcing:** asking users what they want, and what they are demanding. One challenge can be getting the right answer and valid information. A lot of people that answer won't even know what you're asking

⇨ You need a strategy and clear boundaries

⇨ Opens the potential for unethical labour (crowdsource your wiki and pay them to write your wiki)

⇨ Privacy becomes an issue too

Enterprise

- **Enterprise 2.0** refers to Web 2.0 technologies used for some business purpose:

⇨ Promote collaboration and knowledge exchange among employees, consultants and company partners

- **Philosophic Foundations of Enterprise 2.0**
- Organizations had communicated with their audiences using a broadcast model (old model):

⇨ messages flowed from sender to receiver.

- Newer model is the conversation model:

⇨ where communication flows back and forth between sender and receiver.

- **Business use of Web 2.0 technologies:**

⇨ Recruiting and professional networking

⇨ Marketing, promotion, and sales
⇨ Internal collaboration and communication
⇨ Supply chain management 2.0

- Enterprise 2.0 Tools:

⇨ Social media use in businesses is exponentially increasing

⇨ Used for:

- recruiting and professional networking;
- Marketing, promotion and sales;
- Internal collaboration and communication and
- Supply chain management

- Social Media Objectives and Metrics:

⇨ Metrics: evaluating the use and patterns of social media.

⇨ Response hierarchies are used to enhance: awareness, knowledge, liking, preference and purchase

Characteristics of Web 3.0:

- **Main benefit of web 3.0**: allows us to track information because of tags on the information
- Some of the **barriers** are coming around data. As more and more data is collected, how do we decide to bundle the data and tag it. It becomes hard to organize.

- **Web 3.0 = (4C + P + VS)**
- **where**

❑ **3C = Content, Commerce, Community**
❑ **4th C = Context:**
▪ defines the intent of the user; for example, trying to purchase music, find a job, or share memories with friends and family.
❑ **P = Personalization:**
▪ refers to the user's personal characteristics that impact how relevant
❑ **VS = Vertical Search:**
▪ refers to a search strategy that focuses on finding information in a particular content area, such as travel, finance, legal, and medical.

- **Social capital:** the advantage created by a person's location in a structure of relationships. It explains how some people gain more success in a particular setting through their superior connections to other people.
- **Social Network Analysis (SNA)** is the mapping and measuring of relationships and flows between people, groups, organizations, computers, or other information or knowledge processing entities

⇨ **Aggregator, geographical, industry, topical**

Excel

Why Learn Excel?

- most **popular** spreadsheet tool today.
- true “killer app” by many experts.
- using Excel at work, and possibly at home.
- used for simple data management and problem-solving, as well as complex decision making.
- used to **cultivate**
- Critical Thinking and Decision Making Skills
- used to enter, analyze, and present (quantitative) data
- automatic calculation functions
- presentation tools
- enhance the presentation and facilitate **sorting** and **filtering** of data in the ranges.

Four skills for a job:

- abstract **reasoning** skills
- system **thinking** skills (Excel)
- **collaboration** skills (Excel) (WIKI)
- **experimentation** skills (excel) (WIKI)

The purpose of Microsoft Excel (a computer program)is to enter, analyze, and present (quantitative) data into an electronic spreadsheet program.

Excel:

- a computerized spreadsheet application used to build and manipulate worksheets and workbooks

- An electronic spreadsheet program such as excel aids a multitude of problem-solving and decision-making processes through providing:

1. Data management features.
2. Automatic Calculation Functions
3. Presentation Tools.
4. Decision analysis functions.

- An electronic spreadsheet like MS Excel allows for quicker, more accurate changes than were possible with a manual ledger.

Worksheet: a spreadsheet that may contain data including text, numbers, formulas, charts etc. Sometimes a charts based worksheet is referred to as a “Chartsheet”

Workbook: a collection of related worksheets within one file

File Tab: Consists of file operations commands such as opening, closing, saving, printing, and sharing files.

Tabs & Ribbon: Each tab corresponds to sets of features displayed horizontally as a ribbon. A ribbon consists of groupings, and controls. Tabs are designed to be task-oriented and consist of several logical groupings of controls that perform similar functions.

Quick Access Toolbar: Contains controls / commands that are most commonly used. Additional controls can be added through Excel Options settings through the Office Button.

Select All button: used to select all elements of the worksheet

Status Bar: Displays information about a selected command or operation in progress. Also displays basic summary information about a selected range of values.

Range: Can consist of contiguous (together) or non-contiguous (not together) cells

- **A formula is an expression that returns a value through performing operations on *literal values* specified in the formula itself or *referenced values* from other cells**
  - The most commonly used operators are **arithmetic operators**

Order of precedence rules

Formula (A1=50, B1=10, C1=5)	Order of Precedence Rule	Result
=A1+B1*C1	Multiplication before addition	100
=(A1+B1)*C1	Expression inside parentheses executed before expression outside	300
=A1/B1–C1	Division before subtraction	0
=A1/(B1–C1)	Expression inside parentheses executed before expression outside	10
=A1/B1*C1	Two operators at same precedence level, leftmost operator evaluated first	25
=A1/(B1*C1)	Expression inside parentheses executed before expression outside	1

- Using VLOOKUP:
  - For Closest Matches: e.g. mapping numerical marks to letter grades
  - For Exact Matches: e.g. mapping salary levels to employee categories

- =AVERAGE(number1,number2,..) Excel sums the values in the range and then divides by the number of non-blank cells in the range
- =STDEV(number1,number2,..)
- =MAX(number1,number2,..)
- =MEDIAN(number1,number2,..)
- =PEARSON(number1,number2,..) Pearson correlation coefficient
- =COUNT(range) Counts the number of cells that contains numbers
- =COUNTA(range) Counts the number of cells that are not empty. Both numeric and text entries are included
- =COUNTBLANK(range) Counts the number of empty cells
- =COUNTIF(range,criteria) Counts the number of cells within a range that meets the condition. Will try this one in detail in upcoming lab sessions.

- **Grouping: o**rganizing data so that it can be viewed as a collapsible and expandable outline.
- **Formulation:** Transformation of a real problem scenario into a mathematical model
- **Solution:** Solving the model to obtain the optimal solution
- **Interpretation:** Analyzing results and implementing solution

FV(rate,nper,pmt,pv,type)

- **Rate:** Interest rate per period – e.g. 8 percent annual interest rate
- **Nper:** Total # of payment periods in an annuity
- **Pmt :** Payment made each period. Cannot change over the life of the annuity
- **Pv: (**optional) present value or the lump-sum amount that a series of future payments is worth right now
- **Type:** (optional) the number 0 or 1 indicates when payments are due. If type is omitted, it is assumed to be 0 (end of period

- **Heuristics:**
  - **Heuristic methods are used to speed up the process of finding a good enough solution, where an exhaustive search or advanced problem-solving techniques are impractical.**

- a "rule of thumb“, an educated guess, an intuitive judgment, or common sense.

❑ **The most fundamental heuristic is trial and error.**

❑ **Other examples of heuristics:**

- Maximax method, Maximin method , Averaging method, Expected Monetary Value (EMV)

- **Logical Tests: Result of these functions is a logical value (TRUE or FALSE).**
  - ❑ **Other Logical Functions:**
    - AND
    - OR
    - NOT

- **Conditional Functions**: Result may be a specified value or a calculated value**.**
  - ❑ **Examples:**
    - IF
    - COUNTIF
    - SUMIF
    - AVERAGEIF
    - COUNTIFS, SUMIFS, AVERAGEIFS (to be used when multiple criteria are to be tested)

- **AND Function**
  - ❑ Allows you to test the condition of more than just one criterion (condition).
  - ❑ Returns either TRUE or FALSE.
  - ❑ Only returns TRUE if all tested values are TRUE
  - ❑ AND (logical1 [,logical2]…)
    - Example: **=AND(G2="FT",M2>=1)**

- **OR Function**
  - ❑ returns a TRUE value if any of the logical conditions are true and a FALSE value if all the logical conditions are false
    OR (logical1 [,logical2]…)
    - Example: **=OR(G2="FT",M2>=1)**

- **NOT Function:**
  - ❑ Reverses the value of its argument.
  - ❑ Used when you want to make sure a value is not equal to one particular value.
    - Example:**=NOT(G2=“Blah”)**

- **IF Function**
  - ❑ Evaluates whether a condition or a logical test is true or false and returns one value if the condition is true, and another value if the condition is false.
  - ❑ If true then value “a” else value “b”
  - ❑ IF(logical_test, value_if_true, [value_if_false])
  - ❑ Example: IF(A2=“Yes”,B2*C2,0)

- **Nested IF Functions**
  - ❑ **A nested IF function is when one IF function is placed inside another IF function to test an additional condition**
  - ❑ **The Number of IF functions in total would be one less than the number of possible outputs.**
  - ❑ **=IF(D2=1,2%,IF(D2=2,3%, IF(D2=3,4%,"Invalid Pay Grade”)))**

- **Read this as follows:**
  - If the value in D2 is equal to 1, then result is 2%
  - Else… If the value in D2 is equal to 2, then result is 3%
  - Else… If the value in D2 is equal to 3, then result is 4%
  - Else… result is "Invalid Pay Grade"

- **Conditional Functions:**
  - **Summary Functions: COUNTIF, SUMIF, AVERAGEIF**
    - You can calculate the number of cells in a range that match criteria you specify using the **COUNTIF** function, i.e. a conditional count: **=COUNTIF(*range,criteria)***
    - You can add the values in a range that meet criteria you specify using the **SUMIF** function, i.e. a conditional sum: **=SUMIF(*range,criteria[,sum_range])***
    - You use the **AVERAGEIF** function to calculate the average of values in a range that meet criteria you specify, i.e. a conditional average: **=AVERAGEIF(*range,criteria[,average_range])***
- **The COUNTIF, SUMIF, and AVERAGEIF functions specify only one condition to summarize the data.**

- **To summarize the data using several conditions, use:**
  - **COUNTIFS (criteria_range1,criteria1[,criteria_range2, criteria2...])**
  - **SUMIFS (sum_range,criteria_range1,criteria1[,criteria_range2, criteria2...])**
  - **AVERAGEIFS(average_range,criteria_range1,criteria1[,criteria_range2, criteria2...])**

Reporting : Regular Mass Information Dissemination in a standard format

Analytics : Slicing and Dicing with visual feedback and interactivity. Mainly for the Middle Management – for Tactical Decisions and to guide Strategic Decisions

Dashboards : Quick Distilled Snapshots, highlighting the key Indices, for Instant Decision Making

Strategic Dashboards:
- provide quick overview that decision makers need for monitoring the health and opportunities of the business
- typically derived from static snapshots of data, and focus on high-level measures of performance:
- comparisons with targets or levels
- performance indicated categorically or on scales (good/bad ; high/medium/low)

Analytical Dashboards:
- support more sophisticated data analysis by facilitating rich comparisons, and fine grained performance evaluation (drill-down ; slice-and-dice)
- used to not only see what is going on, but to examine the causes

Operational Dashboards:
- for monitoring operations in real-time
- uses simple display media to quickly identify and understand events and to ensure timely responses

What if analysis = goal seek function basically. Solver add-in used.

Access

Importance of Data and Information
- ***Data****:* raw facts that describe the characteristics of an event.
- ***Information****:* data converted into a meaningful and useful context.

- ***Database*** – maintains information about various types of objects (inventory), events (transactions), people (employees), and places (warehouses)
    - ⇨ *Example*:

Raw Data = shares exchanged in the stock market
Information **=** How did a particular stock perform during the last 6 month? How did it perform compare to other stocks?
QUESTION: What is an important asset of an organization?

a) Its capital
b) Its People
c) Its information
d) **All of the above**

Data Management

- Data management is a structured approach for capturing, storing, processing, integrating, distributing, securing, and archiving data effectively throughout their *life cycle.*

QUESTION: Which one of the following statements is NOT correct?

a) Transactional data captures close interactions with customers
b) **Executives use transactional data to make strategic decisions**
c) Transactional data are usually large, and with so many detail

- **What is the goal of data management?** To provide the infrastructure and tools to transform raw data into usable information of the highest quality.
- **Data Management Challenges:**
    - Volume of data is increasing exponentially.
    - Data is scattered throughout the organization.
    - Data is created and used offline without going through quality control checks.
    - Data may be redundant and out-of-date, creating a huge maintenance problem.

Traditional File Organization

- **File**: Group of records of same type
- **Record**: Group of related fields
- **Field**: Group of words or a complete number
- **Byte**: Group of bits that represents a single character
- **Bit**: Smallest unit of data; binary digit (0,1)
- **Problems with Traditional:**
    - **Data redundancy**: The presence of duplicate data in multiple data files so that the same data are stored in more than one place or location
    - **Data inconsistency**: The same attribute may have different values.
    - **Data Isolation, Lack of data sharing and availability:** Information cannot flow freely across different functional areas or different parts of the organization.
    - **Poor security:** Management may have no knowledge of who is accessing or making changes to the organization's data

Database Management Systems (DBMS)

- **DBMS =**
    - A software package to create and maintain databases
    - Acts as interface between application programs and physical data files
    - Separates logical and physical views of data

QUESTION: Which one of the following is NOT a problem with traditional file organization?

a) Data redundancy
b) Data inconsistency
c) Program-data dependence
d) **Files are organized as records and fields**
e) Lack of flexibility in reporting

- ***Entity*** – a person, place, transaction, or event about which information is stored

- ***Entity class (table)*** – a collection of similar entities
- ***Attributes (fields, columns)*** – characteristics or properties of an entity class. Columns in each table contain attributes (ex. Customer ID, Customer Name, Contact Name, Phone)

Relational DBMS

- Represents data as two-dimensional tables. Relates data across tables based on common data element
  - Examples of Relational DBMS: MS Access, DB2, Oracle, MS SQL Server
- ***Primary key*** – a field (or group of fields) that uniquely identifies a given entity in a table
- ***Foreign key*** – a primary key of one table that appears as an attribute in another table and acts to provide a logical relationship between the two tables
- **Select:** Creates subset of rows that meet specific criteria
- **Join**: Combines relational tables to provide users with information
- **Project**: Enables users to create new tables containing only relevant information
- Functions of A DBMS:
  - **Data filtering and profiling:** Inspecting the data for errors, inconsistencies, redundancies, and incomplete information.
  - **Data quality:** Correcting, standardizing, and verifying the integrity of the data.
  - **Data synchronization:** Integrating, matching, or linking data from disparate sources.
  - **Data enrichment:** Enhancing data using information from internal and external data sources.
  - **Data maintenance:** Checking and controlling data integrity over time.

QUESTION: Which of the following is NOT correct about relational database management systems?

a) Relational DBMS consists of two-dimensional tables
b) Access is an example of relational DBMS
c) **Relational DBMS increases the chance of data redundancy**
d) Relational DBMS generates reports combining multiple tables

Part 2

Data Quality

- Low Quality Info:
  - Data/info from different systems have different entry standards and formats
  - Call centre operators enter abbreviated/erroneous info by accident /save time
  - Third party & external info contains inconsistencies, inaccuracies, and errors
- Potential Problems from low quality info:
  - Inability to accurately track customers
  - Difficulty identifying valuable customers
  - Inability to identify selling opportunities
  - Marketing to nonexistent customers
  - Difficulty tracking revenue due to inaccurate invoices
  - Inability to build strong customer relationships
- **Info Cleansing or Scrubbing**: A process that weeds out and fixes or discards inconsistent, incorrect, or incomplete information. Standardizing Customer name from Operational Systems

Data Warehouse

- For organizational learning purposes, data from many sources and over many time periods must be gathered together & organized in a consistent and useful way
- **Data warehouse**: a copy of transaction data specifically structured for querying, analysis, reporting, and more rigorous data mining
  - Note that the data warehouse contains a copy of the transactions which are not updated or changed later by the transaction system

- **Extraction, transformation, and loading (ETL)** – a process that extracts information from internal and external databases, transforms the information using a common set of enterprise definitions, and loads the information into a data warehouse
- **Data mart** – contains a subset of data warehouse information, contains summarized or highly focused portion of data for a specified business unit or group of users

Data center

- Host and integrate networks, computer systems, and storage devices
- High reliability and availability (redundant power supplies, redundant hardware, etc.)
- High security (physical and data/software)
- Distributed Database:
  - A database that is stored in more than one physical location
  - Reduce the vulnerability of a single, massive central site
  - Increase service and responsiveness to local users
  - Can often run on smaller, less expensive computers
  - Depend on high-quality telecommunications lines
- Two **types** of Databases:
  - **Centralized database:** stores all related files in one physical location
  - **Distributed database:** copies of data at all locations
    - *Partitioned database*: Parts of database are stored in different physical locations
    - *Replicated database*: Duplicate the entire database at all remote locations

Document Management

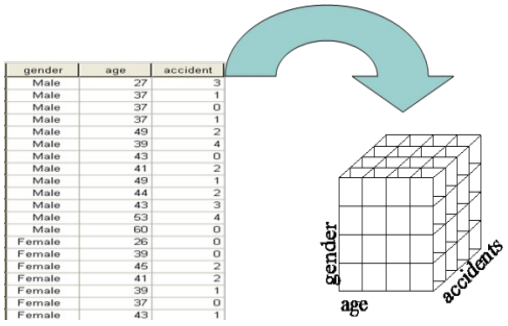
Automated control of imaged and electronic documents, spreadsheets, emails, word processing docs, voice and other documents through their life cycle from initial creation to final archiving or destruction.

- **Document Management Systems**: Hardware and software to archive e-documents, convert paper documents to e-documents, then index and store them according to company policy.
  - **DMS increases productivity and efficiency by:**
    - Cutting labor cost by automating business process
    - Faster search in documents to support decision making
    - Minimizing the cost associated with printing and storing documents
    - Improving the security of the contents

Enterprise Content Management

- Includes:
- electronic document management
- Web content management
- digital asset management
- electronic records management (ERM)
- **E-discovery** is the process of gathering electronically stored information in preparation for trial, legal or regulatory investigation, or administrative action as required by law.

Part 3



gender	age	accident
Male	27	3
Male	37	1
Male	37	0
Male	37	1
Male	49	2
Male	39	4
Male	43	0
Male	41	2
Male	49	1
Male	44	2
Male	43	3
Male	53	4
Male	60	0
Female	26	0
Female	39	0
Female	45	2
Female	41	2
Female	39	1
Female	37	0
Female	43	1

Multi-dimensional Database and OLAP

- Interactive, exploratory analysis of multidimensional data from multiple dimensions/perspectives

"cube" of data, that can be seen from different prespectives

- *Functionalities*: you could drill down, slice and dice the data, aggregate
- Keeps the data in a relational data base form.

Question:
Which of the following statements is NOT true about OLAP?

a) OLAP is a one dimensional data analysis
b) OLAP database is in a form of a cube
c) IBM is one of vendors of OLAP Products
d) Slice and Dice is one of the functionalities supported by OLAP

Data Mining

- Tools for deep down analysis of large pools of data
  - To find hidden patterns
  - To predict future behavior
  - To infer rules to guide decision-making
  - When looking at customer target marketing :
    - Identifying good prospects
    - Choosing appropriate communication channels
    - Picking suitable messages
- Uses a variety of techniques to find **patterns** and **relationships** in large volumes of information and infers rules that predict future behaviour and guide decision making.
- Common forms of data-mining analysis capabilities include:
  - Classification
  - Cluster analysis
  - Association detection
- **Classification:**
  - Classes are pre-defined
  - Assign each data point to one class
    - Example Applications:
      - Grades {A, B, C, D}
      - Customer Credit Assessment {Low, Medium, High}
      - Fraud detection: {Legitimate, Fraudulent}
      - Medical treatments {Critical, NonCritical}
      - Pattern Recognition {A, B, C, …}
- **Clustering**: a technique to divide an information set into mutually exclusive groups such that the members of each group are as close together as possible to one another and the different groups are as far apart as possible.
- **Clusters** are not predefined
- **CRM** systems depend on cluster analysis to segment customer information and identify behavioral traits.
- Customer relationship management:
  - Matching campaigns to customers
  - Customer segmentation
  - Reduce exposure to credit risk
- **Association detection –** reveals the degree to which variables are related and the nature and frequency of these relationships in the information
- **Market basket analysis –** analyzes such items as Web sites and checkout scanner information to detect customers' buying behaviour & predict future behaviour by identifying affinities among customers' choices of products and services
- **Amazon.**com was one of founders of market basket analysis, with their recommendations program
- **Text Mining**:
  - Interpreting words and concepts in context

- Discovery of trends and patterns from textual information.

1) Exploration: Word counts, creating topics
2) Pre-processing: Misspelled words, abbreviations (btw, lvm, …)
3) Modeling: Building a decision tree, neural network, etc.

Examples: Medical records, Twitter, Social networking, Negotiations, Contracts (qualitative evaluations collected from written descriptions of the projects and business plans), Classification of documents

Question 2: Floor planning in stores is an application of what?
a) clustering
b) Statistical analysis
c) Association rules
d) classification

Notes from Textbook

- Companies invest in data management to
  - Earn revenues (customer relationship management, CRM)
  - Cut expenses (inventory management)
- Databases store enterprise data
- Data warehouses aggregate this data
- Data management is structured approach to storing, analyzing, processing, securing and archiving data
- **Data lifecycle principles:**
  - **Diminishing value:** ***more recent, more value***
  - **90/90 data use:** ***90% of data is not accessed after 90 days***
  - **Data in context:** ***meaningful context and format for end data is necessary***
- Data visualization is presenting data in ways that are faster & easier to understand
- Master data management is integrating various data sources in a unified view
- ETL = Extract, Transform and Load data mart information
- Data quality has 5 dimensions:
  - Accuracy
  - Accessibility
  - Relevance
  - Timeliness
  - Completeness
- Data problems include: errors, duplicates, compromised, missing
- Text mining:
  - 1) exploration
  - 2) preprocessing
  - 3) categorizing and modelling