<https://www.youtube.com/watch?v=8Pa_P3qnJco&index=1&list=PLdQddgMBv5zEhlpqdiUcf9aTNEtmESgyl>

* Explain how databases support business operations of an organization
  + Storage and retrieval of traditional data
  + Storage and retrieval of media data
  + Monitor data and take action when necessary
    - Walmart with RFIs
* Understand how relational databases are used to organize data
* Identify the purpose of the database management system (DBMS)
* Understand the importance of the database design
* Recognize the changing landscape of data
* Explain the difference between RDBMS, NoSQL and Big Data systems
* Understand the role of a relational database in the Big Data ecosystem

**Homework Assignment 1:**

Write a two-page paper that summarizes what you have learned in this module about relational databases. Topics discussed in the paper should address at least the following questions:

* What is a relational database?
  + A relational database is a database that stores data by relating tables made up of rows and columns. Relational databases allow data to be application independent and accessed by multiple applications. Rows in the table represent entries where there is a key that represents a unique identifier for that row. The columns in the row represent different attributes or fields of the row. Because the data is tightly structured the data can be queried using SQL which allow a for easy written queries.
* What is the role of the relational database in an organization today?
  + RDMSs allow storage and retrieval of traditional and numeric data. For instance, the amount of items in stock or the amount and date of delivery for a specific item.
  + RDMSs allow storage and retrieval of multimedia data, including videos, audio, and images. For instance YouTube can be structured as a relational database with the different videos being entries.
* What are the main components of a relational database?
  + The main components of a relational database are the data model, schemas and instances, the three-schema architecture, data dictionary, database users, DBMS languages.
  + Data model – description of the data concepts, the data relationships, and various data constraints that make up the content of the DB
    - Conceptual data model – high-level data concepts, close to how the business user perceives the data
    - Logical data model – concepts that may be understood by business users but are not too far removed from physical data organization
      * Heirachial model, network model, relational model, OO model
    - Physical model – low-level concepts that describe the data’s physical strong details
  + Schema – distinguishing between the description of the data and the data itself
    - Database schema – description of a database, not expected to change too frequently, stored in the catalog
    - Database state – the data at a particular moment, changes constantly
    - Example
      * STUDENT (number, name, address, email)
      * COURSE (number, name)
  + Three-schema architecture
    - External schema
      * Various structures of data that the user views\
      * Dictates the scope of the data, who gets what data
    - Conceptual schema – integrates external schemata
      * Specifies naming and defining the types, properties, integrity, rules, characteristics, and interrelationships of entities
    - Internal schema – defines physical storage structures
      * How the data is stored and where it is stored
* What are the main characteristics of a relational database?
  + Redundancy – reduces unnecessary redundancies, increases consistency, guarantees correctness
  + Integrity
    - Syntactical vs Semantical
      * Standardized formats vs conceptual business rules
    - Mkes maintenance easier, rules enforced when updated
  + Concurrency
    - Currency is allowed through use of transactions
    - Still room for inconsistencies though loss of update issues
  + ACID properties
    - Atomicity – all or nothing
    - Consistencies – transactions bring the database from one consistent state to another
    - Isolation – transactions run as if they were in isolation
    - Durability – changes to the database can be made permenant
* What are the main functions of the Relational Database Management System (RDBMS)?
  + SELECT, FROM, WHERE
* Why the database design is important?
  + It allows the users to make a RDBMS that closely matches the real life system. It is important to make sure that the requirements are defined and the schemas are correctly developed and all logical and physical design choices are chosen. If the requirements are incorrectly identified and schemas need to be updated this can lead to downtime if a schema is updated, rework at updating a schema, or possibly increased hardware costs if differenty physical components are needed..
* What other types of databases exist today on the market?
  + File database structures  
    Relational databases
  + NoSQL
    - Document
    - Graph
    - Key value
    - Wide column
  + Object oriented databases
* What is the fundamental difference between NoSQL and a relational database?
  + NoSQL is semi-structured
  + Relational is structured
* What is the role of a relational database in the Big Data ecosystem?
  + it's common to use a big data query to create a result set that is then stored in a relational database for use in the generation of BI, or as input to another process.
  + It is quite feasible to implement a bidirectional data management solution where data held in a relational database or BI system can be processed by the big data batch processing mechanism, and fed back into the relational database or used for analysis and reporting. This is exactly the type of environment that Microsoft Analytics Platform System (APS) provides.
* In your opinion, what is the future for relational databases? Explain your reasoning.
  + Relational databases benefit from an easy to use query language. This easy to use nature is one of its greatest strengths. Currently NoSQL databases require more technical skill to manipulate data. Until NoSQL databases are just as easy to use or easier to use than SQL

**Additional paper requirements:**

* The content of the paper will be equivalent to a minimum of two (1000 words) and maximum of four pages.
* Divide your paper in sections and use an appropriate heading for each section.
* The content of the paper must demonstrate understanding of the topic via citations of the reference sources.
* References used to develop your understanding of the topic should be appropriately cited within these content pages using APA in-text citation formats.
* Use as few quotes as possible. Your paper should include at most 10 percent quoted material.
* Each page must have a header. The header should contain the page number and your name.
* The reference page in APA style/format should be a separate page in your research paper.
* The reference page must include at least five references relevant to the discussed topics (minimum).
* At least three different reference types required – web sites, papers, books, journals, magazines, newspapers, interviews, etc.
* For electronic references, you must include the URL as an active link to the source/database and the date you visited the page.

**Submission Instructions:**

Write your solutions in a MS Word file, type your name and course number in that file, and submit it through the Homework Assignment submission link below. Your paper will be checked in SafeAssign for originality.