What is a Database?

* Stores a bunch of information
* Data is in some way related (Logically Related)
  + You don’t place student data and airline data into a single database table
* Models a real world enterprise
  + Entity ( a real world object - student, course, airline, etc)
  + Relationships (e.g. Alice is taking CSCD 327 from Tom Capaul)
* Usually shared among many people
  + Makes things complicated (where to store DB, who gets to access it, concurrency control, etc.)

What is a DBMS? (Database management system)

* A software package designed to store and manage databases
  + EXTERNAL -> CONCEPTUAL -> INTERNAL -> DB

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External

* Interacts directly with the user
* Collects data in a format user is familiar with
  + Like a web form for entering Credit card data

Conceptual

* Defines logical view of the data (Tables)
  + ATTRIBUTE | DATA TYPE
  + Username | varchar(8)
  + Payment m. | integer
  + Name on C. | varchar(64)
  + Expire date | date
* Main functions of a DBMS live mostly at this level.

Internal

* Determines how and Where Data is stored (on Physical Device)
  + Row orriented (Record Based)
  + Column orriented (Atribute based)
  + Physical Abstraction (Hide implementation details from the user).

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Database Languages

DDL (Data Definition Language)

* It allows DBMS users to define a database
* You can specify data type, structure of data, and constraints on data stored in the DB

DML (Data manipulation Language

* Used to access and manipulate data organized by an appropriate data model
* DML is also known as a query langage

Two major classes of languages

* Procedural: user specifies what data is required AND how to get that data
  + Example (Java): int headcount(courseId, quarter, year){ for(----) return total }
    - This shows what and how ^^^^
* Declarative (Non Procedural): User Specifies what data is required WITHOUT specifying how to get that data
  + Example (SQL): select count(sid)
    - * From Takes
      * Where courseId = ‘CSCD 327’
      * And quarter = ‘ Winter’
      * And year = ‘2019’

Delcarative is better because it is way simpler to use i think.