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Basic Concepts/DBMS Architecture

1a) Database Advantages

- Less redundancy so less of a change for inconsistencies
- Able to view data multiple ways and isolate points of interest
- Database can be manipulated without affecting the users

1b) Database Disadvantages

- Complex and may cause unnecessary costs for simple projects
- Needs concurrency controls for multiple users to prevent inconsistencies
- Model limitations may not handle super complex data

2a) Data Abstraction

The data and how it is stored/organized can be changed without changing how a user accesses the data.

2b) Database Schema vs Database Instance

The database schema is the overall database, it is subject to change. A database instance is a single save of a database. It does not change since it shows a single point in time.

3a) Starting Servers

The database server needs to be started first because the web server cannot work without the database server. Everything might look fine from the web server, but no requests will go through if the database server is not up.

3b) A_I

A_I stands for auto-increment. It creates a unique values for each index of a table by automatically incrementing a starting value by a specified number. The starting values and increment value are both set to 1 as a default.

4) College Database

Database: `college`

```
CREATE TABLE `student` (
  `stud_id` int(10) NOT NULL,
  `firstname` varchar(30) NOT NULL,
  `lastname` varchar(30) NOT NULL,
  `gpa` decimal(1,1) NOT NULL,
  `email` varchar(45) NOT NULL,
  `phone` int(11) DEFAULT NULL
ALTER TABLE `student`
  ADD PRIMARY KEY (`stud_id`),
  ADD UNIQUE KEY `email` (`email`);
```