SOFTENG351 Notes 2017

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1 Lecture One: Fundamentals of Database Systems

1.1 General Information

Database large integrated collection of data.
Contains [Entities, Relationships]

DBMS (Database Management System):
software package to store and manage databases

Database System : DBMS with database

DBMS and uses

- store large amounts of information
- code for queries
- protect from inconsistencies and crashes
- security
- concurrent access

1.2 Why Databases

Need to shift from computation to storage of large amounts of information

Accomodate for changes in:
Variety: types of data
Velocity: movement of data
Veracity: uncertainty of data
Volume: amount of data

Structures/Models Need to have a model to describe data, and a schema used to give an abstract description of the data model

1.3 Levels of Abstraction

Views: describe how data seen
Logical Schema: how data structures organised (variable types)
Physical Schema: how files structured
Data Definition Language: How to define database schema
Data Manipulation: how to update values in database
Query Language: used to access data

1.4 Data Independence

Logical Data Independence

- external handling separate from logical organisation
- mappings change, not external schema
- applications only see external schema

Physical Data Independence

- changes to physical schema doesn't affect logical layer
- abstract from DBMS storage organisation
- can perform optimisation/tuning

1.5 Concurrency Control

- many users have to be able to access information at the smae time and make updates without negatively affecting database
- don't want to access disk lots. It is slow and inefficient
- let multiple users access and keep data consistent
- let users feel like they're the only ones using system