Isys2120 Data and Information Management

Week 1

**Outline**

• Data and DBMS in context

• The relational data model

– Terminology

– Practice understanding relational data

• Careers and people’s roles

• DBMS versus other ways to manage shared data

• Some big ideas

Terminology

• Data: Facts that can be recorded

• Database: A collection of data, is persistant and shared

• Database Management System (DBMS): software package designed to store and manage one or more databases

• Meta-data: descriptions of the format of the data

Relational DBMS: data is stored as instance, containing different entries, and matching data indicates connection.

Instance: contents of the database at a single time

Schema: the structure of data in a particular database( what tables, what metadata(column name))

**Data practice**

**Data design**: to decide what schema will be used for the data.

It proceed in stages:

– first produce a conceptual or semantic model,

– then translate this into a relational schema,

– then evaluate the schema for quality, and improve it if needed

**Languages**: DDL&DML

**Level of abstraction**: DB -> physical schema-> logical schema -> view(multiple)

* **View**: how a user **sees** the data
* **Logical schema**: the **structure of data** shared among all users
* **Physical schema**: the **files and indexes** used for storage on disk

Data Independence

• Applications are insulated from how data is structured and stored

• Logical data independence: Protection from changes in logical schema (eg introducing an extra column in a table)

• Physical data independence: Protection from changes in physical structure and location of data

• Data independence is one of the most important benefits of using a DBMS

**Roles&career**s

Roles with DBMS

• End users- people who do something that advances the organization’ s purpose (business manager)

• DB application programmers- produce the applications that end users can run

• Database administrator (DBA)- manage effective & efficient use of resources in providing access to data

• DBMS Vendor Staff- DBMS software’s support provider from mother company

**Files vs DBMS**

**Files**: accessed directly by all the programs that need to use the data.

Pros: good for storing data for long time; easy to send and share

Cons: **low Integrity**(possible dup data); many **programs** needed(formats) ; assess control is mediocre; no central authority(no unified organize) ; Atomicity of updates(half-complete action cause error);

**DBMS**:

Pros: solve all cons above.

Cons: simple processing performance; money cost; handle specialised data poorly.

Week 2

**Outline**

- Introduction to SQL

- **Joins** and **Aggregate** Functions

- Conceptual Database Design using the **Entity Relationship Model**