

Database Systems

Books

- **Database Systems**

By Thomas Connolly & Carolyn Begg

- **Modern Database Management**

By Jeffrey A. Hoffer, Mary B. Prescott,
& Fred R. McFadden

- **Database Management Systems**

By Ramakrishnan & Gehrke

Data vs. Information

- Data: Stored representation of objects and events that have meaning and importance in the user's environment
- Information: Data that have been processed in such a way as to increase the knowledge of the person who uses the data (Jeffrey A. Hoffer)

The Data Explosion Problem

- Human being is a Data Agent e.g.,
 - We use mobile phones
 - Surf on the internet
 - Do shopping
 - Go to work
 - Go on outing
- Electronic devices including smart phones, computers, Online Transaction Processing (OLTP) systems, telephone switches, web and wireless sensors are producing a huge amount of data on the daily basis

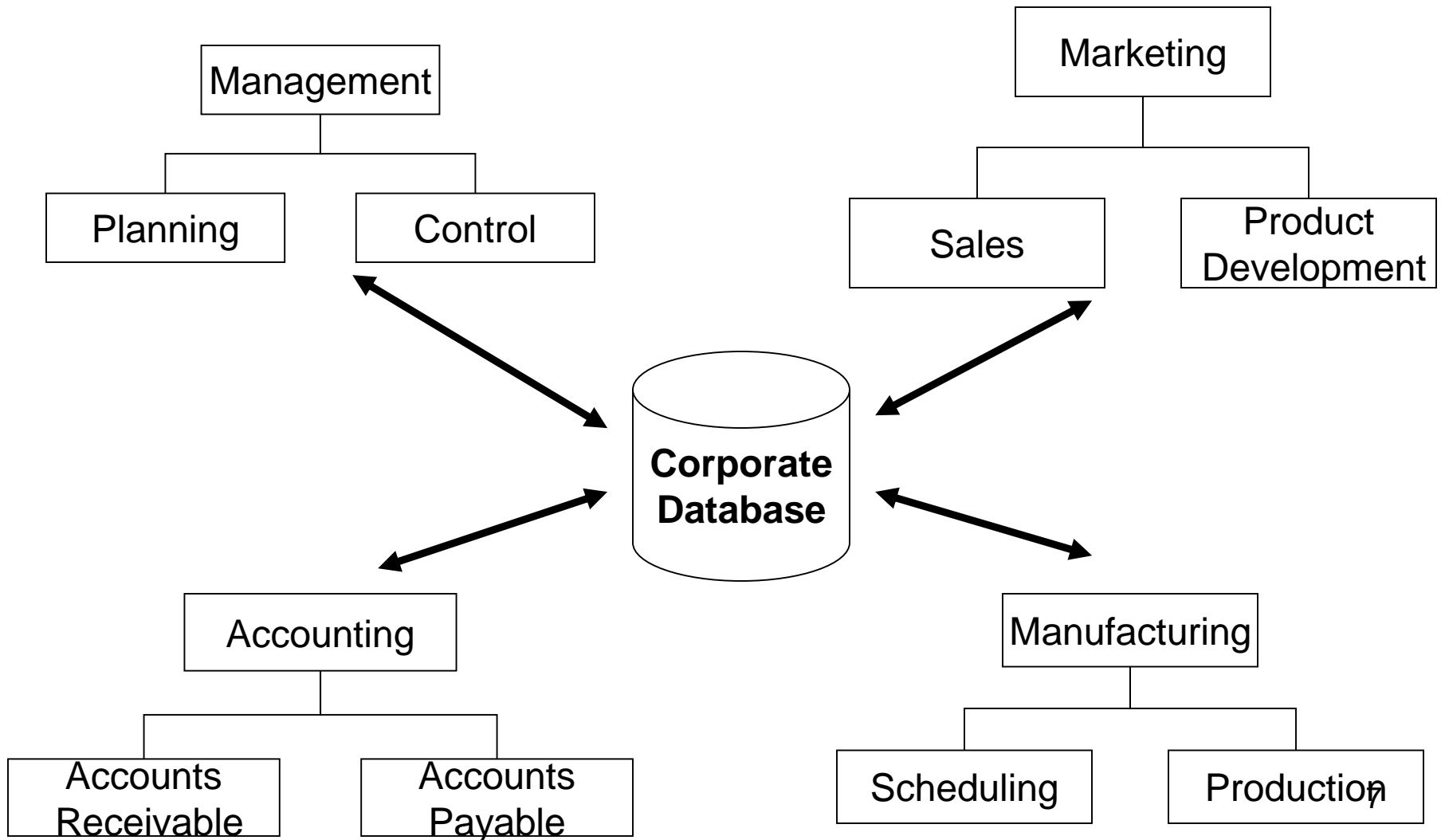
The Data Explosion Problem

- Every day, we create 2.5 quintillion bytes of data
- Google generates 20PB data on the daily basis

Database

A database is a shared collection of logically related data, and a description of this data, designed to meet the requirements of different users of an organization. (Connolly)

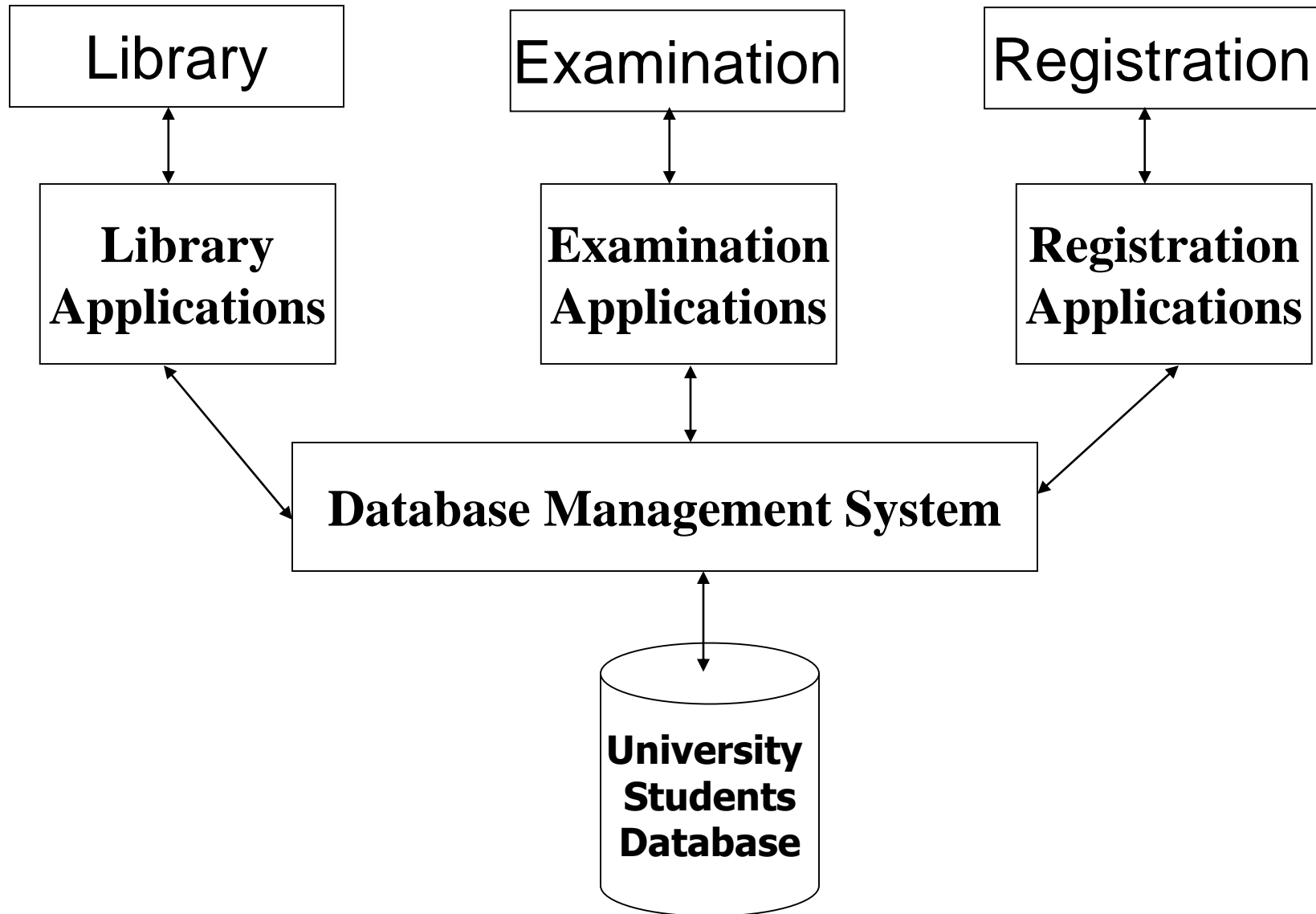
The concept of a shared organizational database



Database Management System

A software system that enables users to define, create, maintain, and control access to the database.
(Connolly)

Example of a Database System



Disadvantages of File-Based Approach

- Non-Sharing of Data
- Data Duplication
- Data Dependence
- Lack of Data Standards
- Lack of Integrity and Security
- No Concurrency
- High Maintenance Cost

Advantages of a Database Approach

- Sharing of Data
- Data Independence
- Better Data Security
- Controlled Redundancy
- Better Data Integrity
- Improved Data Standards
- More Information from the same amount of data

Advantages of a Database Approach

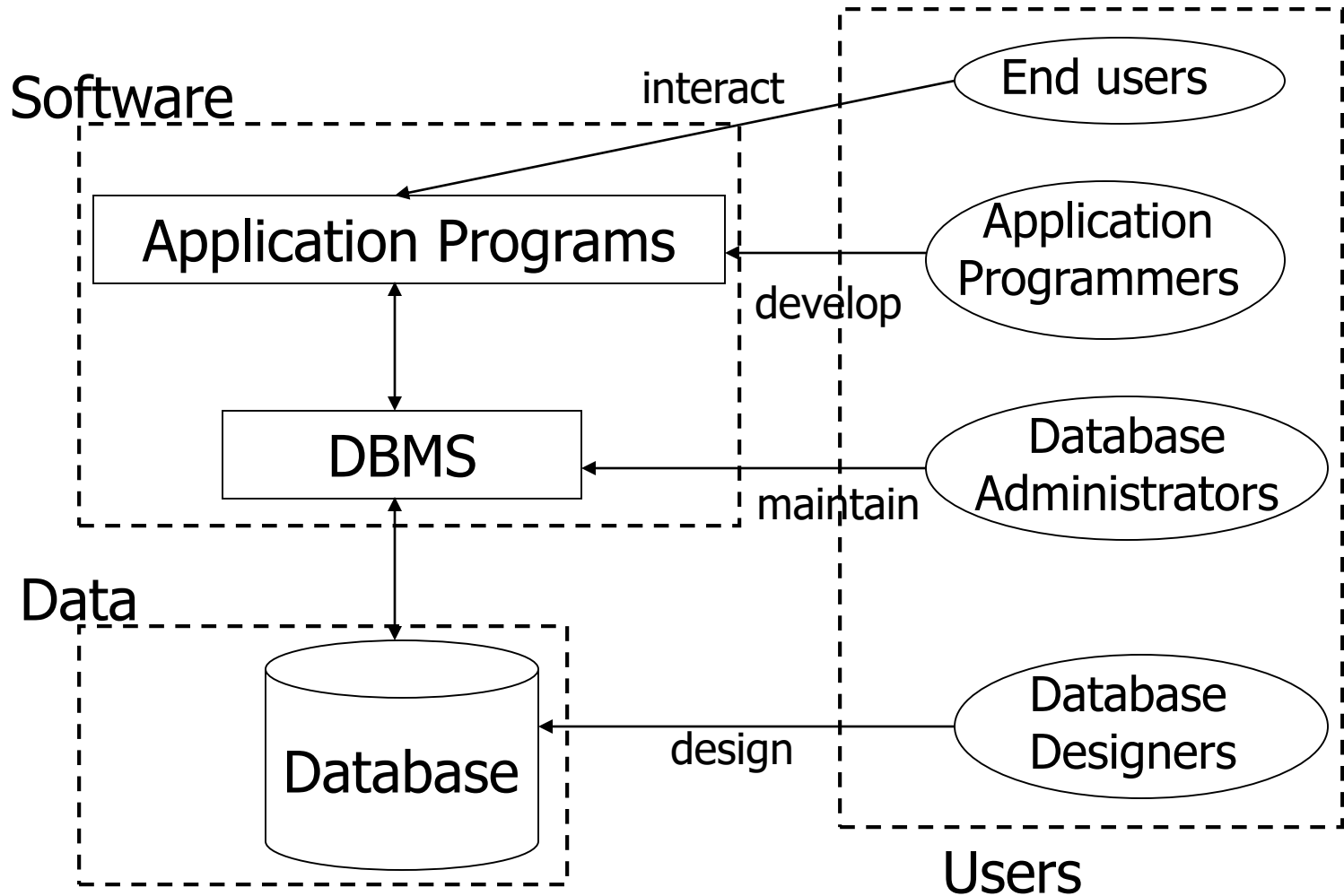
- Faster development of new applications
- Increased concurrency
- Improved maintenance through data independence
- Improved backup and recovery services

Disadvantages

- Complexity
- Cost of Conversion
- Cost of DBMS

Is Data a Resource?

A Typical Database System



Practical Assignment

- **In Oracle,**
 - Try DDL (Create, Drop, Alter)
 - Try DML (Select, Insert, Update, Delete)