In the Name of

Allah

The Most Merciful and Compassionate the most gracious and beneficent, Whose help and guidance we always solicit at every step, at every moment.

Database Systems 2021

Introduction
Lec-1

Textbook

- Modern Database Management by Jeffrey A. Hoffer (12th Edition)
- Database System by Thomas Cannolly
- SQL/Oracle
- Every think discussed in class is part of material

Course Description

- This course is concerned with the basic concepts of databases,
  Design, Modeling, Creation, administration, maintenance of databases.

- Entity Relationship Model
- Data Models
- Normalization
- Database Design (Conceptual and Physical Design)

Course Description

- Database Administration
  - Database Integrity
  - Database Security
  - Database Recovery
  - Database Concurrency

  - and many more ……

Database

- A **shared collection** of **logical related data** which is design to meet the need of multiple users in an organization.
- A collection of information usually kept in a list to **manipulate information** so that it can sorted and access records fast and efficient.
- Database may be of any size and complexity.

Database

Data

- Fact concerning Objects and events that could be recorded or stored on computer media.

- Data is always in raw form.

Example:

- Customer name, address, telephone number in Customer database.

Database

Type of Data

- Structured data
- Unstructured Data

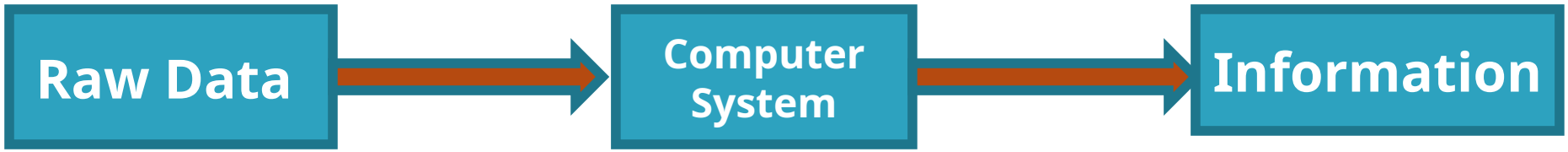
Database

- **Information**
- .
-



Database

- **Information**



Database

- **Example of data and Information**

Department of Computer Science

Name	Age	Salary
Amjad	38	16000
Abid	55	80,000
Sara	32	45,000
Ibrar	30	26,000
Pervaiz	52	11,000
Javeed	36	26,000

Database

- **Example of data and Information**

Baker, Kenneth D	324917628
Doyle, Joan E.	476193248
Finkle, Clive R.	548429344
Lewis, John C.	551742186
McFerran, Debra R.	409723145
Sisneros, Michael	392416582

Database

- **Example of Processed Data or Information**

Class Roster

Course: MGT 500 Business Policy Semester: Spring 200X

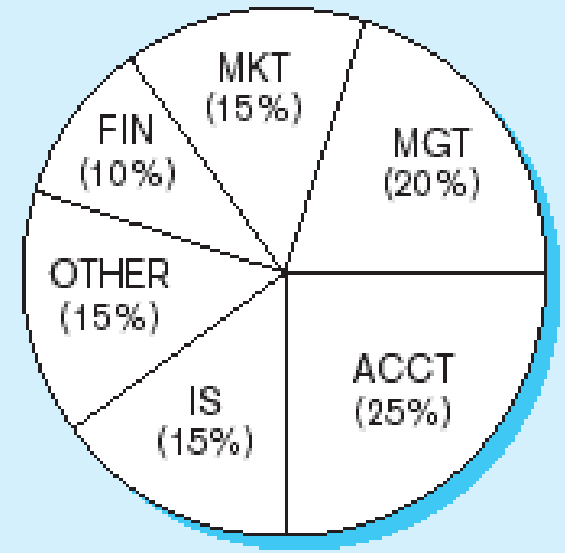
Section: 2

Name	ID	Major	GPA
Baker, Kenneth D.	324917628	MGT	2.9
Doyle, Joan E.	476193248	MKT	3.4
Finkle, Clive R.	548429344	PRM	2.8
Lewis, John C.	551742186	MGT	3.7
McFerran, Debra R.	409723145	IS	2.9
Sisneros, Michael	392416582	ACCT	3.3

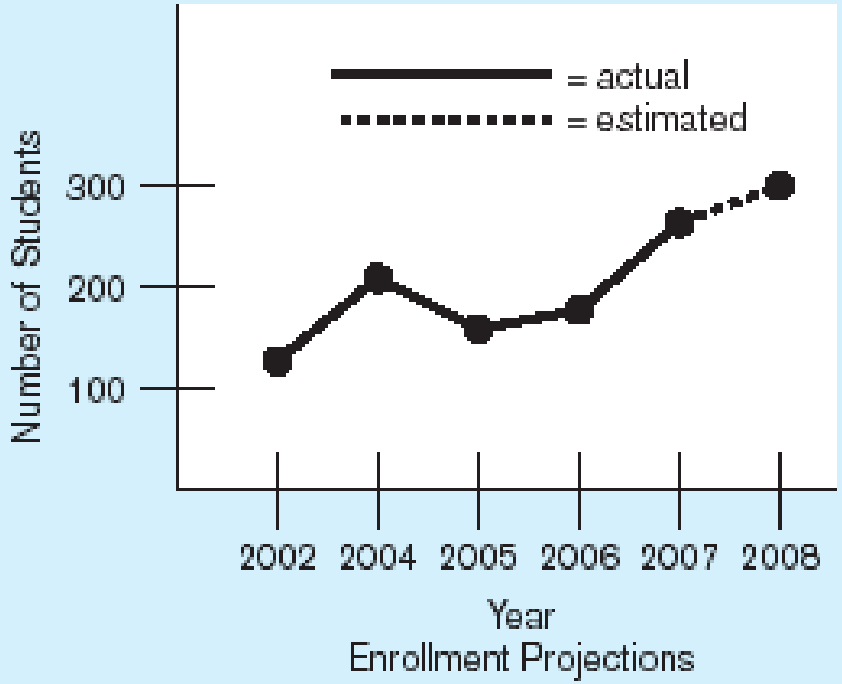
Converting data to information

Database

- **Example of Processed Data or Information**



Percent Enrollment by Major (200X)



Enrollment Projections

Summarized data

Database

- **Data Versus Information**

DATA	INFORMATION
Always in Raw form	Always in Arranged Form
Can't used directly for decision making	Can be used for decision making directly
No Information system in data collection and arrangement	Information system i.e Computer system is involved in this process
Input of Computer System	Output of Computer System

Database

- **Metadata**

- Data about data is called metadata.

- Data that describe the properties or characteristics of end user data and the **context of the data**.

- Described Properties including data name, definition, length.

Database

- **Metadata**

Table 1-1 Example Metadata for Class Roster

Data Item		*Value*				
Name	**Type**	**Length**	**Min**	**Max**	**Description**	**Source**
Course	Alphanumeric	30			Course ID and name	Academic Unit
Section	Integer	1	1	9	Section number	Registrar
Semester	Alphanumeric	10			Semester and year	Registrar
Name	Alphanumeric	30			Student name	Student IS
ID	Integer	9			Student ID (SSN)	Student IS
Major	Alphanumeric	4			Student major	Student IS
GPA	Decimal	3	0.0	4.0	Student grade point average	Academic Unit

Data Management

- How to perform DML operations
- How to perform DDL operations

- Different systems are used for data management.
  - Traditional file processing system.
  - Database system

Traditional file processing system

- Why traditional file processing systems (TFPS) were developed?

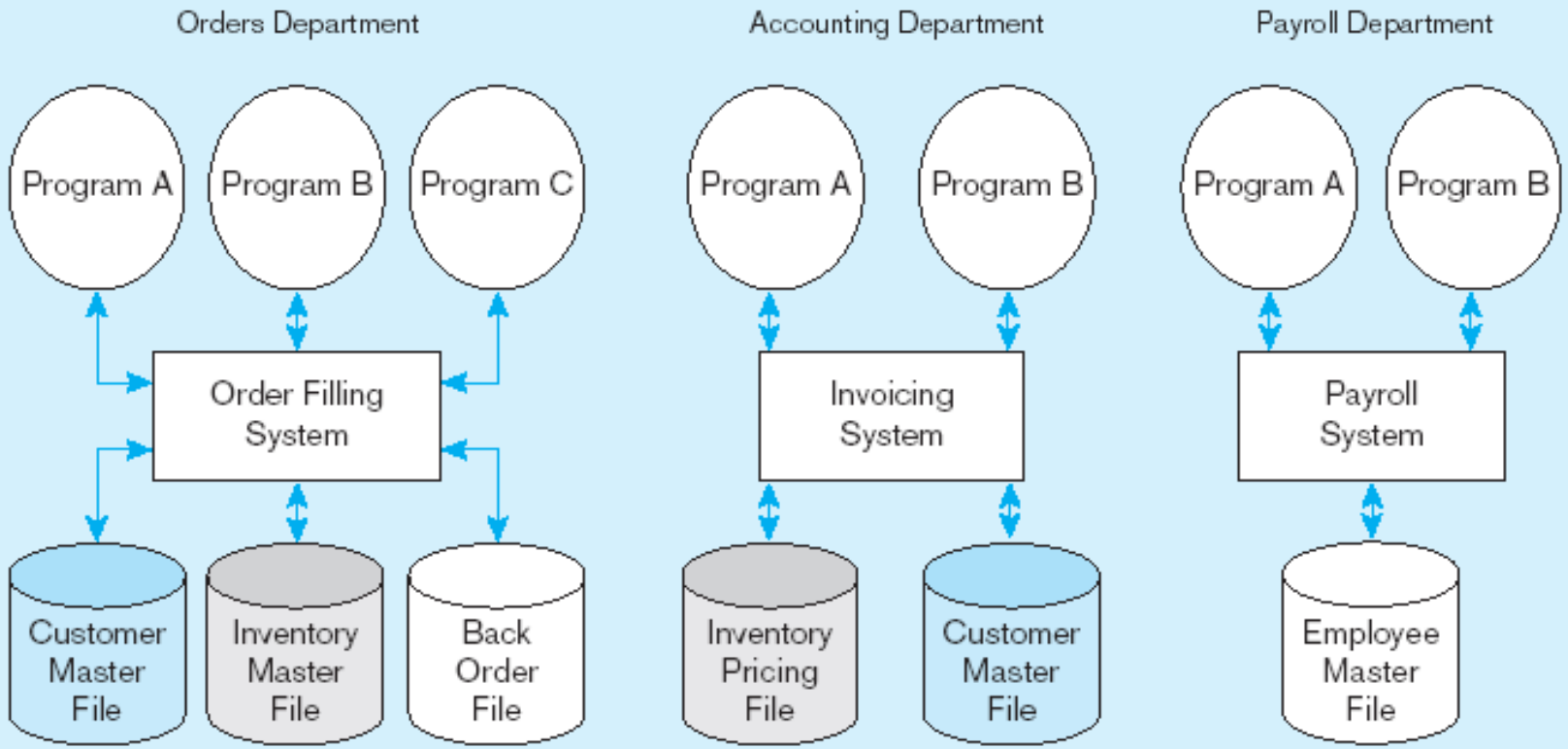
- File processing system is an old method but it is still widely used today, especially for database backup.

Traditional file processing system

- **Disadvantage of File Processing Systems**

- Program-Data Dependencey
- Duplication of Data
- Limited Data Sharing
- Lengthy Development Times
- Unnecessary Program Maintenance
  - 80% of information systems budget

Traditional file processing system



Traditional file processing system

- **Program-Data Dependency**
- **File description** is stored within each application program.
- **Drawback:**
  - Any change to a file structure requires changes to the file descriptions for all programs that access the file.
  - Lack of coordination and central control

Traditional file processing system

- **Duplication of Data**

- **Drawback:**
  - Waste storage space
  - Difficult to keep all the file up to date.
  - Loss of **data integrity**
  - Inconsistent results

Traditional file processing system

- **Limited Data Sharing**
- In TFPS, no centralized control of data.

Traditional file processing system

- **Lengthy Development Times**

- **Drawback:**
  - Long time require to develop

Traditional file processing system

- **Others Drawbacks of TFPS**
- Difficulty in accessing data
- Need to write a new program to carry out each new task
- Data isolation
- Hard to add new constraints or change existing ones

Have a Nice Day