QUEZON CITY UNIVERSITY
COLLEGE OF COMPUTER STUDIES
INFORMATION TECHNOLOGY DEPARTMENT

WEEK 2
Review of Database System Concepts

IM101 - Advanced Database Systems

LEARNING OUTCOMES:

At the end of the session, the students should be able to:

1. Identify the terminologies and basic concepts of Database Systems
2. Understand the Database Environment.
3. Enumerate and Discuss the characteristics of Business Rule
4. Define the concepts of Data Models, Schema and Instances

Terminologies and Basic Concepts of Database Systems

Key Terms:

- **Database**: A structured collection of data stored electronically.
- **DBMS** (Database Management System): Software that manages and controls access to the database.
- **Tables**: Organized format for data storage, consisting of rows (records) and columns (fields).
- **Primary Key**: A unique identifier for each record in a table.
- **SQL** (Structured Query Language): Language for interacting with the database.

Information System Concepts

A set of interrelated components that collect, manipulate, and disseminate data and information, and provide feedback to meet an objective

Database Environment

Components of Database Environment

- **Data**: Raw facts stored in the database.
- **Hardware**: Physical devices like servers and storage.
- **Software**: DBMS (e.g., Oracle Database) and related applications.
- **People**: End users, database administrators (DBAs), and developers.
- **Procedures**: Policies and guidelines for managing and using the database.

Four Stages of Processing

- **Input**: collect and introduce data to system
  - Transaction: a business event, usually entered as input
- **Data processing**: perform calculations on input
- **Output**: what is produced by the information system
- **Storage**: vast amounts of data stored on optical discs

Data and Information

Data. Stored representations of meaningful objects and events.

- ***Structured***: numbers, text, dates
- ***Unstructured***: images, video, documents

Example:

Baker, Kenneth	324917628
Doyle, Joan E.	476193248
Finkle, Clive R.	548429344

Data and Information

Information. Data processed to increase knowledge in the person using the data.

Example:

(a) Data in context

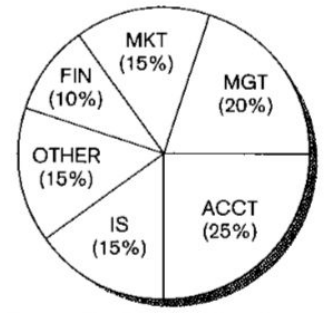
Class Roster

Course: MGT 500 Business Policy Semester: Spring 200X

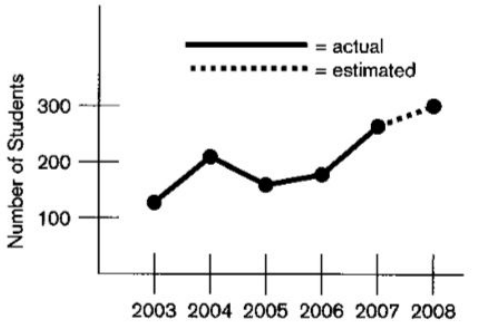
Section: 2

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

(b) Summarized data



Percent Enrollment by Major (200X)



Enrollment Projections

Metadata

Data that describes the properties and context of user data.

Properties to describe

- Data names
- Length (or size)
- Allowable values

Data context to describe

- Source of data
- Ownership
- Usage

Metadata

NAME	TYPE	LENGTH	MIN	MAX	DESCRIPTION	SOURCE
Couse	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

Table 1.1
Example of Metadata

Characteristics of Business Rules

- **Declarative**: State what is required rather than how to achieve it.
- **Precise**: Clearly defined and unambiguous.
- **Consistent**: Does not conflict with other rules or system behaviors.
- **Expressible**: Represented formally and understood by stakeholders.
- **Enforceable**: Can be implemented and enforced in the database.

Characteristics of Business Rules

Examples:

- A customer must have a unique email address.
- An order cannot be placed without payment details.

Data Models, Schema, and Instances

Data Models: Abstract representations of how data is organized and accessed.

- Examples: Relational Model, Entity-Relationship Model, Object-Oriented Model.

Data Models, Schema, and Instances

Schema: The structure of the database, including tables, fields, and relationships.

- **Physical Schema**: How data is stored physically.
- **Logical Schema**: Design of the database, including relationships and constraints.

Summary

- We covered the basics of database terminologies and concepts.
- Explored the components of the database environment.
- Discussed the characteristics of business rules.
- Defined data models, schema, and instances.

END OF PRESENTATION.
THANK YOU!