3. Introduction to Information Systems and Data Modelling

Information Systems

Information systems are ubiquitous in our daily lives. From using public transport with a Go card to purchasing a coffee at a café, information systems are constantly at work, recording and processing data. It is crucial to have a solid foundational understanding of what information systems are and how they function.

Data vs. Information

There is a distinction between data and information:

- Data refers to the basic, raw facts.
- Information is data that has been transformed or processed to provide meaning and context.

For example, a list of names in a mobile phone's contacts is data. When an information system orders those names by family name or by group, it becomes information. Formally, information is data plus semantics. The semantics, or meaning, of the data is contextual and varies depending on the organization or domain.

Information is generally more valuable than data because it has been transformed for decision-making purposes. The quality of the information presented can directly impact the quality of the decisions made, which in turn affects an organization's costs and profits.

Components of an Information System

An information system consists of several components, including:

- Software (specifically the Database Management System or DBMS)
- Database

Data Modeling

To design a database, we use data modeling techniques to analyze and define the data and information requirements. Data models provide abstraction, allowing us to create diagrams or

other types of models that serve as communication tools and aid in refining the database design.

Choosing an appropriate data modeling technique enables the efficient development of a database model that minimizes cost and time.

Universe of Discourse

The universe of discourse refers to the specific context for which the database is being designed. It encompasses the business domain and the types of information systems relevant to that domain.

As a data modeler or system analyst, you may not always be familiar with the universe of discourse for a particular project. In such cases, it is necessary to consult with domain experts to gain the required understanding.

Examples of domain experts for different systems:

- Student Information System: experts in enrollments, results management, and graduation processes
- Personnel System: experts in staff management, superannuation, and payroll
- Library System: experts in cataloging, borrower processing, and ordering new stock

Data Modeling Approaches

There are several data modeling approaches available, including:

- UML Class Diagrams
- Entity-Relationship Model (ER Model)
- Object-Role Model (ORM)

See Also
4. The Three Level Architecture