Data, Information and Knowledge

Data

> Raw facts, devoid of context or intent. Data can be quantitative or qualitative:

- Quantitative - Numeric data, the result of a measurement, count or some other mathematical calculation.
- Qualitative - Descriptive data.

Information

> Processed data that possesses context, relevance, and purpose.

Knowledge

> Human beliefs/perceptions about relationships among facts or concepts relevant to a particular area of study. Knowledge can be viewed as information that facilitates action.

- Explicit knowledge - Knowledge that can be expressed in to words or numbers
- Tacit knowledge - Insights and intuition that are difficult to transfer to another person by means of simple communication.

Wisdom

> The ability to combine knowledge and experience to produce a deeper understanding of a topic.

Big Data

> Massively large datasets that conventional data processing technologies do not have sufficient power to analyse them.

Databases

> A tool that allows for the aggregation and analysis of data

Reasons databases are needed

1. Build up of redundant data
2. Potential violation of data integrity
3. Otherwise relying on human memory to store and search for needed data

Data Models and Relational Databases

Data Model

> The Logical structure of data items and their relationships

Relational Database

> A Database model where data is organized into tables (relations).

Field

> A criterion which defines the structure of data stored in each table

Record

> An instance of a set of fields in a table

Primary Key

> A unique field that denotes each separate record

Foreign Key

> A primary key that has been referenced in another table

Normalization

> To design a database in a way that reduces data redundancy and ensures data integrity

1st Normal Form

2nd Normal Form

3rd Normal Form

Data Types