Database – Integrated collection of stored data, centrally managed and controlled

Database management system (DBMS) – system software component generally purchases and installed.

Two related information source:

Application domain data – actual data for the problem domain

Schema – descriptive information about application domain data. (Describe structure and rules for accessing application.) It includes:

* Organization of individual stored data, tables
* Associations among tables
* Details of individual data items
* Access and content controls, including allowable values

Database Design – Defined as a collection of steps that help in designing, creating, implementing, and maintaining business data

Database Design Team – Larger organization have staff members dedicated to maintain operational database. Ensure consistency between database requirements for new and existing systems.

Two Key Roles in Database Management:

Data Administrator (DA) – Responsible for the structure and integrity of the data itself

* Data Standards – Naming standards, definition, standards
* Use – Ownership of the data, accessibility of the data
* Data Quality – Validation rules, completeness

Database Administrator (DBA) – Maintains database after it has been deployed. Ensure both data and DBMS is configured correctly

* Managing a multiple DBMS environment
* Protect Data and Database
* Monitoring and maintaining high levels of performance
* Backing up the database and defining recovery procedures

Relational Database – organizes stored data into tables or relations

Table (relation) – composed of rows and columns

Tuple – each table row represents data

Attribute – each table column

Single data value – intersection row and column

Key – attribute or set of attributes occur one time in all rows

* Super key – combination of attributes uniquely identify
* Candidate key – Superkey without unnecessary attributes
* Primary key – Candidate key, uniquely identify all other attribute values in given row
* Foreign key – attribute or combination of attribute in table that match primary key in other-table
* Secondary key – combination of attribute used for data retrieval

Protecting Database

Transaction Logging – technique in which any update in database is log

* Discourage fraudulent transaction
* Provides recovery mechanism

Avoiding to damage each other data once there’s a multiple user.

Two important techniques help with this:

1. Transaction – piece of work that has several steps, including several read and write to the database
2. Database lock – technique where a portion of data base is lock

* Shared lock – allows other user to read same data but not update
* Exclusive lock – no other user can read and rewrite the data.

Software Development Lifecycle – Standard business practices to building software applications.

6 – 8 Steps: (Planning, requirements, design, build, document, test, deploy, maintain)

Predictive approach – Assume that development can be planned and organized and new information can be develops according to plan. Systems that are well known and understood

Adaptive approach – when system requirements and user needs are not well understood.

Traditional Predictive Approaches to the SDLC

Project Initiation – Group of activities identifies problem and secures approval to develop new system.

Project Planning – planning, organizing, and scheduling the project.

Analysis – discovering and understanding the details of the problem or need

Design – configuring and structuring new system components.

Implementation – includes programming and testing the system

Deployment – installing and putting system into operation.

Phases – six group of activities

Support phase – activities to upgrade and maintain system after it has been deployed.

Newer Adaptive Approaches to the SDLC

**Adjustable Plans** – The project can change as new needs arise.  
**Iterations (Mini-Projects)** – The system is built in small parts, improving step by step.  
 **Early User Feedback** – Users can test parts of the system early, ensuring it meets their

System Development Methodology – guidelines for every facet of the system development lifecycle.