
بسم الله الرحمن الرحيم

Database Systems
Lecture 4

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Lecture 4

DFD Example , Schema and Subschemas and Data Independence

DFD Example:
Bus Garage Repairs

DFD Example: Bus Garage Repairs

- Buses come to a garage for repairs.
- A mechanic and helper perform the repair, record the reason for the repair and record the total cost of all parts used on a Shop Repair Order.
- Information on labor, parts and repair outcome is used for billing by the Accounting Department, parts monitoring by the inventory management computer system and a performance review by the supervisor.

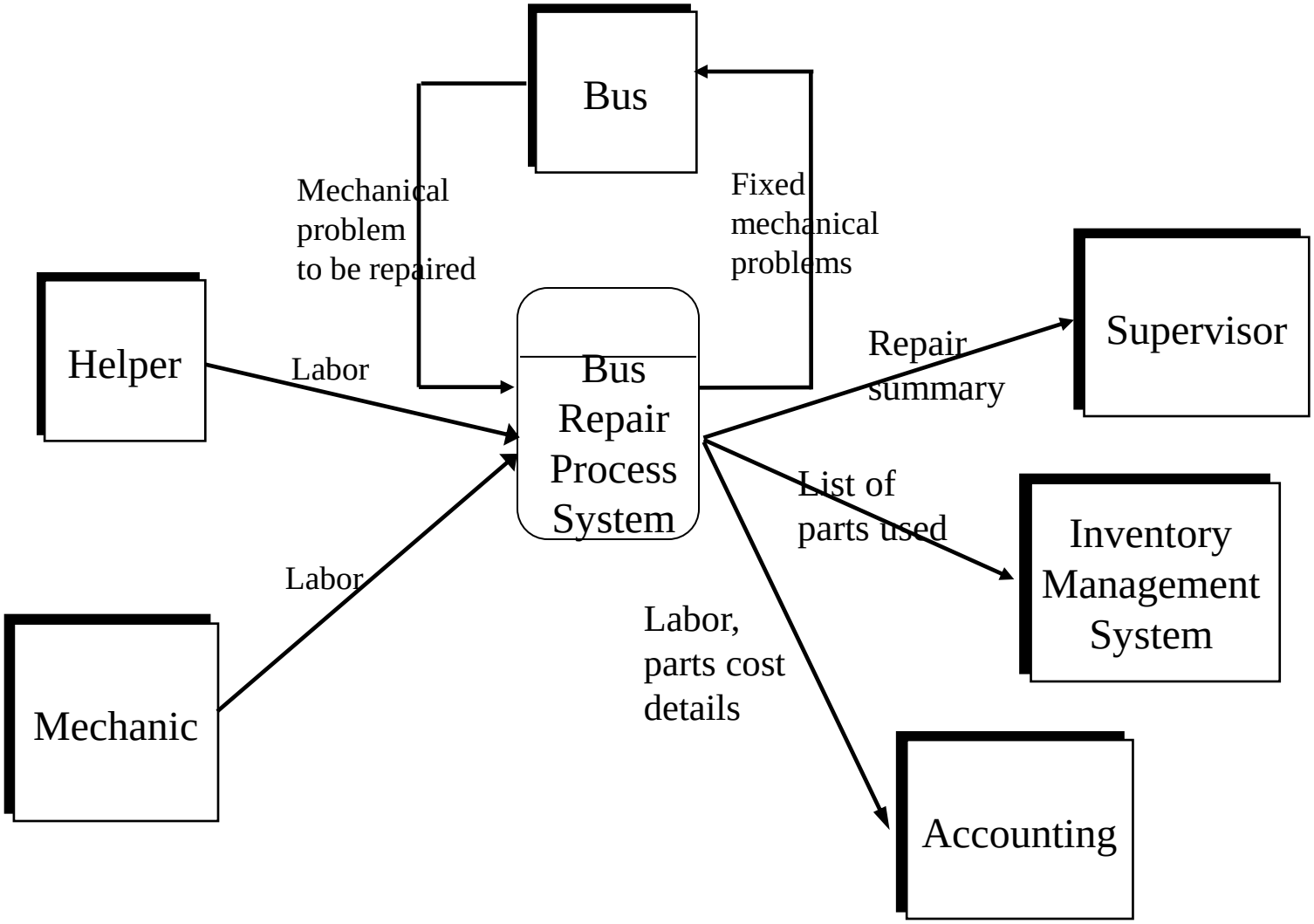
DFD Example: Bus Garage Repairs (cont'd)

- *External Entities*: Bus, Mechanic, Helper, Supervisor, Inventory Management System, Accounting Department, etc.
- *Key process* ("the system"): performing repairs and storing information related to repairs
- *Processes*:
  - Record Bus ID and reason for repair
  - Determine parts needed
  - Perform repair
  - Calculate parts extended and total cost
  - Record labor hours, cost

DFD Example: Bus Garage Repairs (cont'd)

- *Data stores*:
  - Personnel file
  - Repairs file
  - Bus master list
  - Parts list
- *Data flows*:
  - Repair order
  - Bus record
  - Parts record
  - Employee timecard
  - Invoices

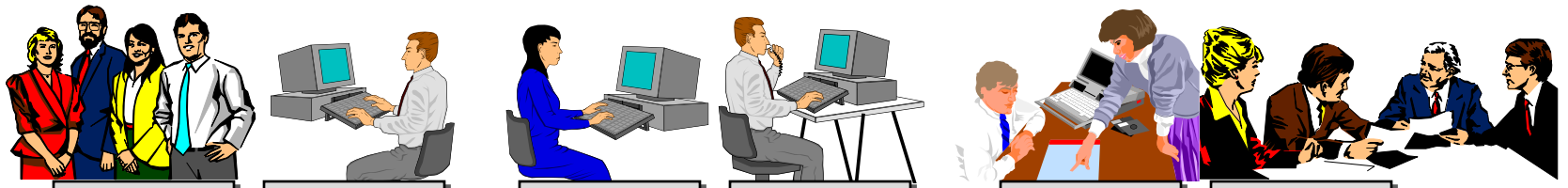
Bus Garage Context Diagram



Prepare 0 – Level and 1-Level diagram

Schema and Subschemas

Schema and Subschemas



User | User | User | User | User | User

Subschema | Subschema | Subschema

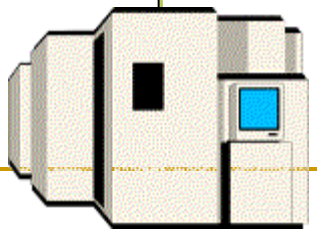
Individual Views

Schema

Complete catalog of all data retained in the database

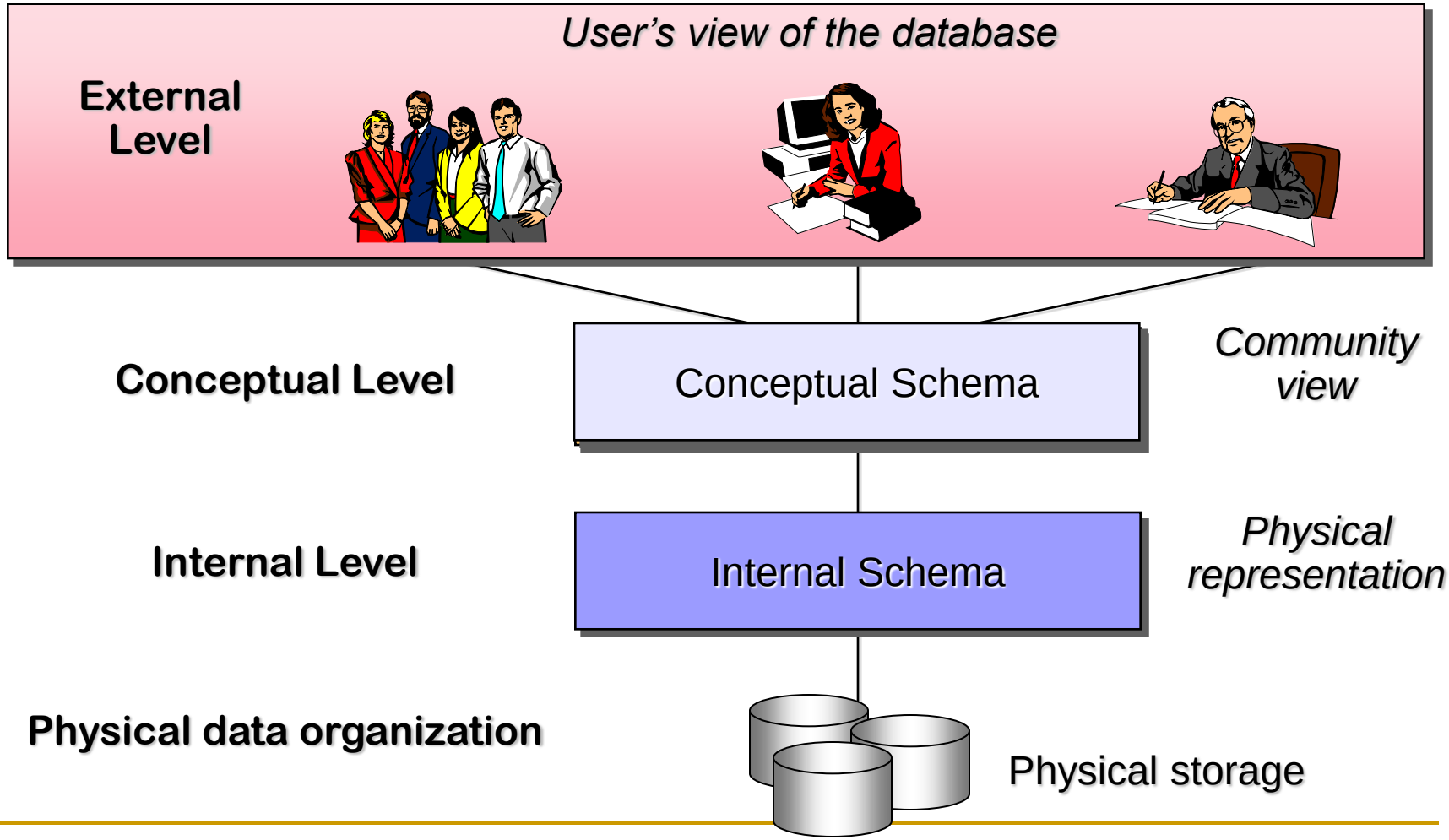
DBMS Software

Manages the database



Physical Database

Database Environment
Three Level Architecture



Independence

- Each user should be able to access the same data, but have a different customized view of the data
- Users should not have to deal directly with physical database storage details
- The DBA should be able to change the database storage structures without affecting the users' views
- The internal structure of the database should be unaffected by changes to the physical aspects of storage
- The DBA should be able to change the conceptual or global structure of the database without affecting all users

Three-Level Architecture

- **External Level**
  Describes that part of the database that is relevant to a particular user
- **Conceptual Level**
  Describes *what* data is stored in the database and relationships among the data
- **Internal Level**
  Describes *how* the data is stored in the database