WEEK 1

THREE SCHEMA ARCHITECTURE

STUDENT OBJECTIVES

- Upon completion of this video, you should be able to:
  - Distinguish between the description of the database and the database itself
  - Define database schema, database snapshot/state and instance
  - Name the 3 levels in the 3-Schema Architecture
  - Determine which levels will be affected by a change
  - Distinguish between Logical Data Independence and Physical Data Independence

SCHEMAS, INSTANCES AND DATABASE STATE

SCHEMA

A description of the database but NOT the data itself

Similar to types in programming languages

E.g. Our database might have 3 tables:

- Patient (patient name, OHIP number)

- Room (room number, num of beds)

- Nurse (nurse name, nurse employee id)

INSTANCE

An occurrence of a data item described in the schema

E.g. The Patient name might be "Homer Simpson" and the OHIP number might be "123-345-567"

STATE/SNAPSHOT
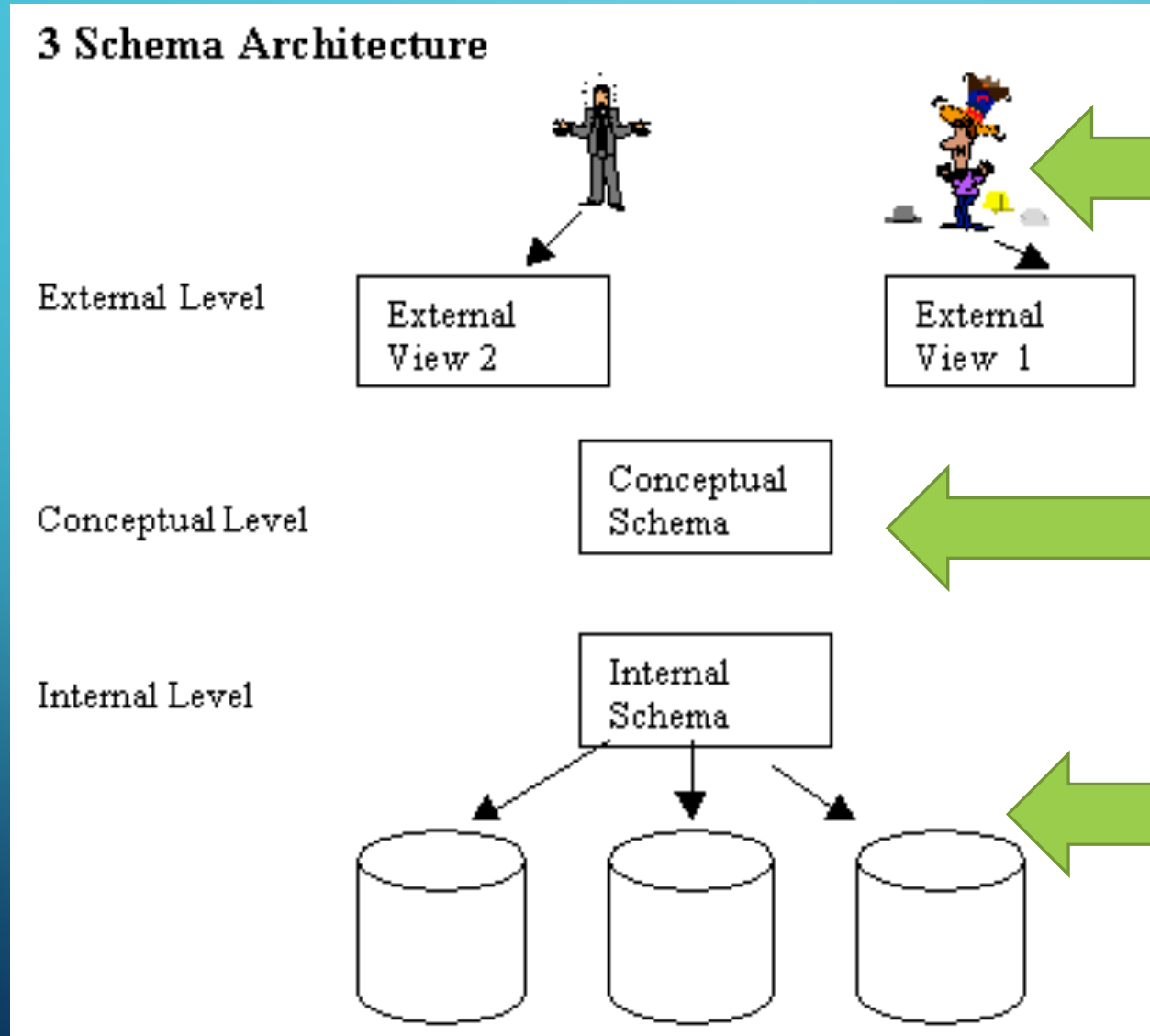
The data in the database at a moment in time

Current set of instances

Every time we delete or add or change a value of a data item we change the state.

MORE INFO ABOUT SCHEMAS AND STATES

- When we define a new database, we are specifying its schema

- Initially the state/snapshop will be empty

- Part of the DBMS's job is to make sure every state is a valid state

- The schema of the schema is called the meta data. The DBMS stores the schema for the schema of each database.

- QUESTION: Changes occur frequently in the Database Schema or the Database State or Both?

3-SCHEMA ARCHITECTURE

3 Schema Architecture

External Level — External View 2 — External View 1

Conceptual Level — Conceptual Schema

Internal Level — Internal Schema

Each view only shows the data that each end user is interested in and hides the other data.

Normally the data in the database is stored in tables (the relational model).

Describes the data storage and indices to get to the data.

DATA INDEPENDENCE

- Logical Data Independence

  - Capacity to change the conceptual schema without affecting the external schema or views

- Physical Data Independence

  - Ability to change the physical schema without changing the conceptual schema

- The goal is to have BOTH physical and logical data independence!