

A decorative graphic on the left side of the slide, consisting of a network of white lines and circles on a blue gradient background. The lines are vertical and horizontal, with some branching out, resembling a circuit board or a tree structure. The circles are of varying sizes and are placed at the ends of the lines.

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:

what the database have.

- 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"

↑
the actual data itself.

STATE/SNAPSHOT

The data in the database at a moment in time

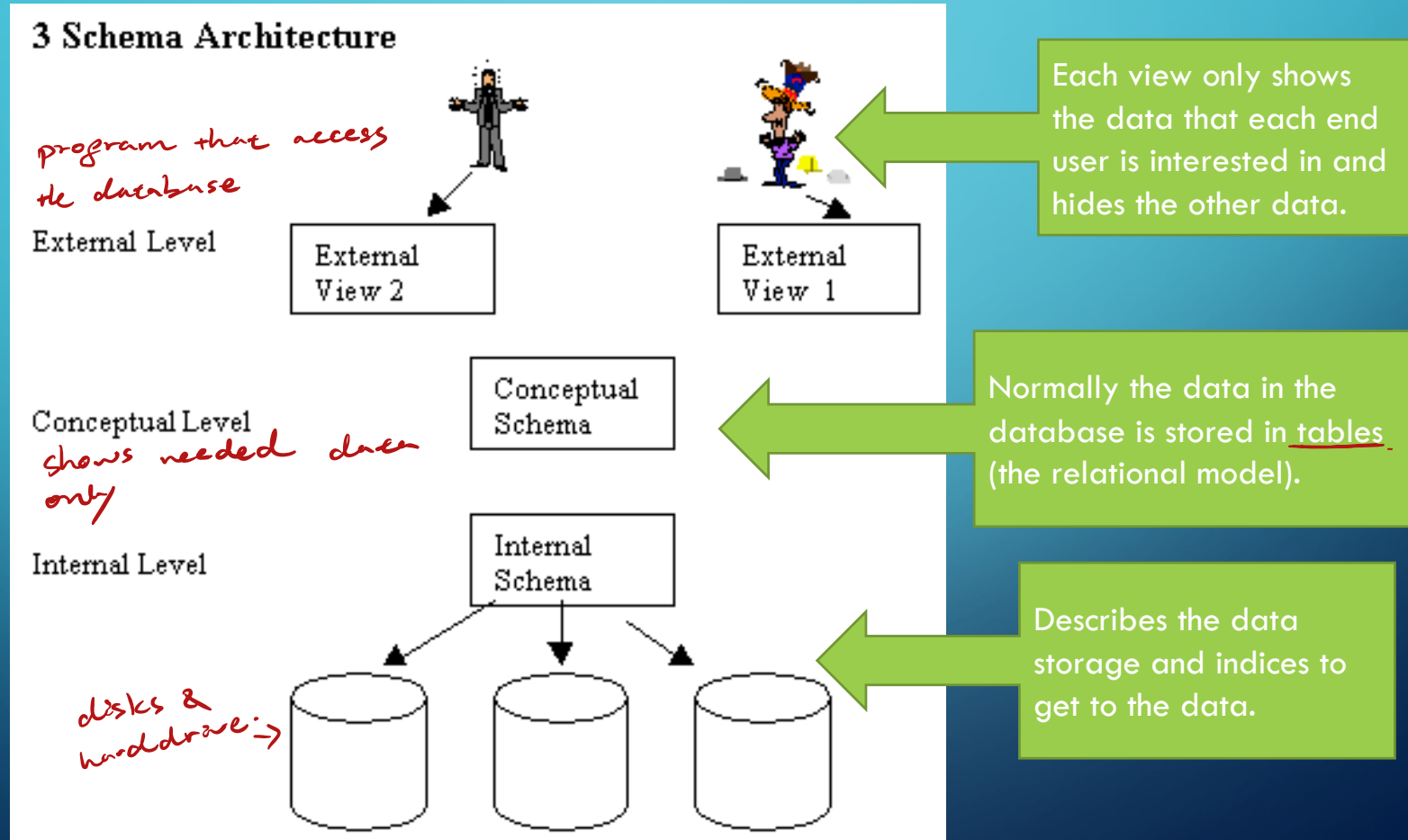
Current set of instances

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/snapshot will be empty
- Part of the DBMS's job is to make sure every state is a valid state *i.e. preventing an invalid data type / leave required fields empty.*
- 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? *state only.*

3-SCHEMA ARCHITECTURE



DATA INDEPENDENCE

- Logical Data Independence *show needed. data only.*
 - 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
?e. put all data in one disk.
- The goal is to have BOTH physical and logical data independence!