

## Lesson 2 - Fundamentals of Databases 2018-08-24

ANSI/SPARC DBMS Framework (2/2): Query transformer dictate how the user / application get information from the internal storage.

Query flow: 12 → 38 → 31 → 36 → 30 → 34 → 21

→ This process doesn't take place everytime; too inefficient  
Metadata Chart

DDL → Data definition statement

What is Metadata?

System metadata: where data came from, how data were changed, how data are stored, how data are mapped, who owns data, who can access data, data usage history, and data usage statistics

Business metadata: what data are available, where data are located, what the data means, how to access the data, predefined reports, predefined queries, and how current the data are

System metadata → Critical for DBMS

Business metadata → Critical for data warehouse

# Lesson 2 - Fundamentals of Databases

Internal Schema: describes how information described in the conceptual schema is physically represented to get best performance

→ Many queries on a particular column can be sped up with a  $B^+$ -tree index → Logarithmic time access

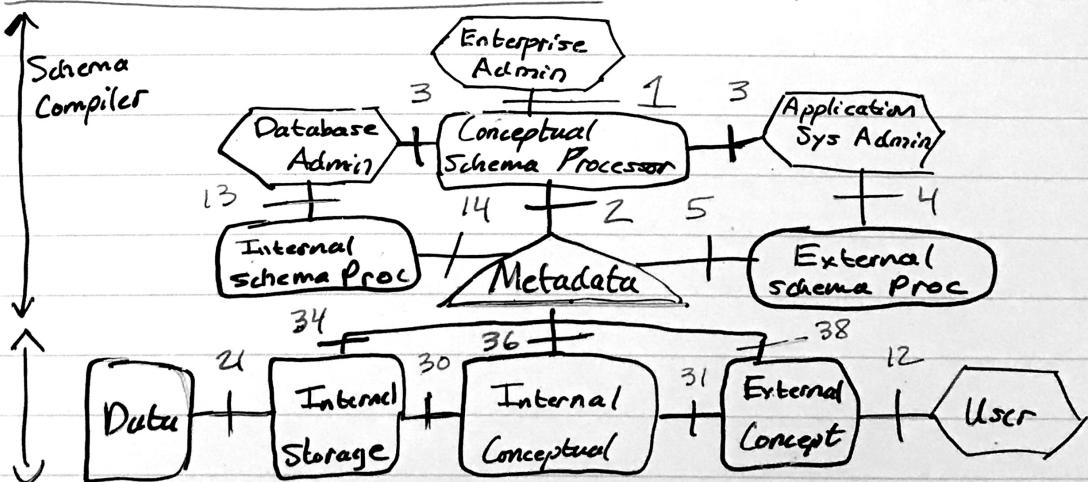
\* What is this? → An index contains two columns: list of column data and pointers to the rows in the database

\* Physical data independence: measure of how much the internal schema can change without affecting the application programs  
→ Similar to the concept of object oriented programming and encapsulation

\* Logical data independence: measure of how much the conceptual schema can change without affecting the application programs

→ More difficult to provide logical data independence since external schemas are logically derived from conceptual schema

ANSI / SPARC DBMS framework: (1/3)



Query transformer

Hexagon = People

Rectangles = Processors or software that transforms text

Summary: Internal schema controls how data is actually stored. Databases want both physical and logical data independence, although logical is harder to achieve.