Data Independence, Database Users & Administrator **(CLASS-L5)**

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Data Independence

- Definition: Capacity to change the schema at one level without having to change the schema at the next higher level (mappings may change)
- **Logical Data Independence**: The capacity to change the conceptual schema without having to change the external schemas and their application programs.
  Ex:

  By adding or removing a record type or data item to
  - expand the database
  - reduce the database

Data Independence (Continue ….)

- **Physical Data Independence**: The capacity to change the internal schema without having to change the conceptual schema.
- Ex:
- Reorganize physical files to improve performance

Example

UNIVERSITY Conceptual Schema
STUDENT (Name, Student Number, Class, Major)
COURSE (Course Name, Course Number, Credit, Dept)
PREREQUISITE (Course Number, Prerequisite Number)
SECTION (Section Id, Course Number, Semester, Year, Instructor)
GRADE_REPORT(Student Number, Section Id , Grade)

UNIVERSITY External Schema
TRANSCRIPT(Student Name, Course Number, Grade, Semester, Year, Section Id)
derived from STUDENT, SECTION, GRADE_REPORT

PREREQUISITES(Course Name, Course Number, Prerequisites)
derived from PREREQUISITE, COURSE

Change GRADE-REPORT Schema Construct
GRADE_REPORT (Student Number, Student Name, Section Id, Course Number,Gra

Change Mapping (& View Definition)
TRANSCRIPT derived from SECTION, GRADE_REPORT

DB Development Life Cycle

- Database planning
- System definition
- Requirement collection and analysis
- Database design
- DBMS selection
- Application design
- Prototyping
- Implementation
- Data conversion and loading
- Testing
- Operational maintenance

DBMS Interfaces

- Stand-alone query language interfaces. (casual end user)
- Programmer interfaces for embedding DML in programming languages:(programmer)
  - Pre-compiler Approach
  - Procedure (Subroutine) Call Approach
- User-friendly interfaces:
  - Menu-based Interfaces for Browsing.
  - Forms-based Interfaces.
  - Graphical User Interfaces
  - Natural language Interfaces

  Combination of the above
- Interfaces for the DBA:
  - Creating accounts, granting authorizations
  - Setting system parameters
  - Changing schemas or access path

Database Users

Users are differentiated by the way they expect to interact with

the system

- **Application programmers** – interact with system through DML calls
- **Sophisticated users** – form requests in a database query language
- **Specialized users** – write specialized database applications that do not fit into the traditional data processing framework
- **Naïve users** – invoke one of the permanent application programs that have been written previously
  - Examples, people accessing database over the web, bank tellers, clerical staff

Database Administrator

- Coordinates all the activities of the database system; the database administrator has a good understanding of the enterprise's information resources and needs.
- Database administrator's duties include:
  - Schema definition
  - Storage structure and access method definition
  - Schema and physical organization modification
  - Granting user authority to access the database
  - Specifying integrity constraints
  - Monitoring performance and responding to changes in requirements

THE END