DATABASE LANGUAGES and LEVELS

Database Language Levels

• Each Level has a Definition Language
• Internal
  – Storage Definition Language
• Conceptual
  – Data Definition Language
• External (User)
  – View Definition Language
• Define data’s structure
Data Definition Language

Logical Structure of Conceptual Level Data
- Record Types
- Attributes

Rules governing DB
- Rules for each table
- Rules about connections between tables

Conceptual: DDL

- create table employee (
  fname varchar(15) not null,
  lname varchar(15) not null,
- ssn char(9) primary key,
- dno number(3) foreign key references department);
Storage Definition Language

- Physical Structure
- Bytes per field
- Order of fields
- Sorting
- Access (hash, B-tree)
- File Structure
- Mixed Records, etc.

SDL Example

- `create table employee ( ...,
  initrans 3, /* simul updates */
  pctfree 30, /* use new block */
  initial 7,
  next 7); /* space allocated */
- Beyond scope of this course
View Definition Language

• Define Subsets of records available to classes of user.
• Create "virtual tables" from base tables.
• View appears to user like conceptual level.

VDL Examples

• `create view emp5 as
  select * from employee
  where dno = 5;
  -- See only dept 5 employees`

• `create view empdept as
  select fname,lname,dno,dname
  from employee,department
  where dno=dnnumber;
  -- Make both dept number and name available.`

Based in two tables
View Examples, cont.

- Create view stats as
  select dname, count(*), avg(salary),
  from employee, department
  where dno = dnumber
  group by dname;
  - This count and average do not exist in any DB table.

Data Manipulation Language

- Used at conceptual level
- and at External Level.
- query (request info)
- delete
- update
- insert
DML examples

- select * from stats
  where dname = 'Research';
- insert into works_on
  values('123456789',7,15);
- update works_on
  set hours = 10
  where essn = '123456789'
  and pno = 7;

Standard SQL Defines

- Conceptual Level DDL (Data Definition Lang)
- Conceptual Level DML (Data Manipulation)
- External Level DDL
  - Views are defined as Queries with names
- External Level DML (same as Conceptual)
- NO Storage Definition Language
Oracle DB Definition

• Adds SDL constructs to Standard SQL DDL.
• Also structures database with Configuration Files
• This is province of DB Administration.
• Beyond the Scope of this Course