SQL Basics

for **Database** Access in the **OOP** Course

Database Management System (**DBMS**)

- **Independent** software to manage enterprise data
- It facilitates
  - **CRUD** operations, **provides** consistent, reliable data
  - **Faster** data Access **with low-cost** maintenance
  - **Improved** data sharing and data security
  - **Eliminates** data loss, Backup/restore
  - **Effective** data integration, **Scalability** and **flexibility**
  - **Compliance** with privacy regulations
  - **Increased productivity** and **Better decision-making**
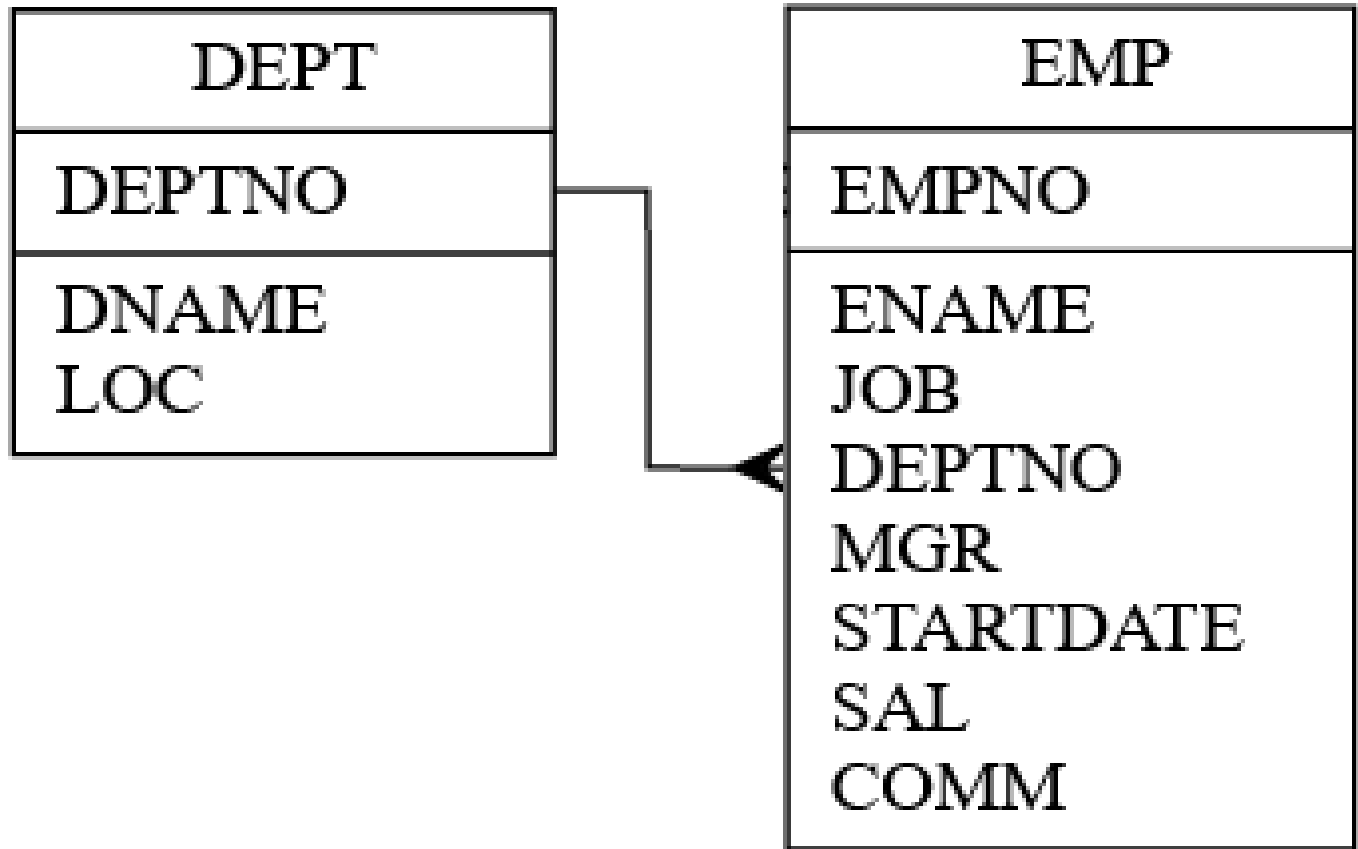
Database (DB)
the storehouse of Data

- A database is **an organized collection of structured information, or data, typically stored electronically in a computer system**. A database is usually controlled by a database management system (DBMS).

- ODBC, **open database connectivity** provide single standardized method to connect verity of DBMS's DBs
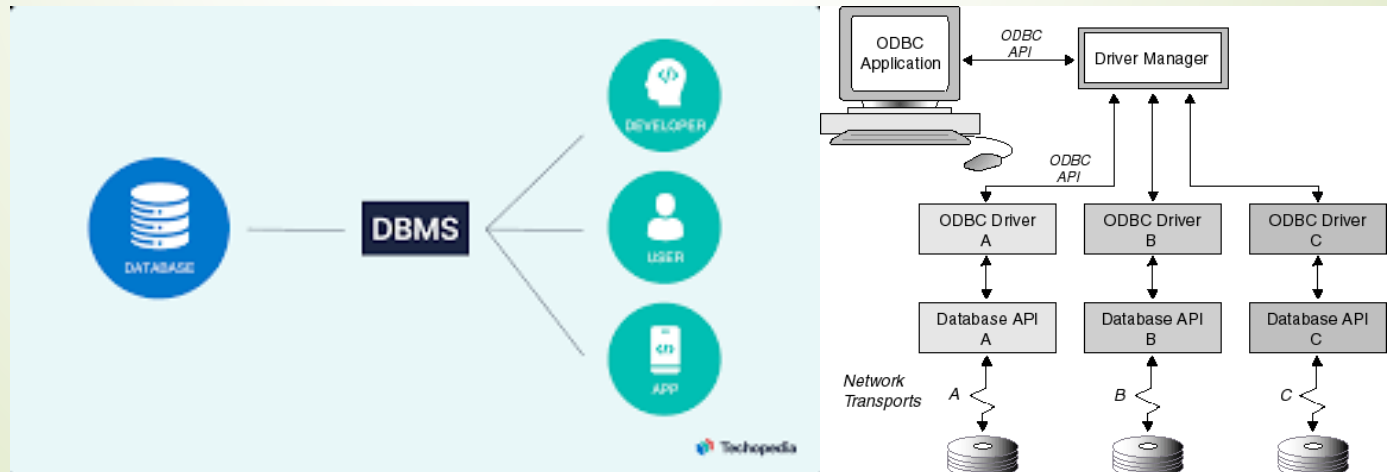
Data model, ERD or ORM Object relationship model

Related Data in DB
emps and deps are related on deptno

SQL for RDBMS
Structured Query Language

- Create/Alter/Drop
  - Databases, Tables, and many other object
- Insert into table (column,…) values (data,…)
  - To add new data in table columns
- Select column,… from table where filter order by column,…
  - To retrieve filtered and ordered data columns
- Update table set column,… = newData,… where filter
  - To modify data in table columns
- Delete from table where filter
  - To remove from in table

commit makes changes permanent
rollback undo changes upto last commit

Create table

create table *table_name*

(

    column1_name column1_type,
    column2_name column2_ type,
    column3_name column3_ type,

    …

)

may be in one line only, above preferred in DBMS editor

SQLite

INTEGER
REAL
TEXT
BLOB

NULL

Insert into *table*

insert into *table_name*

(*column_name, ...***)**

values

(*data, ...***)**

NULL values

may be in one line only, two lines preferred in DBMS editor

Delete from *table*

delete from *table_name*

where *filter*

may be in one line only, two lines preferred in DBMS editor

Update *table*

update *table_name*
Set *column_name1 = newdata1,*
    column_name2 = newdata2,

   …

where *filter*

may be in one line only, multiple lines preferred in DBMS editor

Select ... from **table**

select *column_name* [**as** *alias*], ...
from *table_name* | *join* of *tabulars*
[**where** *filter*]
[**order by** *column, ...*]

expressions, operations and functions
group/aggregate functions

may be in one line only, four lines preferred in DBMS editor

Dynamic statements used within programs/apps

*Concatenation of parts of query strings and values of variables to form a valid SQL statement in a **string object**.*

SQL Injection Attacks

***Dynamic string objects** may be obtained by any method, f-strings, prepared statements, etc*

***Prepared statements** or **stored procedures** should be used for performance and to avoid SQL injections.*