



# Introduction to Oracle RDBMS

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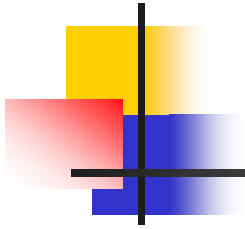
Presented by  
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# What's a Relational Database?

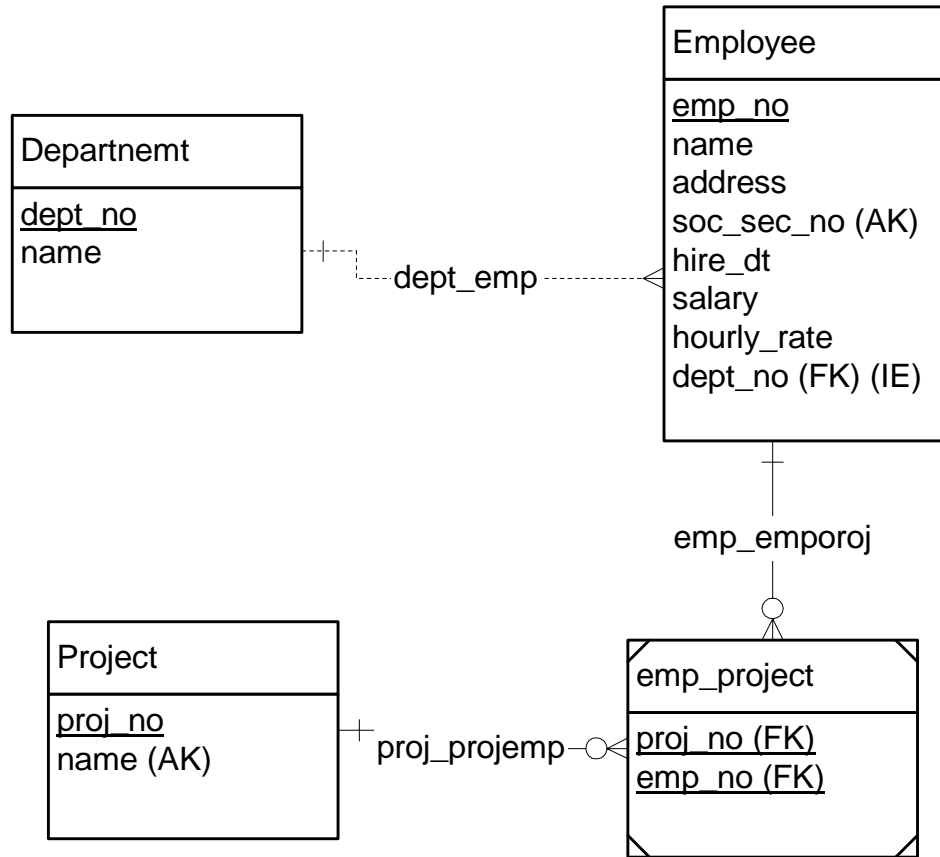
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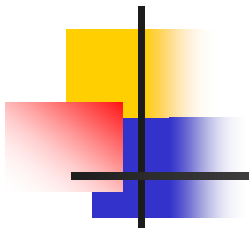
- Data is represented as Entities and Relationships
- Entities
  - Attributes
- Relationships
  - One-to-One
  - One-to-Many
  - Many-to-many



# Logical Design

# Logical Design Example





# Physical Design



# Database Objects

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- ***Tables***

- **Rows and Columns**

- **Constraints**

- **PK: Primary Keys**
- **UK: Unique Keys/Alternate Keys**
- **FK: Foreign Keys**
- **CK: check Constraints**

- **Triggers**

- **Auto execution of code based on Table action (Insert, Update, Delete)**



# Database Objects (contd.)

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- ***Indexes***
  - Unique
  - Non-unique
- ***Views***
  - Logical Views of data
- ***Object Tables***
- ***Object Type***
- ***Stored Procedures/Functions***
  - Server side code



# Database Object Placement

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- **Tablespaces**

- *System*
- *Rollback*
- *Temporary*
- *Application data*
- *Redo Logs*

- **Data Files**

- *Physical placement of tablespaces*





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# Object Creation and Data Manipulation



# Data Manipulation

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- ***DDL – Data Definition Language***
  - CREATE Table/Index/Procedure/Function/Trigger
  - ALTER Table/Index
- ***DML – Data Manipulation Language***
  - INSERT,UPDATE,DELETE
  - SELECT
    - SELECT <select list>
    - FROM <table list>
    - WHERE <filters>
    - ORDER BY <sort list>



# Transaction Control

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- **Rollback Segments**
  - Logs uncommitted changes, in case they need to be undone
- **Redo Logs**
  - Logs data block changes, in case of database recovery
- ***Commit***
- ***Rollback***



# Database Access/Security

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- ***System Privileges***
  - ***Create session, create table, alter table, select any table, ...***
- ***Object Privileges***
  - ***Select, Insert, Update, Delete, Alter, ...***
- ***Can group privs into roles***
  - ***Connect, resource, DBA, ...***
- ***Highest access level: internal or sys***
- ***Lowest access level: no privs***



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# Oracle Configuration



# Physical Configuration

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- ***Env variables:***
  - **ORACLE\_BASE**
  - **ORACLE\_HOME**
  - **ORACLE\_SID**
  - **PATH: \$ORACLE\_HOME/bin**
  - **LD\_LIBRARY\_PATH: \$ORACLE\_HOME/lib**
- ***Initialization parameters***
  - **\$ORACLE\_HOME/dbs**



# Physical Configuration

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- **Admin directory structure**
  - **`$ORACLE_BASE/admin/<sid>/`**
  - **create, pfile, bdump, cdump, udump**
  - **alert\_<sid>.log**
- **`/u*/oradata/<sid>/`**
- **data files: <tablespace name>xx.dbf**
- **control files: \*.ctl**
- **redo logs: \*.log**
- **archive logs: arch\*.log**



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# Client/Server Communication



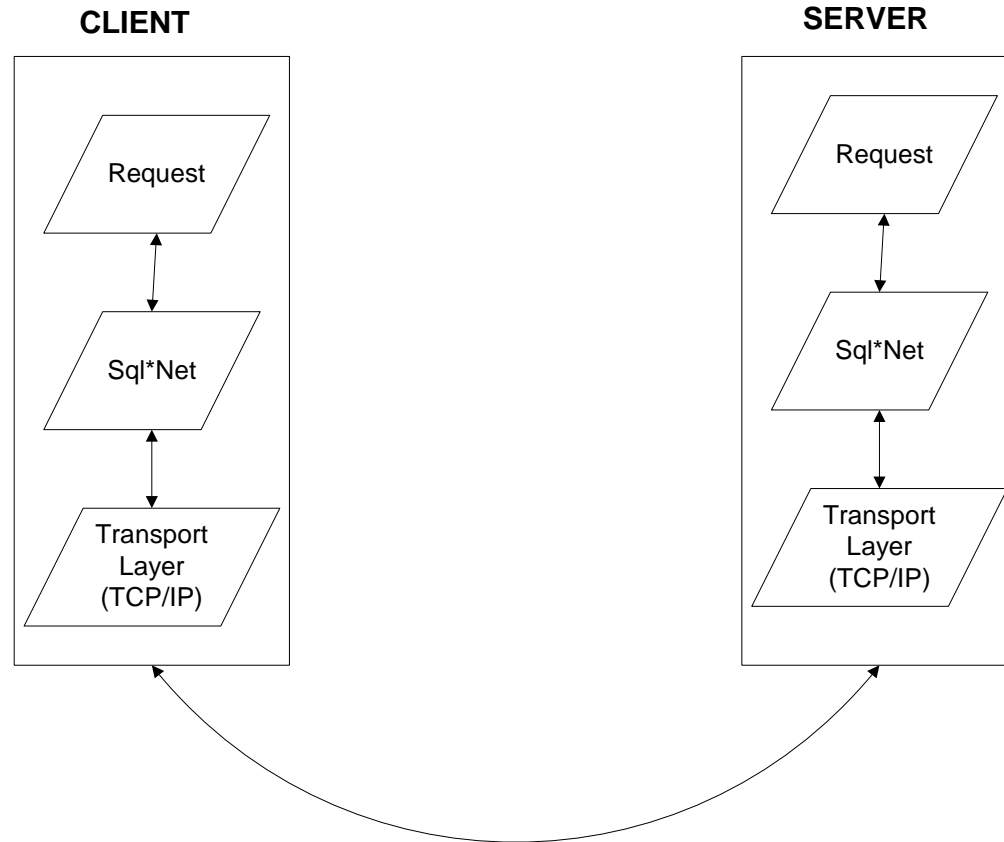


# Client/Server Communication

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- ***Server:***
  - Listener.ora
  - Listener process
- ***Client:***
  - Sqlnet.ora
  - Tnsnames.ora
- ***Oracle Names***

# Data Transfer





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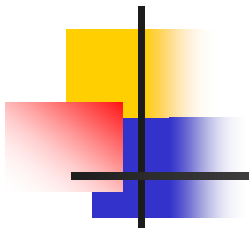
# Oracle Memory Structures



# Memory Use

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- Shared Memory
  - Data cache
  - Sql stmt Cache
  - Data Dictionary Cache
- Private Memory
  - Heap
  - Sort Area



# Oracle Processes



# Background Processes

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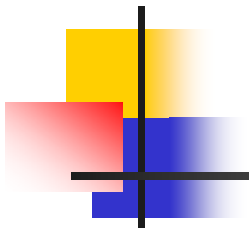
- *Pmon (process monitor)*
- *Smon (system monitor)*
- *Dbwr (database writer)*
- *Ckpt (checkpoint)*
- *Lgwr (log writer)*
- *Reco (recovery)*
- *Pxx (parallel query)*
- *Snp (snapshot/job)*
- *Arch (archiver)*



# Other Processes

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- Listener
  - Listens for connections and spawns server processes
- Server Processes
  - Receive client requests, process requests and serve results
  - One per connection (unless MTS)



Questions?