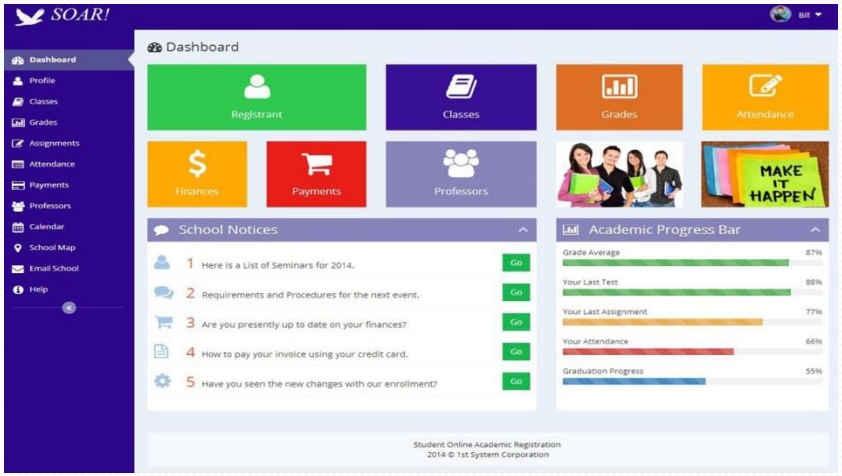
# Database

# Data everywhere !!!





# What is database ??

**Person**

| Login | LastName | FirstName |
|---|---|---|
| skol | Kovalevskaya | Sofia |
| mlom | Lomonosov | Mikhail |
| dmitri | Mendeleev | Dmitri |
| ivan | Pavlov | Ivan |

**Project**

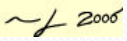
| ProjectId | ProjectName |
|---|---|
| 1214 | Antigravity |
| 1709 | Teleportation |
| 1737 | Time Travel |

**Experiment**

| ProjectId | ExperimentId | NumInvolved | ExperimentDate | Hours |
|---|---|---|---|---|
| 1214 | 1 | 1 | NULL | 1.5 |
| 1214 | 2 | 1 | 1889-11-01 | 14.3 |
| 1709 | 1 | 3 | 1891-01-22 | 7.0 |
| 1709 | 2 | 1 | 1891-02-23 | 7.2 |
| 1737 | 1 | 1 | 1900-07-05 | -1.0 |
| 1737 | 2 | 2 | 1900-07-05 | -1.5 |

**Involved**

| ProjectId | ExperimentId | InvolvedId | Login |
|---|---|---|---|
| 1214 | 1 | 1 | mlom |
| 1214 | 2 | 1 | mlom |
| 1709 | 1 | 1 | dmitri |
| 1709 | 1 | 2 | skol |
| 1709 | 1 | 3 | ivan |
| 1709 | 2 | 1 | mlom |
| 1737 | 1 | 1 | skol |
| 1737 | 2 | 1 | skol |
| 1737 | 2 | 2 | ivan |



# What about files ???

# Files

Asma, 20179000, asm2017@std.psut.edu.jo, 0777888888

Amal, 20155000, ama2015@std.psut.edu.jo, 0777999998

Anas, 20199000, ana2019@std.psut.edu.jo, 0799888888

Alaa, 20119000, ala2011@std.psut.edu.jo, 0788888888

Ali, 20149000, ali2014@std.psut.edu.jo, 0787777778

…

…

…

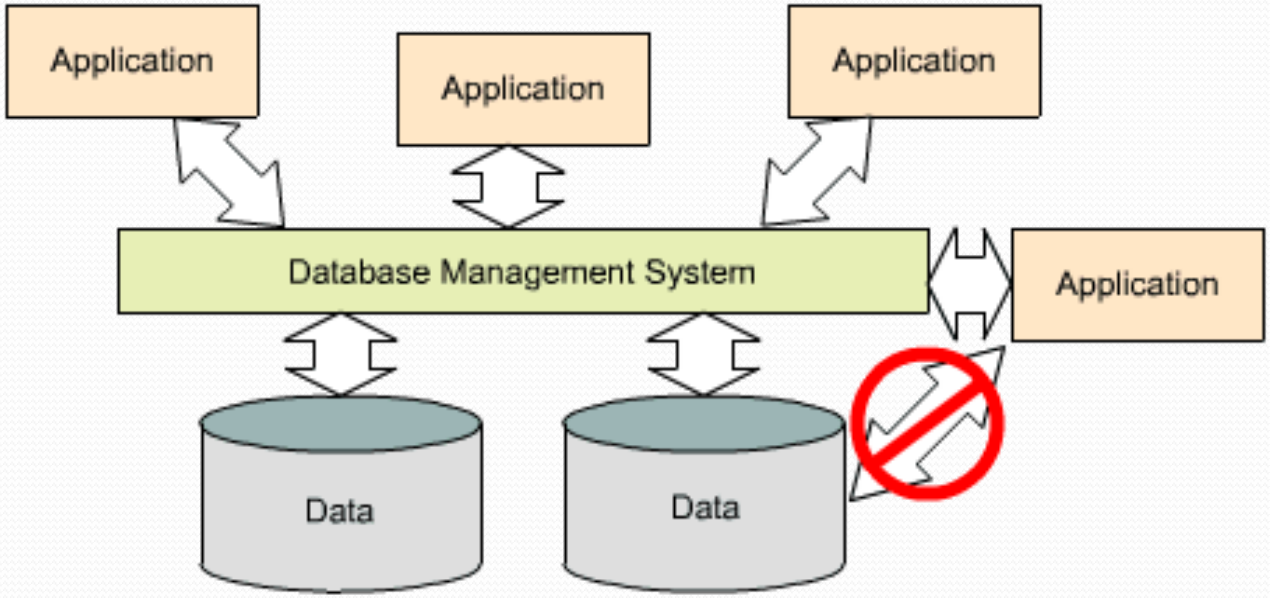
# Database features

- Self-describing nature of a database system
- Insulation between programs and data, and data abstraction
- Support of multiple views of the data
- Sharing of data and multiuser transaction processing

# The complete process

- Requirements specification and analysis
- Conceptual design
- Logical design
- Physical design

# How to access the database



# DBMS


ORACLE
firebird
PostgreSQL
IBM DB2
Microsoft SQL Server 2008
SQLite
MySQL
123
TERADATA
CSV

# In this course

- Oracle DBMS
- SQL*Plus

# Why should we study DB?????

# Why should we study DB?????

# Structured query language (SQL)

| | |
|---|---|
| SELECT | Data retrieval |
| INSERT<br>UPDATE<br>DELETE | Data manipulation language (DML) |
| CREATE<br>ALTER<br>DROP<br>RENAME<br>TRUNCATE | Data definition language (DDL) |
| COMMIT<br>ROLLBACK<br>SAVEPOINT | Transaction control |
| GRANT<br>REVOKE | Data control language (DCL) |

# Data Retrieval

Doctors

| ID | Name | Sal | addr ess | .... | ... |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Query: retrieve the id and salary for the doctors who lives in Amman




# Data Retrieval

Doctors

| ID | Name | Sal | address | .. . | ... |
|---|---|---|---|---|---|
| | | | | | |
| | | | Amman | | |
| | | | | | |
| | | | Amman | | |
| | | | | | |





Determine the following:

1)Which table?
2) Which columns?
3)Which rows?(condition)
4)How to order the result?

# Select Statement

```
Select      cols
From      Table-Name
Where  Condition
Order by cols
```

# Data Retrieval

Doctors

| id | fname | Lname | bdate | address | sal | Dno |
|---|---|---|---|---|---|---|
| 1255 | Ahmad | sami | 9-May-1979 | Amman | 2000 | 20 |
| 1314 | Sara | ali | 1-jan-1996 | Irbid | 1550 | 20 |
| 1772 | Sana | khalil | 5-mar-1960 | Ajloun | 3000 | 1 |
| 5988 | mohammad | qais | 10-aug-1988 | Karak | 5700 | 5 |
| 3421 | leen | wesam | 10-feb-1987 | Amman | 2500 | 3 |

# Basic Data Retrieval

- Select fname, bdate, sal from doctors

| fname | bdate | sal |
|---|---|---|
| Ahmad | 9-May-1979 | 2000 |
| Sara | 1-jan-1996 | 1550 |
| Sana | 5-mar-1960 | 3000 |
| mohammad | 10-aug-1988 | 5700 |
| leen | 10-feb-1987 | 2500 |

# Basic Data Retrieval

- Select * from doctors

| id | fname | Lname | bdate | address | sal | Dno |
|---|---|---|---|---|---|---|
| 1255 | Ahmad | sami | 9-May-1979 | Amman | 2000 | 20 |
| 1314 | Sara | ali | 1-jan-1996 | Irbid | 1550 | 20 |
| 1772 | Sana | khalil | 5-mar-1960 | Ajloun | 3000 | 1 |
| 5988 | mohammad | qais | 10-aug-1988 | Karak | 5700 | 5 |
| 3421 | leen | wesam | 10-feb-1987 | Amman | 2500 | 3 |

# Data Retrieval (operations)

- Select fname, sal * 12 from doctors

| fname | sal * 12 |
|---|---|
| Ahmad | 24000 |
| Sara | 1860 |
| Sana | 36000 |
| mohammad | 68400 |
| leen | 30000 |

# Data Retrieval (operations)

| Operator | Description |
|---|---|
| + | Add |
| - | Subtract |
| * | Multiply |
| / | Divide |

**Operator Precedence**

| * | / | + | – |
|---|---|---|---|

# Data Retrieval (Alias)

- Select fname as “First Name”, sal * 12 as “Annual Salary” from doctors

| First Name | Annual Salary |
|---|---|
| Ahmad | 24000 |
| Sara | 1860 |
| Sana | 36000 |
| mohammad | 68400 |
| leen | 30000 |

# Data Retrieval (Alias)

- Select fname “First Name”, sal * 12 “Annual Salary” from doctors
- ***As*** is optional

| First Name | Annual Salary |
|---|---|
| Ahmad | 24000 |
| Sara | 1860 |
| Sana | 36000 |
| mohammad | 68400 |
| leen | 30000 |

# Data Retrieval (Alias)

- Select fname FirstName, sal * 12 “Annual Salary” from doctors
- “” is optional

| FIRSTNAME | Annual Salary |
|---|---|
| Ahmad | 24000 |
| Sara | 1860 |
| Sana | 36000 |
| mohammad | 68400 |
| leen | 30000 |

# Data Retrieval

- Select address from doctors

| address |
| --- |
| Amman |
| Irbid |
| Ajloun |
| Karak |
| Amman |

# Data Retrieval (distinct)

- Select distinct address from doctors

| address |
| --- |
| Amman |
| Irbid |
| Ajloun |
| Karak |

- Two columns

| ID | Name |
| --- | --- |
| 1 | Ali |
| 2 | Sama |
| 3 | Ali |
| 2 | Sama |

# Concatenation

- Select id, fname || lname as “Name” from doctors

| id | Name |
|---|---|
| 1255 | Ahmadsami |
| 1314 | Saraali |
| 1772 | Sanakhalil |
| 5988 | mohammadqais |
| 3421 | leenwesam |

# Concatenation

- Select id, fname ||' '||lname as "Name" from doctors

| id | Name |
|---|---|
| 1255 | Ahmad sami |
| 1314 | Sara ali |
| 1772 | Sana khalil |
| 5988 | Mohammad qais |
| 3421 | Leen wesam |

# Concatenation

- Select fname ||' lives in '|| address details from doctors

| DETAILS |
| --- |
| Ahmad lives in Amman |
| Sara lives in Irbid |
| Sana lives in Ajloun |
| Mohammad lives in Karak |
| Leen lives in Amman |

# Describe

- To view the structure of the table use **describe** keyword:

describe TableName

- Example:

**describe books**