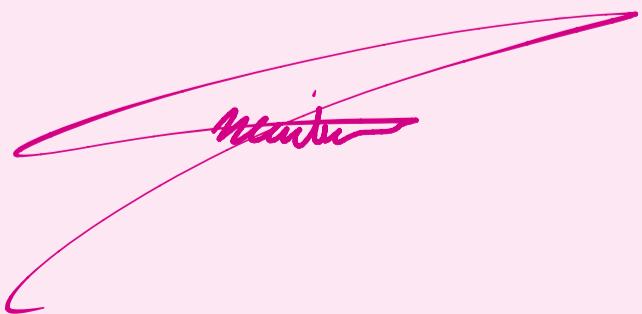


notes to all labs (database)

A handwritten signature in black ink, appearing to read "Martin".

studied

meaning

notes

## 1-characters Types:-

1. char (n)

create table name-table (  
n.att char (n) , n.att varchar (n))

البيانات الثابت عددها  
تستخدم كاحد (عدد)

2-varchar (n)

البيانات الغير ثابت عددها  
(متغير)  
نقطة بسيطة كـ max

## 2-Number Types:-

1. int

create table name-table (  
n.att int , n.att date )



نحدد فيه عدد الابيات

2. float (n)

int → الارقام الصحيحة

4 byte = 24  
8 byte = 53

3. money

float → الارقام العشرية

Example:  
Let's say we have a table named "Product" with a column called "Price" defined as float(24). This means the "Price" column can store a 4-byte floating-point number with a precision of 24.  
CREATE TABLE Product {  
Price float(24)  
};  
INSERT INTO Product (Price) VALUES (12.345);  
In this example, the value 12.345 is stored in the "Price" column as a 4-byte floating-point number with a precision of 24.

4. decimal (P)

money → monetary values

decimal (P) → max 38 digits

## 3-Binary data types:-

1. bit

bit → single bit      1bit or 8bit      ex.  
n.att bit (1)  
↔ 11 bit (8)

2. image

image → Large chunks  
n.att Image

## 4-Date types:-

1. datetime

① both < time  
date + storage (8bytes) + 3.33 millisecond

نوع البيانات التي يمكن تخزينها	النوع
YYYY-MM-DD تاریخ ، سیطروں کے	DATE
HH:MM:SS وقت ، سیطروں کے	TIME
تاریخ ووقت ، سیطروں کے YYY-MM-DDHH:MM:SS	DATETIME

2. time

② time 100 nanosecond + storage (3-5 bytes)

CREATE TABLE

- create table in sql  
- create table name-table ( column\_name datatype, ..., ... )

Ex:  
CREATE TABLE department (DEPARTMENT\_id int , DEPARTMENT\_Name varchar(255), Date\_of\_Work date)

Select \* from

- display the table  
- select \* from Table\_name

نستخرج الجدول من اسم الجدول . ونستخرج المقوس الدائري اسم العمود ونسمي  
ويمثل بسيط بحافله .

طريق لحرف الجدول

## Alter Table

ALTER TABLE  
ADD

- Add new column to table  
- Alter table table\_name  
ADD column\_name datatype.

ex.  
Alter table employee ADD Age int

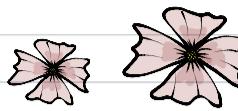
ALTER TABLE  
ALTER column

- changing the datatype of column  
- Alter table table\_name  
ALTER column\_name datatype  
new o)

ex. ALTER TABLE Employee ALTER COLUMN date\_of\_work  
varchar (255)

## ALTER TABLE DROP COLUMN

- Delete a column in table
- ALTER TABLE table\_name  
DROP COLUMN column\_name



- ماتصالح تذكر

- ex.

ALTER TABLE Employee DROP COLUMN Age

## LAB Three

### Data manipulation Language (DML)

#### INSERT INTO

- columns في الـ
- Two ways :-

① with column name

```
INSERT INTO table_name (column1 ,...,column n)
VALUES (value1,value2,value3,...)
```

② without column name

```
INSERT INTO table_name
VALUES (value1,value2,value3,...)
```

```
INSERT INTO DEPARTEMENT
VALUES('Administration',4,'987654321','1995-01-01')
```

#### UPDATE SET WHERE

- update the existing records in table
- where clause to update select rows
- UPDATE table-name
  - زد الماء
  - الجدول
  - set column\_name = Value
  - where condition

(لأنه أدمم به ماذ العين، ما يتصاحن نكتة)



② DECLARE @A int Set @A = 5

متغير فيه قيمة بكرها كبيرة  
يمكنه استخدام هذه الايفر مع القيم

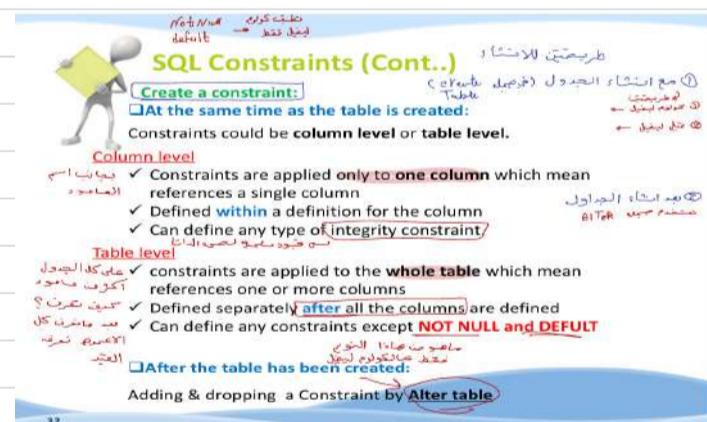
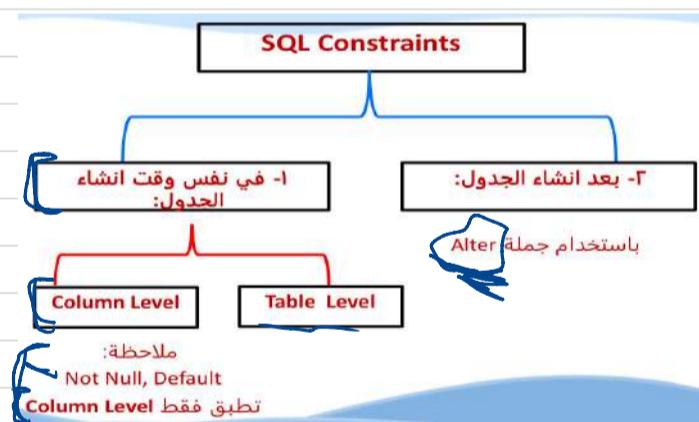
#### DELETE FROM WHERE

- use delete Rows existing Records from table
- where ~ delete select Rows
  - \*with where
  - DELETE FROM table-name
    - WHERE condition
- without where
  - DELETE FROM table-name

- ببروح للشرط أورث نعم بعد الصنوف المصنفة للشرط وجعل لها الديت  
and  
or

- نقدر نستخدم مع الشرط لكن يكون المتأثر عالى كل

### SQL constraints



#### start at

#### measuring

#### 1- NOT NULL

- use constraint ~column not accept Null value
- \* only used from column level

when table is created

```
CREATE TABLE table_name (
  column_name datatype NOT NULL ,...)
```

After the table is created

```
ALTER TABLE table-name
ALTER column column_name
datatype NOT NULL
```

#### notes

\* العاليسوا الحدود ما يكون منها Null  
\* فقط عالكلو لم يتم ليمتن

## UNIQUE

مُحِظٍ

الكريبيون

constraint `CONSTRAINT`  
`UNIQUE`

- use → all values column are different
- no same value

when table is created

1-column level:

```
CREATE TABLE table_name (  
    column_name datatype UNIQUE, ...)
```

2-Table level:

```
CREATE TABLE table_name (  
    column_name datatype, ...  
    constraint constraint_name UNIQUE  
    (column_name) )
```

After the table is created

```
ALTER TABLE table_name  
ADD UNIQUE (column_name)
```

- \* يتم فحصه وختير منكره
- \* هي طريقة المبدول ومحض الطريقة
- \* في Table level ← نعمي اسم للعنصر
- لست يعني أن اسم
- العنصر حفظه فقط

## CHECK

## DEFAULT

- used to insert default value into column
- only from column level

when table is created

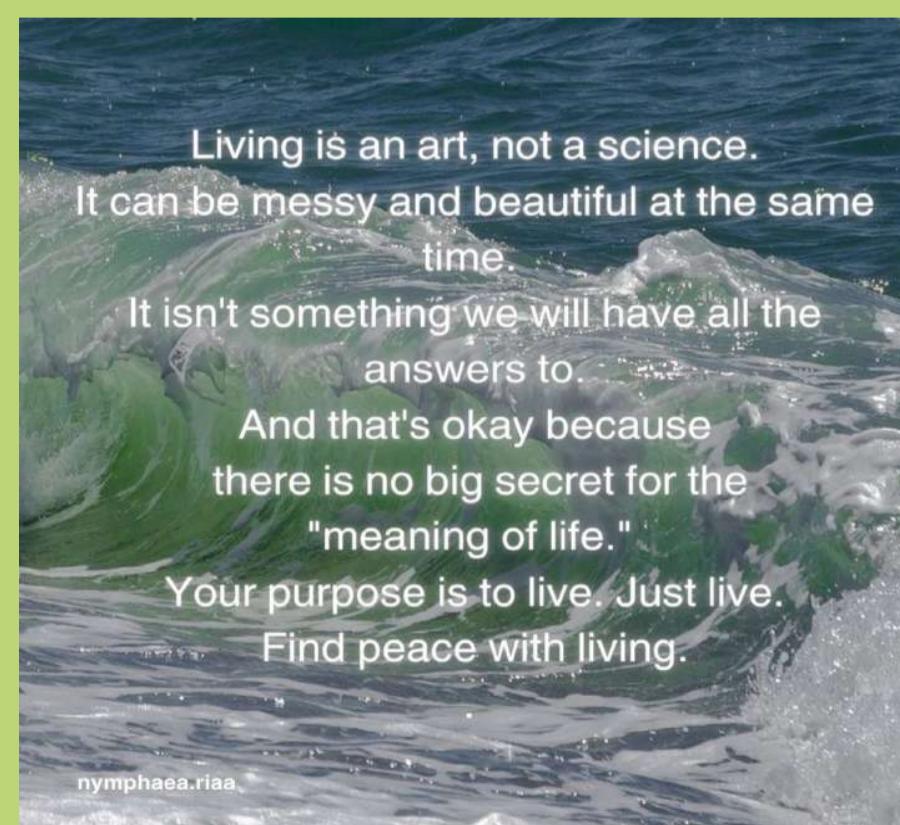
```
CREATE TABLE table_name (  
    column_name datatype DEFAULT  
    default_value, ...)
```

(↳ → basic condition)

After the table is created

```
ALTER TABLE table_name  
ADD constraint constraint_name  
DEFAULT defalut_value FOR column_name
```

- في حال لم يتم إدخال قيمة يتحقق المعيار في المدخلات



## LAB Four

start

measuring

notes

### PRIMARY KEY

- \* Create Primary key in table
- \* when table is created :

\* column level :-

```
create table table-name (column-name
datatype Primary key, ....)
```

\* Tables level

```
create table table-name (column-name datatype,
....., constraint constraint-name
primary key column-name)
```

After table is created

```
Alter TABAL table-name
Add Primary key (column-name)
```

→ ١٠ خط

→ اكمل من عاًمود

when table is created .

After table is created

```
create table table-name (column-name datatype,
....., constraint constraint-name
primary key column-name)
```

```
Alter TABAL table-name
Add Primary key (column-name)
```



### FOREIGN KEY

- \* when table is created :-

column level

```
Create TABAL table-name (
column-name datatype Foreign key
References table-name_of_Primary key
(column-name), ....)
```

يكون اسم المفتاح primary key موجود في الـ Foreign key  
وذلك في المكان الذي ذكرناه في المفتاح primary key

Table level

```
Create table table-name ( column-name
datatype, ...., constraint cons-name
Foreign key column-name References
table-name_of_Primary key (column-name))
```

- \* After table is created

```
Alter table table-name add Foreign key column-name
References table-name_of_Primary key (column-name)
```



- retrieving information from database

1- where clause :-

```
Select column1, column2, .... From table-name where [condition]
```

### SELECT

2- all att values of select table

```
Select * From table-name
```

```
Select * from table-name where condition
```

ascending (Asc)

descending ↪

(DESC)

3- order by :-

```
Select columns from table-name
order by columns1 Asc | DESC
```

ترتيب تصاعدي او تنازلي

Asc DESC

Set of operation to select data استرخام لبيانات

## LAB Five

start

measuring

notes

### 1- Arithmetic operation:- use on (Number and Date)

operator  
 $(+,-,\times ,/\times )$

$+$  → add       $*$  → multiply  
 $-$  → subtract       $/$  → Divide

Select col\_name1, col\_name2 [arithmetic operator] col\_name3 from table\_name

new column ← النتيجة  
نستخرج نتائج أو نكتب في database في خطوة

### 2- logical operators:- use with all (number, text,...)

AND  
OR

-True both components (and)  
-True either component (or)

Select column\_name from table\_name  
where column\_name with condition (And, or) column\_name with condition

DB\_company.sql -> SH\dr iman (54)\*  
SELECT Fname, Lname, Address  
FROM EMPLOYEE  
WHERE Dname='Research' AND Dnumber=5

نستخرج مع where في condition  
لعن هنا نربط بين أكثر من سطر

NOT

Select column\_names  
from table\_name  
where column\_name Not (condition)

نتيجته راج تكون مخصوص بالشرط  
الشرط (NOT)

### 3- Comparison operators:- use with all (number, text,...)

BETWEEN

-Select of range of data bet two values

Select column\_name  
from table\_name  
where column\_name Between Value1 AND Value2

\* العاشر داخلي بالنتائج  
Range of Value ← btw \*  
Specified Value ← and

IN

- only one column  
- compare column with more than one values

Select column\_name  
from table\_name  
where column\_name IN (Value1, Value2, ...)

المدى عن قيمة مسمى في معاود

LIKE

-Pattern no يرجح  
Select column\_name  
from table\_name  
where column\_name like Pattern

%            -  
no limit    | single character

Single quotation pattern يكون داخل



IS NULL

Select column\_name  
from table\_name  
where column\_name IS NULL

يرجح العثور على على null

# LAB 5

Syntax

meaning

notes

Select distinct C-name1, ...  
From T-name

نتائج العمليات  
ب دون تكرار

DISTINCT

① change name column or table or both

Select C-name As alias\_name  
From T-name As alias\_name

لو كان في مسافة بـ كامس زد  
تحاطه بين "alias name"  
متعدد امام



② add more than one column in one column (must column at same datatype)

Select C-name + ',' + C1-name + ',' + C2-name  
As column-name  
From T-name

\* ينبع خط مواهد متان الداتا بالجول  
\* تكون مرتبة  
\* اخْفَعْنَد بـ ينكون لجميع الاقواع  
numeric datatype  
\* مكتبات افتراضية عملاها  
operation

\* اجباري تحديد الاسم اليه ولوكاون قيم الالام

\* التغير سيكون لظيفي فقط في سطر  
الا تعلم بعد ما يرجع الى الاس الاتي

Alias

T-name.C-name or Select New-T-name.C-name  
From T-name As New-T-name

العمليات الحسابية لـ بـ بـ طـ لـ جـ

④ useful with calculations

Select 1.1 \* C-name As new-C-name  
From T-name As new-T-name  
Where condition

عمليات حسابية بـ بـ طـ لـ جـ

UNION

UNION	only select distinct values	بـ دون تكرار
UNION ALL	all values (duplicates)	بـ تكرار

يعطي حق العمليات

\* سـ وـ طـ لـ جـ  
① compatible type (same datatype +  
② same number and order in all queries

where	without where
-------	---------------

UNION

Select column-name ... From T-name1  
Where condition  
Union / Union All  
Select column-name ... From T-name2  
Where condition

Select column-name ... From T-name1  
Union / Union All  
Select column-name ... From T-name2

البيانات

① البيانات ت تكون متناسبة  
② عدد الاعداد تكون قدر بعض

Select c1,c2,c3 From M Line  
Union  
Select c4,c5 From N1  
columns ايلو 80 جون في عدد الـ

بطاطس ايلو



## MAX - MIN

→ ALL → all values , and ALL is default  
 → DISTINCT → only unique value

MIN [ALL | DISTINCT] expression)

MAX [ALL | DISTINCT] expression)

MAX & MIN (Cont...)			
Select all data for employee who's salary is Maximum Salary of Employees ?			
<b>Employees</b>			
1	Osar	Saql	5000.0000
2	Piel	Egyptian	3000.0000
3	Samer	Saql	3000.0000
4	Mazen	Egyptian	7000.0000
5	Ahmad	Syrian	4000.0000

```
SELECT * FROM Employees WHERE
Salary = (SELECT MAX(Salary) FROM Employees)
```

Output:

EmpID	EmpName	Nationality	Salary
1	Mazen	Egyptian	7000.00

## SUM()

مجموع

→ ALL → all values , and ALL is default

→ DISTINCT → only unique value

SUM [ALL | DISTINCT] expression)

\* Type → numeric data  
except bit

Employees			
1	Osar	Saql	5000.0000
2	Piel	Egyptian	3000.0000
3	Samer	Saql	3000.0000
4	Mazen	Egyptian	7000.0000
5	Ahmad	Syrian	4000.0000

```
SELECT SUM(Salary)
AS 'مجموع الرواتب'
FROM Employees
```

Output:

رواتب
22000.00

## LAB 8

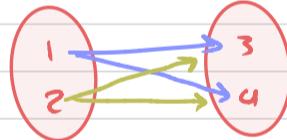
### JOIN

Depending on condition existence

Select <c-n1, c-n2, ...>  
 From <T-n1, T-n2...>

المسيرة :- يدوى اضافة سطر  
 و عادي سكان لوحظينا سطر  
 داخلي ستفد

Select <c-n1, c-n2, ...>  
 From T-n1  
 CROSS JOIN T-n2

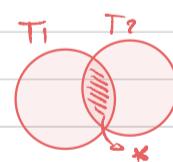


### CROSS JOIN

سيقارن والنتائج المائتى مائتى حد الترتيب + لا يقارن قيم null يتم تجاهلها + يوجد به سط الرابط

### INNER JOIN

Select c-n1, c-n2, ...  
 From T-n1  
 JOIN T-n2  
 ON condition (=, <, >, <>)



### OUTER JOIN

Type of outer join

1. left outer join

Select c-n1, c-n2, ...  
 From T-n1  
 Left JOIN T-n2  
 On condition

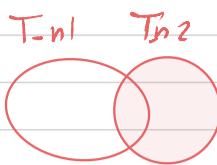
وهي نتائج  
 T-n1 T-n2



## OUTER JOIN

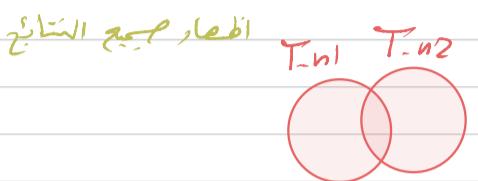
### 2. Right outer

Select c-n1, c-n2, ...  
From T-n1  
Right Join T-n2  
on condition



### 3. Full outer join

Select c-n1, c-n2, ...  
From T-n1  
Full Join T-n2  
on condition



both results null in GYI joins

## Depending on comparison operator

equality == like exists

Select c-n1, c-n2, ...  
From T-n1  
(Inner, Left, Right) Join T-n2  
on name = name

other operators != < > <= >=

Select c-n1, c-n2, ...  
From T-n1  
(Inner, Left, Right) Join T-n2  
on name (>, <, <=, >=) name

## Depending on used tables

\* Joined to itself  
in self-join

Select c-n1, c-n2, ...  
From T-n1  
(Inner, Left, Right) Join T-n1  
on condition

## Self Joins

## LAB 9

group by clause with query

Select c-n1, aggregation\_fun(c-n1) As new-n  
From T-n1  
where condition ← group by  
group by c-n1

By

```
StudentID 15
SELECT COUNT(*) AS #ofcs
FROM Student
GROUP BY gender
```

## Group By

Having

group by  $\rightarrow$  بحسب

Select c-n1, c-n2, ...  
From T-n1  
Group by c-n1  
Having aggregate-func() or condition

query within other query

Select columns  
From T-n1  
where expression (Select columns From T-n2  
where condition)

نحوه في السطح المائي  
الثانية من) :- يرجع داتا وتقارنها بـ  
out query

Sub Queries