



جامعة طرابلس
كلية تقنية المعلومات



قواعد البيانات المتقدمة Advanced Databases ITSE312

د. عبدالسلام منصور الشريف

a.abdoessalam@uot.edu.ly

المحاضرة الثالثة – استرجاع البيانات I

Retrieving Data I

Advanced Database Lecture 3

Contents

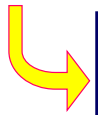
- ▶ Retrieving Data
 - ▶ SELECT
 - ▶ ORDER BY
 - ▶ DISTINCT
 - ▶ WHERE , IN
 - ▶ BETWEEN
 - ▶ LIKE
 - ▶ NULL
 - ▶ NOT
 - ▶ LIMIT

Advanced Database Lecture 3

Select Statement - General Structure

SELECT FROM WHERE

.....



```
SELECT [ALL / DISTINCT] expr1 [AS col1], expr2 [AS col2] ;
FROM tablename WHERE condition
```

Select Statement - General Structure

```
SELECT [ALL / DISTINCT] expr1 [AS col1], expr2 [AS col2] ;
FROM tablename WHERE condition
```

- ▶ The query will select rows from the source *tablename* and output the result in table form.
- Expressions ***expr1***, ***expr2*** can be :
 - (1) a column, or
 - (2) an expression of functions and fields.
- And ***col1***, ***col2*** are their corresponding column names in the output table.

Select Statement - General Structure

```
SELECT [ALL / DISTINCT] expr1 [AS col1], expr2 [AS col2] ;  
FROM tablename WHERE condition
```

- DISTINCT will eliminate duplication in the output while ALL will keep all duplicated rows.
- **condition** can be :
 - (1) an inequality, or
 - (2) a string comparison
 - using logical operators AND, OR, NOT.

Select Statement - General Structure

List all the student records.

```
SELECT * FROM students
```

Id	Name	PhoneNo	Semester	Gender	BirthDate	Municipality	CreatedOn	CreatedBy	DepartmentId
9223082	Salem Ahmed Najem	(21891) 729-6482	2	M	01/11/2003	AinZarah	48:57.4	dbo	4
9223312	Sabria Altaher Omar	(21892) 246-5442	1	F	06/08/2002	AbuSaleem	48:57.4	dbo	3
9223333	Ahmed Othman kalaf	(21892) 765-3482	2	M	10/09/2003	AinZarah	48:57.4	dbo	2
9223334	Samir Alhadi Qabaj	(21892) 765-3411	3	M	25/09/2004	AbuSaleem	48:57.4	dbo	2
9223338	Fatim Hussni Mahmood	(21891) 376-4882	4	F	05/03/2003	HaiAlandalus	48:57.4	dbo	1
9223363	Ali Ahmed Salem	(21892) 765-3482	1	M	05/09/2003	Tajora	48:57.4	dbo	3
9223373	Alfirjani Adel Muftah	(21892) 765-3482	1	M	12/09/2003	Janzoor	48:57.4	dbo	3
9223381	Zahra Fouad Aljosh	(21891) 212-3482	2	F	01/09/2003	TripoliCenter	48:57.4	dbo	4
9223382	Asma Altaher Omar	(21892) 246-5482	2	F	06/08/2003	AbuSaleem	48:57.4	dbo	4
9225582	Sumia Adel Rajab	(21891) 212-3482	2	F	30/12/2003	TripoliCenter	48:57.4	dbo	4
9243282	UmKulthom Ahmed Kamel	(21892) 317-8482	2	F	09/05/2003	AinZarah	48:57.4	dbo	4

Select Statement

List the ids, names and gender of all students.

```
SELECT Id, Name, Gender FROM Students
```

Id	Name	Gender
9223082	Salem Ahmed Najem	M
9223312	Sabria Altaher Omar	F
9223333	Ahmed Othman kalaf	M
9223334	Samir Alhadi Qabaj	M
9223338	Fatim Hussni Mahmood	F
9223363	Ali Ahmed Salem	M
9223373	Alfirjani Adel Muftah	M
9223381	Zahra Fouad Aljosh	F
9223382	Asma Altaher Omar	F
9225582	Sumia Adel Rajab	F
9243282	UmKulthom Ahmed Kamel	F

Select Statement

List the ids, names and gender of all students.

```
SELECT Id, Name, Gender
FROM Students
WHERE Municipality = 'AinZarah'
```

Id	Name	Gender
9223082	Salem Ahmed Najem	M
9223333	Ahmed Othman kalaf	M
9243282	UmKulthom Ahmed Kamel	F

Select Statement

List the Municipalities

```
SELECT Municipality FROM Students
```

Municipality
AinZarah
AbuSaleem
AinZarah
AbuSaleem
HaiAlandalus
Tajora
Janזור
TripoliCenter
AbuSaleem
TripoliCenter
AinZarah

Select Statement

Municipalities without duplication

```
SELECT DISTINCT Municipality FROM Students
```

Municipality
AinZarah
AbuSaleem
HaiAlandalus
Tajora
Janזור
TripoliCenter

Select Statement

List the names and Ids of AbuSaleem girls.

Condition for ‘AbuSaleem girls’:

- 1) Municipality = ‘AbuSaleem’
- 2) Gender = ‘F’
- 3) Both (AND operator)

Select Statement

List the names and Ids of AbuSaleem girls.

```
SELECT Id ,Name FROM Students
WHERE Municipality = 'AbuSaleem' AND Gender = 'F'
```

Id	Name
9223312	Sabria Altaher Omar
9223382	Asma Altaher Omar

General Structure

Date difference function.

Functions:

days:

DATEDIFF(day, start_date, end_date)

years:

DATEDIFF(day, start_date, end_date)/365.0

1 decimal point: ROUND(__ , 1)

General Structure

List the Ids names birthdates and ages of males.

```
SELECT Id, Name, BirthDate,
ROUND(DATEDIFF(day, BirthDate, GETDATE())/365.0, 1) AS Age
FROM Students
WHERE Gender = 'M'
```

Id	Name	BirthDate	Age
9223082	Salem Ahmed Najem	01/11/2003	18.2
9223333	Ahmed Othman kalaf	10/09/2003	18.3
9223334	Samir Alhadi Qabaj	25/09/2004	17.3
9223363	Ali Ahmed Salem	05/09/2003	18.3
9223373	Alfirjani Adel Muftah	12/09/2003	18.3

General Structure

List the names, id of not enrolled male students.

```
SELECT Id, Name
FROM Students
WHERE Gender = 'M' AND Enrolled = 0

SELECT Id, Name
FROM Students
WHERE Gender = 'M' AND NOT Enrolled = 1
```

Id	Name
9223333	Ahmed Othman kalaf
9223373	Alfirjani Adel Muftah

Comparison

```
expr IN ( value1, value2, value3)
expr BETWEEN value1 AND value2
expr LIKE "%_"
```


Comparison

List the students who live in either AinZarah or TripoliCenter.

```
SELECT Id, Name, Municipality
FROM Students
WHERE Municipality IN ('AinZarah', 'TripoliCenter');
```

Id	Name	Municipality
9223082	Salem Ahmed Najem	AinZarah
9223333	Ahmed Othman kalaf	AinZarah
9223381	Zahra Fouad Aljosh	TripoliCenter
9225582	Sumia Adel Rajab	TripoliCenter
9243282	UmKulthom Ahmed Kamel	AinZarah

Comparison

List the students who were not born in February, March, December.

```
SELECT Id, Name, BirthDate FROM Students
WHERE MONTH(BirthDate) NOT IN (2,3,12);
```

Id	Name	BirthDate
9223082	Salem Ahmed Najem	2003-11-01
9223312	Sabria Altaher Omar	2002-08-06
9223333	Ahmed Othman kalaf	2003-09-10
9223334	Samir Alhadi Qabaj	2004-09-25
9223363	Ali Ahmed Salem	2003-09-05
9223373	Alfirjani Adel Muftah	2003-09-12
9223381	Zahra Fouad Aljosh	2003-09-01
9223382	Asma Altaher Omar	2003-08-06
9243282	UmKulthom Ahmed Kamel	2003-05-09

Comparison

eg. List the all marks between 70 and 100 (incl).

```
SELECT Id, StudentId, Mark FROM Semesters
WHERE Mark BETWEEN 70 AND 100;
```

Id	StudentId	Mark
1	9223333	90.5
2	9223333	77
8	9223373	99
9	9223382	84
12	9223382	76.9

Comparison

List the students whose names start with “A”.

```
SELECT Id, Name, Municipality FROM Students
WHERE Name Like 'A%';
```

Id	Name	Municipality
9223333	Ahmed Othman kalaf	AinZarah
9223363	Ali Ahmed Salem	Tajora
9223373	Alfirjani Adel Muftah	Janzoor
9223382	Asma Altaher Omar	AbuSaleem

Comparison

List the students whose names contain ‘a’ as the 2nd letter

```
SELECT Id, Name, Municipality FROM Students
WHERE Name Like '_a%';
```

Id	Name	Municipality
9223082	Salem Ahmed Najem	AinZarah
9223312	Sabria Altaher Omar	AbuSaleem
9223334	Samir Alhadi Qabaj	AbuSaleem
9223338	Fatim Hussni Mahmood	HaiAlandalus
9223381	Zahra Fouad Aljosh	TripoliCenter

Grouping

```
SELECT ..... FROM ..... WHERE condition
GROUP BY groupexpr [HAVING requirement]
```



Group functions:
COUNT(), SUM(), AVG(), MAX(), MIN()

- **groupexpr** specifies the related rows to be grouped as one entry. Usually it is a column.
- WHERE **condition** specifies the condition of individual rows before the rows are group.
- HAVING **requirement** specifies the condition involving the whole group.

Grouping

List the number of students of each Municipality.

```
SELECT Municipality, COUNT(Id) StudentsCount
FROM Students
GROUP BY Municipality;
```

Municipality	StudentsCount
AbuSaleem	3
AinZarah	3
HaiAlandalus	1
Janzoor	1
Tajora	1
TripoliCenter	2

Grouping

List the average score of each course.

```
SELECT CourseId, AVG(Mark) Average
FROM Semesters
GROUP BY CourseId
```

CourseId	Average
ITIS315	76.90
ITNE312	53.67
ITSE313	42.85
ITWT212	42.75

Grouping

eg. 13 List the number of girls of each municipality.

```
SELECT [Municipality], COUNT(Gender) Females
FROM Students
WHERE Gender = 'F'
GROUP BY Municipality
HAVING COUNT(Gender) > 1 ;
```

Municipality	Females
AbuSaleem	2
TripoliCenter	2

Grouping

eg. 14 List the max. and min score from Semester.

```
SELECT MAX(Mark) MaxMark, MIN(Mark) MarkMin, CourseId
FROM Semesters
WHERE IsSuspended <> 1
GROUP BY CourseId
```

MaxMark	MarkMin	CourseId
76.9	76.9	ITIS315
84	77	ITNE312
90.5	20.7	ITSE313
99	22	ITWT212

Display Order

```
SELECT ..... FROM ..... WHERE .....  
GROUP BY ..... ;  
ORDER BY colname ASC / DESC
```

Display Order

List the males of the 2nd semester order by their names.

```
SELECT Id, Name, Semester, Municipality  
FROM Students  
WHERE Gender = 'M' AND Semester = 2  
ORDER BY Name
```

Id	Name	Semester	Municipality
9223333	Ahmed Othman kalaf	2	AinZarah
9223082	Salem Ahmed Najem	2	AinZarah

Display Order

List the 2nd semester students by their municipality.

```
SELECT Id, Name, Semester, Municipality
FROM Students
WHERE Semester = 2
ORDER BY Municipality
```

Id	Name	Semester	Municipality
9223382	Asma Altaher Omar	2	AbuSaleem
9223082	Salem Ahmed Najem	2	AinZarah
9223333	Ahmed Othman kalaf	2	AinZarah
9243282	UmKulthom Ahmed Kamel	2	AinZarah
9223381	Zahra Fouad Aljosh	2	TripoliCenter
9225582	Sumia Adel Rajab	2	TripoliCenter

Display Order

List the number of students of each municipality
(in desc. order).

```
SELECT COUNT(*) AS Cnt, Municipality
FROM Students
GROUP BY Municipality
ORDER BY Cnt DESC
```

Cnt	Municipality
3	AbuSaleem
3	AinZarah
2	TripoliCenter
1	HaiAlandalus
1	Janזור
1	Tajora

Display Order

eg. 19 List the boys of each house order by the classes. (2-level ordering)

```
SELECT Municipality,Name,BirthDate
FROM Students
ORDER BY Municipality, BirthDate
```

Municipality	Name	BirthDate
AbuSaleem	Sabria Altaher Omar	2002-08-06
AbuSaleem	Asma Altaher Omar	2003-08-06
AbuSaleem	Samir Alhadi Qabaj	2004-09-25
AinZarah	UmKulthom Ahmed Kamel	2003-05-09
AinZarah	Ahmed Othman kalaf	2003-09-10
AinZarah	Salem Ahmed Najem	2003-11-01
HaiAlandalus	Fatim Hussni Mahmood	2003-03-05
Janzoor	Alfirjani Adel Muftah	2003-09-12
Tajora	Ali Ahmed Salem	2003-09-05
TripoliCenter	Zahra Fouad Aljosh	2003-09-01
TripoliCenter	Sumia Adel Rajab	2003-12-30