



THE AMERICAN UNIVERSITY IN CAIRO

Center for Adult and Continuing Education

Computer Studies Division

*Information Science & Technology Certificate*

**Design and Management of  
Databases**

*June 28 - July 14, 05*

**course Handouts**

by

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الجامعة الأمريكية بالقاهرة  
مركز التعليم المستمر  
قسم دراسات الحاسب الآلى

أهلا بضيوفنا الاعزاء من وزارة العدل

يسعد أسرة قسم دراسات الحاسب بمركز التعليم المستمر بالجامعة الأمريكية بالقاهرة أن ترحب بكم فى هذا البرنامج التدريبى والذى أعد خصيصا لكم كنخبة مميزة من العاملين المنوط إليهم مهمة اقتحام عصر التكنولوجيا ومواجهه تحديات المستقبل .

إن هذا البرنامج هو ثمرة تعاون وثيق ومستمر بين وزارة العدل والجامعة الأمريكية وهو برنامج تخصصى فى مجالات تكنولوجيا المعلومات الخاصة بقواعد البيانات ونظم المعلومات وشبكة الانترنت ويهدف الى عرض الأدوات واكتساب المهارات فى التعامل مع تكنولوجيا المعلومات .

نرحب بحضراتكم ونرجو أن تتحقق لكم عظيم الاستفادة فى الدراسة والتدريب وان تكلل جهودكم بالنجاح .

مدير قسم دراسات الحاسب الآلى

دكتور محمد أشرف القشيري

٢٨ يونيو ٢٠٠٥

# Design and Management of Databases

## Course Overview

This course provides an introduction to the basic concepts of databases and explains how to design a database and manipulate data. The focus is on hands-on practical training in labs in the form of a workshop. Microsoft Access XP and Oracle SQL/PLUS 9 are the tools used in the workshop. The course does not assume detailed knowledge of databases; some familiarity with Access would be an asset. The course progresses over two major levels: Access (Level 1) and Oracle (Level 2). More than 60% of the time allocated to the course will be spent in practical training using the tools installed on computers in a well-equipped computer science lab.

## Audience

Ten attendees from the National Center of Judicial Studies and the Judicial Information Center.

## Time

The total number of hours is 36. The duration of the training program is three weeks, with 12 hrs / week distributed over three days (Tuesday, Wednesday, and Thursday) from 4:30 to 8:30 p.m.

## Objectives

Upon completing the course, participants will be able to:

1. Understand the basic concepts of databases.
2. Explore the main features of both MS Access XP and Oracle SQL/Plus 9i
3. Design database Objects and manipulate data.
4. Manage different techniques of indexing.
5. Secure database files.

## Topics

1. Database architecture, classifications, and design steps.
2. Data Flow Diagrams and Entity Relationship (E-R) models.
3. Tables, Forms, Queries, Reports, and Menus using MS Access XP.
4. Enter, Modify, Delete, Index, Store, and secure records in database.
5. SQL/PLUS file types; Parameter, Control, Redo Log, and Data.
6. Create, Compile, Modify, and Delete Objects and Records in a Schema.

# Part I: Database Techniques

## Introduction to Databases

### Definition

A database is a collection of related data with an implicit meaning established for certain applications serving a group of users having assigned privileges .

Each DB should have one or several sources for driving data , a set of rules and privileges for controlling data , and end users interface for handling data .

DB Plays critical role in automated information systems specially large ones .

Databases are widely used in banks, hospitals , hotels, airline reservations, libraries, etc.

### Database Management Systems ( DBMSs )

A DBMS is a collection of application software (programs) for enabling users to carry out the following three main functions:

Defining a database: specifying data types , structure , constraints, etc., for storing data.

Manipulating data: insert , modify , delete and query stored data .

Constructing a database: physical storage of data on different media .

A DBMS should contain concurrency control software to ensure correct procedures in

Updating the same data by several users.

### Major Players in the world of databases

Administrators, designers, as well as different users for data entry , query , report , etc.

### Workers behind the scene

- DBMS design , development and operation
- Tool Developers
- System software maintenance
- Hardware maintenance

## **Types of Database Systems**

### **Traditional or General Purpose**

Databases used to manipulate textual data, characters, numbers, date and logical Data.

### **Multimedia**

Databases used to manipulate pictures , audio , video , etc., as well as textual data .

### **Geographic Information System (GIS)**

Databases used to manipulate data from maps , weather forecasts , satellites, etc.

### **On Line Transaction Processing (OLTP)**

Large number of online users accessing the database. This is characterized by a slow response time.

### **Decision Support Systems (DSS)**

Characterized by long running queries over a large set of data. Entails high processing.

### **Data Warehouses**

Combination of both OLTP & DSS. Both response time and high processing.

### **Real Time Systems**

Industry applications with interfaces for hardware automatic actions. Special features.

### **Techniques Supporting DB**

#### **On Line Analytical Processing (OLAP )**

Quick Search tool for large different databases, World Wide Web ( WWW ) , And decision-making systems.

#### **Real Time and Immediate Action Databases**

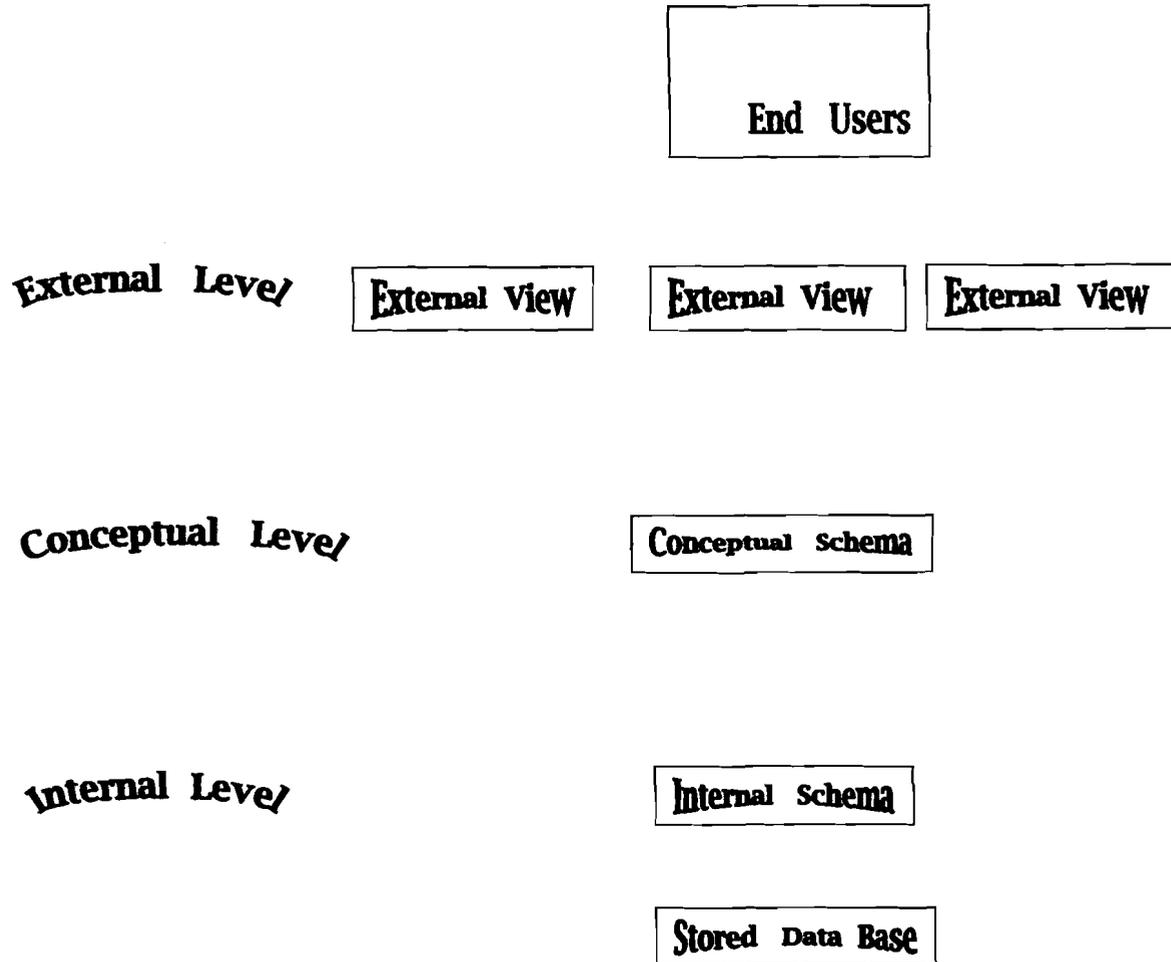
Controlling hardware in industrial and manufacturing processes.

### **Advantages of Database Systems**

1. Control data redundancy
2. Have different privilege levels .
3. Store both objects definition and data at the same storage structure .
4. Support complex relationships between data .
5. Provide multiple user interfaces .

6. Enforce data integrity constraints .
7. Facilitate data backup and recovery procedures .

**Three Schema Architecture**



**Classification**

1. Hierarchical Data Model .
2. Network Data Model .
3. Relational Data Model
4. Object Data Model .

**Data Independence**

The capacity to change the schema at one level without obligation to

change at the next higher level . There are two types:

1. Logical data dependence  
Change conceptual Schema without changing the external schema .
2. Physical data dependence  
Change Internal Schema without changing neither the external nor the internal schema .

### **Design Steps**

1. **Determine the purpose of the DB .**
  - A. *Field of usage .*
  - B. *Type of data .*
  - C. *Required information .*
2. **Specify accurate details of each Table**
  - A. *No redundant data .*
  - B. *Keeping data whatever its importance .*
  - C. *Being flexible far from manual system .*
  - D. *No mixing between Tables and Relations .*
3. **Define Attributes**
  - A. *Direct connect Attribute with Table subject .*
  - B. *No storage of calculated or deducted data usually .*
  - C. *Storage of data according to smallest logical part .*
  - D. *Assign primary key field usually .*
4. **State Clear Relations among Tables .**
  - A. *One to One .*
  - B. *One to Many .*
  - C. *Many to many .*
5. **Check Data entry with proper constraints .**
  - A. *Primary Key .*

*B. Foreign Key .*

*C. Unique Key .*

*D. Check .*

*E. Not Null .*

*6. Design Form & Menu style to match its contents and user requirement .*

*A. Columnar*

*B. Tabular*

*C. Data Sheet*

*D. Justified*

*E. Pivot Table*

*F. Pivot Chart*

*7. Simplify Queries & Reports to save processing time .*

*A. Stepped*

*B. Block*

*C. Out Line 1*

*D. Out Line 2*

*E. Align Left 1*

*F. Align Left 2*

*8. Control database access with well known privileges for each user .*

*A. Schema Access for modifying design .*

*B. Data access for certain part of DB for Query only .*

*C. Data access for certain part of DB for Inserting , Modifying & Deleting .*

*D. Auditing & Monitoring of transactions .*

*E. Defining new users & their privileges .*

*9. Improve The Design*

*A. Insert , Update , or Delete unused Tables / Attributes / Relations .*

*B. Modify data type or length of Attributes .*

*C. Reselect Primary Key .*

*D. Split Table into several ones .*

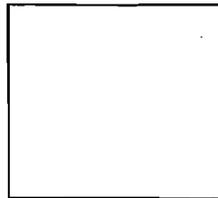
*E. Simplify complex Relations among Tables .*

*F. Modify Forms / Queries / Reports to match system & user requirement .*

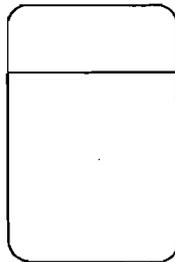
*G. Write maintenance plan for data & schema In addition to system S/W & H/W .*

**Data Flow Diagram**

**ENTITY**



**PROCESS**



**DATA STORE**



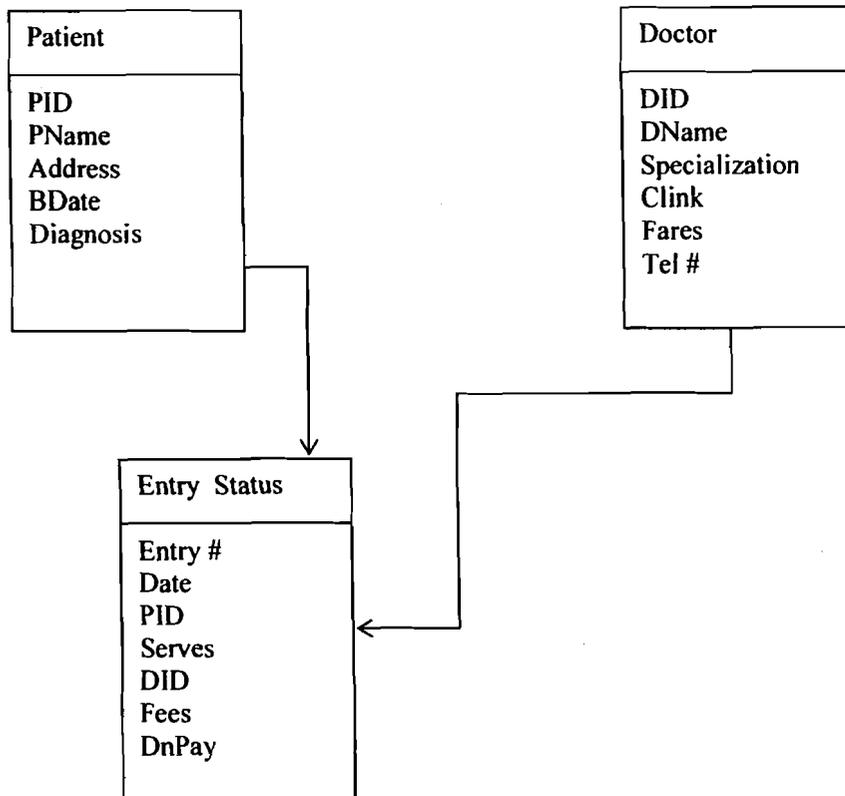
**FLOW OF DATA**



## Entity-Relationship

ER Entity Relationship & EER Enhanced Entity Relationship

UML Universal Modeling Language & OMT Object Modeling Technique



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## Index Structure

*It is an auxiliary access structure to speed up Query process .*

*Most of Index Types store both index Key value with a pointer to its unique value record block on the disk . For multiple values , a cluster is used . A file may have several secondary indexes besides a primary one . Index has different types like:*

### 1. Single Level

Simple search based on Block Factor

## 2. Multi Level

Reduce Block Factor seek time using Binary Search .

## 3. Dynamic Multi Level using B Tree & B + Trees

Heavy computational to reduce seek time .

## 4. Hash Index

- A. Internal for file records .
- B. External for disk files .
- C. Extendable for Dynamic file expansion .
- D. Partitioned , allow access on multiple keys .

## 5. Multiple Keys

*More than one key field index , compound key .*

## 6. Grid arrays

*Construct an array with linear scale for each key field .*

## Securing Data

Mainly through Backing up ; On line / Off line Automatically / Manually ,  
or Archiving ; Off line Manually .

Back up has different sorts

### 1. On Line

A. On the same Platform through Data Mirror ;  
RAID Redundant Arrays of Inexpensive Disks.  
RAID types are 0 , 1 , 2 , 3 , 4 , 5 & 6 . Each  
has its technique for applying data mirroring .

B. On NAS Network Attached Storage , or  
SAN Storage Area Network

### 2. Off Line on site

A. Traditional Tapes .  
Using sequential recording / Restoring .

B. Tape Library .  
Using split recording on several tapes .

### 3. Off Line / Off site

Store back tapes on far place from the site .

RAID is not only a sort of back up , but a way of improving both performance and reliability . It has some disadvantages like extra I/O load in extra writing , additional computing for redundancy , and more space for redundant information . In Critical data system , it is preferable to have multiples of different types of back up .

**Example 1**

**An Inventory system containing Four simple tables**

1. Items consist of Item Name , Item # , Qty , Store # & Vendor # .
2. Vendors consist of Vendor Name , Vendor # & Address .
3. Stores consist of Store Name , Store # & Address .
4. Transactions consist of Tr # , TrType , TrDate , QTY , Item # , Store # & Vendor # .

Items					
S/N	#	Name	Qty	Store#	Vendor#
1	100	AB	10	900	800
2	200	BC	15	910	810
3	300	BD	20	920	820
4	400	CC	3	930	830
5	500	DD	0	940	840

Vendors				
S/N	#	Name	Address	Tel #
1	800	KKK	1 AB	11111
2	810	GGG	100 GF	22222
3	820	JJJ	22 DS	33333
4	830	UUU	65 RR	44444
5	840	PPP	10 KK	55555

Stores				
S/N	#	Name	Address	Tel #
1	900	Q11	66 TR	5555
2	910	RR4	11 KK	6666
3	920	YY8	12 DK	7777
4	930	KK6	11 KK	8888
5	940	IOT	1 AB	9999

Transactions							
S/N	Tr#	TrDate	TrType	Qty	Item#	Store#	Vendor#
1	1	1/1	A	10	100	900	800
2	2	1/2	A	15	200	910	810
3	3	1/3	A	20	300	920	820
4	4	1/4	W	3	400	930	830
5	5	1/5	W	10	500	940	840

Example 2

A Human Resource System containing Four simple tables

1. Employees consist of ID , EName , BDate , HDate , Address & Dept # .
2. Departments consist of Dept # , Dept Name , Location & Budget .
3. Training consist of TrName , Location , SDate , EDate , Cost & Trainees .
4. Grads consist of Gd # , SSalary , ESalary , Allowance , Conditions & Available # .

Employees						
S/N	ID	EName	BDate	HDate	Address	Dept #
1	100	AB	10/2	10/2	800	10
2	200	BC	15/3	15/3	810	20
3	300	BD	20/4	20/4	820	40
4	400	CC	3/5	3/5	830	50
5	500	DD	11/10	11/10	840	60

Departments				
S/N	Dept#	DeptName	Location	Budget
1	800	KKK	1 AB	11111
2	810	GGG	100 GF	22222
3	820	JJJ	22 DS	33333
4	830	UUU	65 RR	44444
5	840	PPP	10 KK	55555

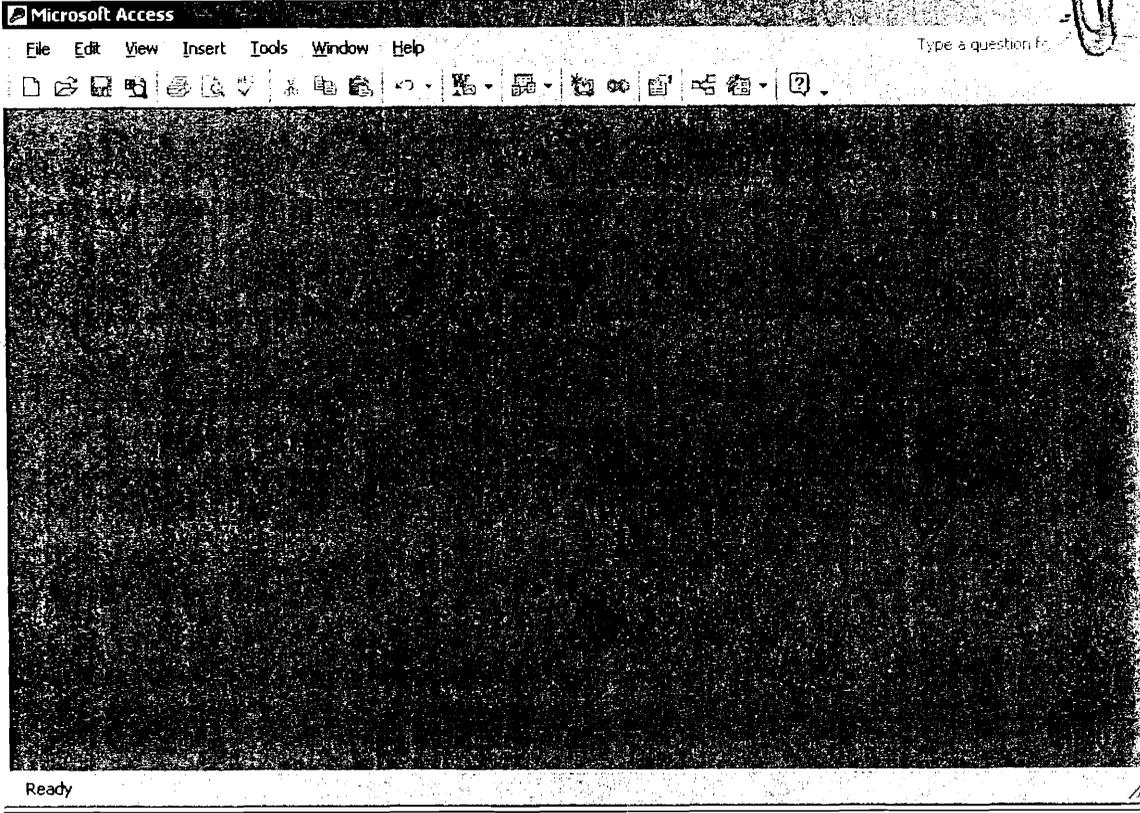
Training						
S/N	TrName	Location	SDate	EDate	Cost	Trainee
1	AA11	Q11	10/2	10/2	1234	55
2	SSS33	RR4	15/3	15/3	4321	44
3	DD22	YY8	20/4	20/4	5432	33
4	WW90	KK6	3/5	3/5	2345	22
5	ABV40	IOT	11/10	11/10	1245	11

Grads						
S/N	Gd#	SSalary	ESalary	Allowance	Conditions	Available#
1	1	1001	11001	10	100	90
2	2	1232	21232	15	200	10
3	3	1453	21453	20	300	5
4	4	1444	31444	3	400	3
5	5	1665	41665	10	500	1

## PART II: MICROSOFT ACCESS XP

### AccessXP

Start Window النافذة الافتتاحية



Main Icons الأيقونات الأساسية

File ملف

Edit تحرير

View عرض

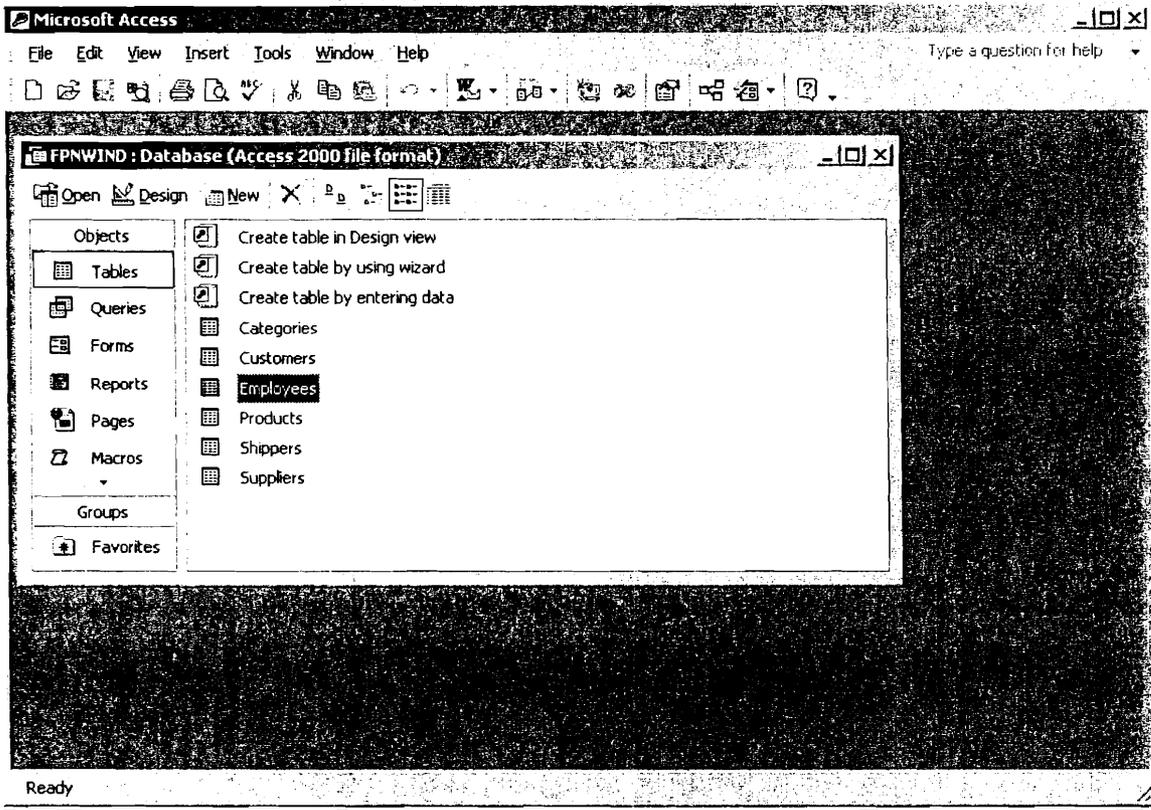
Insert إدراج

Tools أدوات

Window نافذة

Help تعليمات

## نافذه قاعده البيانات DB Window



تتكون من

1 - أيقونات افقيه Horizontal Icons

فتح Open

عرض أو إدخال بيانات

تصميم Design

عرض أو تعديل تصميم

جديد New

تعريف موضوع أو مجموعه جديده

## ٢ - أيقونات رأسية Vertical Icons

### ١ - عمود الموضوعات

Tables الجداول

Queries الاستعلامات

Forms النماذج

Reports التقارير

Pages الصفحات

Micros ماكروز

Modules وحدة نمطية

### ب - عمود المجموعات

Favorites المفضلات

\*\*\* كل أيقونه رأسية يمكن فتحها في أحد حالات الأيقونات الأفقية

والفتح الافتراضي هو "فتح"

\*\*\* تخزن قاعدة البيانات "تعريفات/بيانات" في ملف ينتهي "MDB".

## الجدول Tables

### - أنواع البيانات Data Types \* رقمي Number

من ٠ الي ٢٥٥ بطول بايت بدون علامه عشريه	بايت Byte
من - ٣٢٧٦٨ الي ٣٢٧٦٨ بطول ٢ بايت	عدد صحيح Integer
من - ٢١٤٧٤٨٣٦٤٨ الي ٢١٤٧٤٨٣٦٤٨ بطول ٤ بايت	عدد صحيح طويل Long Integer
من - ١٠(٣١)٢ الي ١٠(٣١)٢ بطول ٤ بايت والعلامه حتي ٧	فردى Single
من - ١٠(٣٠٨)١٧٩٧ الي ١٠(٣٠٨)١٧٩٧ بطول ٨ بايت والعلامه حتي ١٥	مزدوج Double

### \* نص Text

يحتوي علي حروف وأرقام بطول من ١ الي ٢٥٥ والحجم الافتراضي ٥٠

### \* تاريخي Date

يحتوي علي تاريخ " عام / طويل / متوسط / مختصر "  
١ / ٣١ / ٢٠٠٤ : ٤ م السبت ٣١ يناير ١٩٩٣ - ٣١ يناير ٩٨ / ١ / ٨٧

أو وقت " طويل / متوسط / مختصر " أو الإثنين معا  
٢٢ : ٣٠ : ٩ ص ٢٥ : ٤ م ٣٥ : ١٥

### \* مذكره Memo

يحتوي علي حروف وأرقام بطول من ٠ الي ٦٥٥٣٦

### \* متشعب MultiMedia

يحتوي علي أحد صور الوسائط المتعدده " صوره / صوت / فيلم ..... "

### - خصائص الحقل Field Properties

عدد الخانات أي قصر وطول الحقل	حجم الحقل Size
العرض بشكل معين للتاريخ / الأرقام / النص / العمله	تنسيق Format
مكان وعدد الخانات بعد الفاصله العشريه	أماكن العلامه العشريه Decimal Point
عرض مكونات التنسيق والتأكد من البيانات المدخله	مرشح الإخال Input Mask
تحديد تسميه اخري غير التسميه الافتراضيه للحقل	عنوان Caption
تعبئه الحقل تلقائيا بقيمه معينه عند اضافته سجل	القيمه الافتراضيه Default
عدم السماح بإدخال بيانات لا تتوافق مع مطلب معين	قاعده التحقق من الصحه Validation Rule
نص التحقق من الصحه	نص التحقق من الصحه Validation Text
ضروره إدخال بيانات في حقل	المطلوب Required
السماح بتخزين السلاسل ذات القيم الصفرية	السماح بطول صفرى Allow Zero Length
زياده سرعه البحث في الحقول التي يتكرر البحث بها	مفهرس Index

### \*\*\* التنسيق Format

الأرقام وتنسيقات اخري	تنسيق ارقام
عمله	Numbers Format
عام / متوسط / طويل / مختصر	تنسيق عمله
طويل / متوسط / مختصر	Currency Format
اختيار منطقي من أحد قيمتين نعم / لا // ص / خ // ت / غ	تنسيق تاريخ
تعريف تنسيق جديد خلاف التنسيقات السابقه	Date Format
	تنسيق وقت
	Time Format
	تنسيق نعم / لا
	Yes / No Format
	تنسيق مخصص
	Special Format

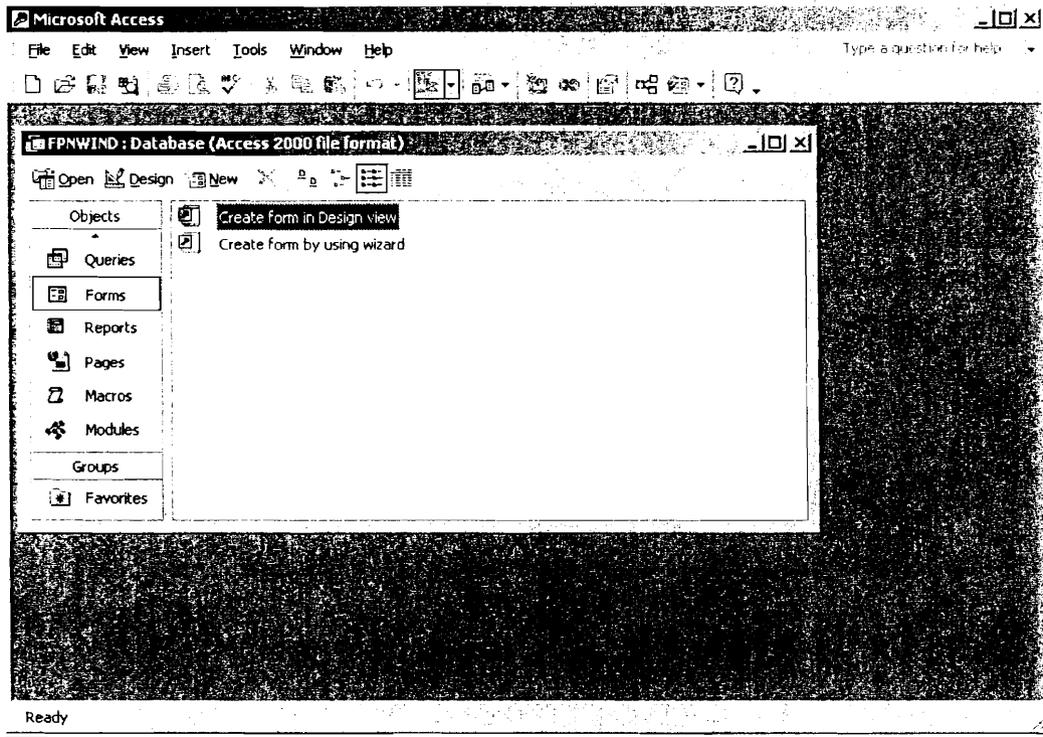
### \*\*\* مرشح إدخال Input Mask

رقم عشري إدخال مطلوب / رقم عشري إدخال غير مطلوب	صفر / ٩
حرف إدخال مطلوب / حرف إدخال غير مطلوب / حرف أو رقم إدخال مطلوب / حرف أو رقم إدخال غير مطلوب	a / A / ? / L
رقم عشري / علامه + أو - / مسافه إدخال غير مطلوب	#
اي حرف أو مسافه إدخال غير مطلوب	&
اي حرف أو مسافه إدخال مطلوب	C
فاصل / علامه عشريه / مسافه	. , /

### - قواعد التحقق من الصحة Validation Rules

أدخل قيمه غير صفريه	0 < >
أدخل قيمه بين الصفر و ١٠٠	٠ أو ١٠٠
أدخل قيمه ذات أربع أحرف تبدأ بالحرف "خ"	Like "????خ"
أدخل تاريخا قبل ١٩٩٢	# ٩٢ / ١ / ١ # >
أدخل تاريخا يقع خلال عام ١٩٩١	# ٩١ / ١ / ١ # = < # ٩٢ / ١ / ١ # > و

## FORMS النماذج النافذة الأفتاحيه Start Window



هناك خيارين لعمل نموذج جديد

- ١ - تصميم نموذج بدون أي مساعدات جاهزه " لقائمه التطبيق أو للمحترفين " Design View
- ٢ - تصميم نموذج باستخدام مكتبه النماذج الجاهزه " للنماذج النمطيه أو للمبتدئين " Wizard

## خطوات تصميم نموذج باستخدام مكتبة النماذج الجاهزه Using Wizards

١ - النافذه الاولى تطلب تحديد الجدول المطلوب عمل النموذج له واختيار حقول النافذه .

**Form Wizard**

Which fields do you want on your form?  
You can choose from more than one table or query.

Tables/Queries  
Table: Categories

Available Fields:  
CategoryID  
CategoryName  
Description

Selected Fields:

Cancel < Back Next > Finish

٢ - النافذه الثانيه تطلب تحديد نوع عرض الحقول من بين ستة أنواع والعمود هو النوع الافتراضي.

**Form Wizard**

What layout would you like for your form?



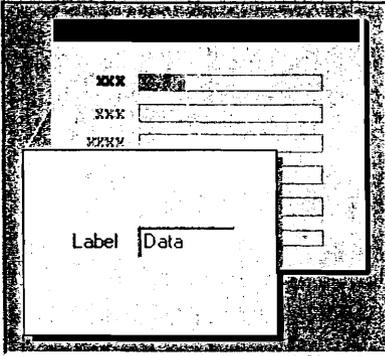
Columnar  
 Tabular  
 Datasheet  
 Justified  
 PivotTable  
 PivotChart

Cancel < Back Next > Finish

٣ - النافذة الثالثة تطلب تحديد شكل العرض من بين عشرة أنواع والقياسي هو النوع الافتراضي.

**Form Wizard**

What style would you like?



- Blends
- Blueprint
- Expedition
- Industrial
- International
- Ricepaper
- SandStone
- Standard**
- Stone
- Sumi Painting

Cancel < Back Next > Finish

٤ - النافذة الرابعة تطلب تحديد عنوان النموذج والموافقة علي ماتم بالخطوات السابقة أو التعديل.

**Form Wizard**

What title do you want for your form?

Categories

That's all the information the wizard needs to create your form.

Do you want to open the form or modify the form's design?

Open the form to view or enter information.

Modify the form's design.

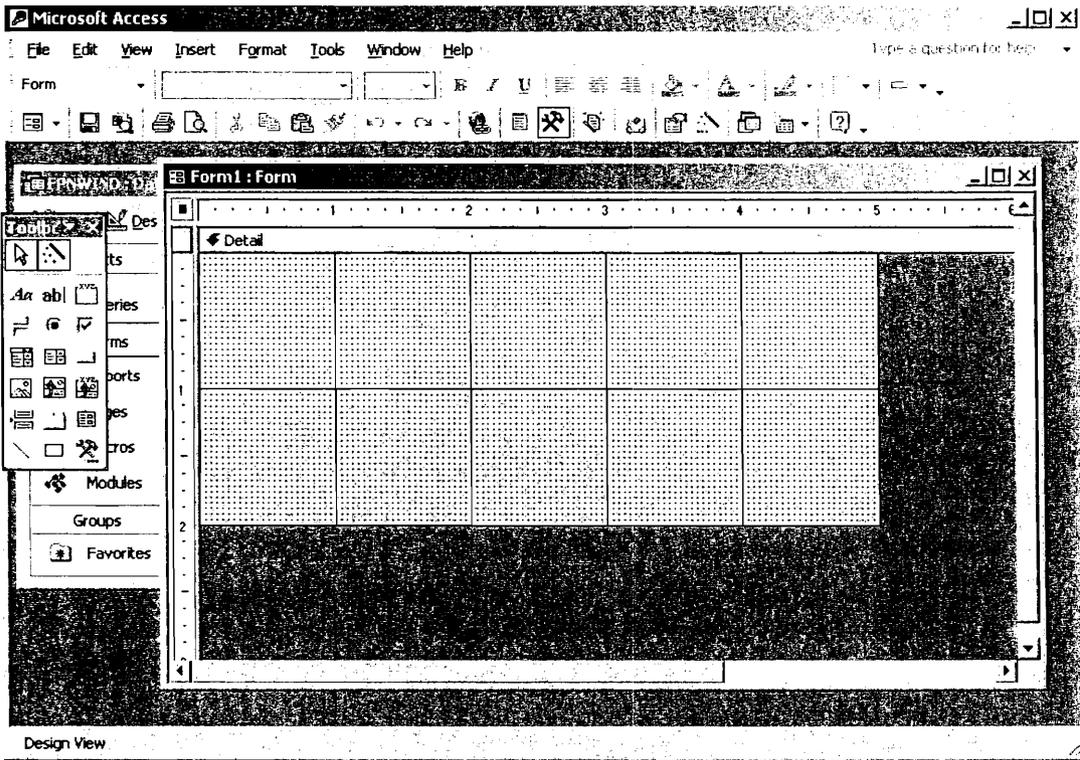
Display Help on working with the form?

Cancel < Back Next > Finish

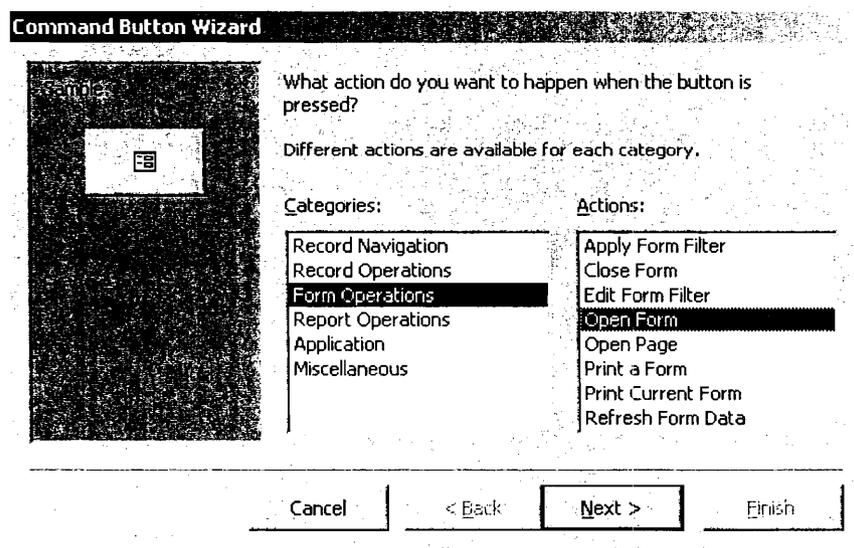
في حاله الموافقه يظهر النموذج وعليه السجلات الموجوده بالجدول أو خاليا إن لم يكن هناك سجلات .

## خطوات تصميم نموذج بدون أي مساعدات جاهزه Design View

١ - النافذه الاولى تظهر خاليه و معها جدول الأدوات لملء النموذج.



٢ - نختار زر الأمر ونرسمه علي النموذج فتظهر النافذه الثانيه لتحديد نوع الأمر من بين سته أنواع " الافتراضي ملاحه السجل" والفعل من بين ثمانيه إجراءات " الافتراضي إيجاد التالي".



٣ - النافذة الثالثة تطلب تحديد اسم النموذج المطلوب فتحه.

**Command Button Wizard**

Sample

What form would you like the command button to open?

Categories

Cancel < Back Next > Finish

٤ - النافذة الرابعة تعرض اختيارين إما فتح النموذج خالياً أو بعرض السجلات الموجودة به .

**Command Button Wizard**

Sample

Do you want the button to find specific information to display in the form?

For example, the button can open a form and display the data for a specific employee or customer.

Open the form and find specific data to display.

Open the form and show all the records.

Cancel < Back Next > Finish

٥ - النافذة الخامسة تعرض اختياراتين إما عرض الزر وعليه نص أو صورته والافتراضي صورته .

Command Button Wizard

Do you want text or a picture on the button?

If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

Text: Category Form

Picture: MS Access Form Browse...

Show All Pictures

Cancel < Back Next > Finish

٦ - النافذة السادسة تطلب اسم للزر وتسال هل تعرض مساعده عند الاستخدام والافتراضي لا .

Command Button Wizard

What do you want to name the button?

A meaningful name will help you to refer to the button later.

Open Category Form

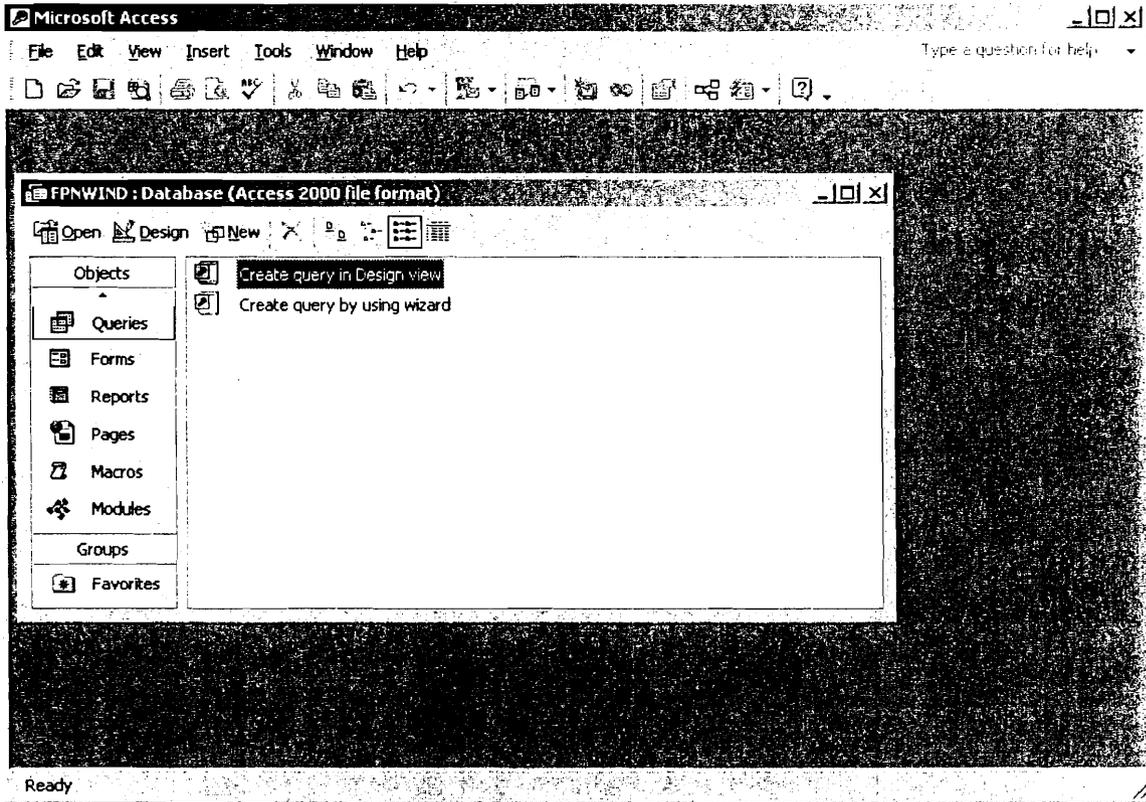
That's all the information the wizard needs to create your command button.

Display Help on customizing the button.

Cancel < Back Next > Finish

لا تنسي أن تعطي للنموذج اسما وليكن القائمه الرئيسيّه .

الإستعلامات  
النافذة الأفتاحيه  
QUERIES Start Window



هناك خيارين لعمل إستعلام جديد

- ١ - تصميم إستعلام بدون أي مساعدات جاهزه " للإستعلامات المركبه أو للمحترفين "
- ٢ - تصميم إستعلام باستخدام المكتبة الجاهزه " للإستعلامات النمطيه أو للمبتدئين "

## خطوات تصميم إستعلام باستخدام مكتبة النماذج الجاهزه

١ - النافذه الاولى تطلب اسماء الحقول سواء من جدول واحد او من عدة جدول او من إستعلام .

**Simple Query Wizard**

Which fields do you want in your query?  
You can choose from more than one table or query.

Tables/Queries  
Table: Suppliers

Available Fields:

CompanyName	>	ProductID
ContactName	>>	CategoryID
ContactTitle	>>	SupplierID
Address	<	
City	<<	
Region	<<	
PostalCode	<<	
Country	<<	

Cancel < Back Next > Finish

٢ - النافذه الثانيه اسماء للإستعلام واحد اختياريين إما قتحه لعرض المعلومات أو إجراء تعديل .

**Simple Query Wizard**

What title do you want for your query?  
QueryProdCatSup

That's all the information the wizard needs to create your query.  
Do you want to open the query or modify the query's design?

Open the query to view information.  
 Modify the query design.

Display Help on working with the query?

Cancel < Back Next > Finish

١ - النافذه الاولى تطلب اسماء الحقول سواء من جدول واحد او من عدة جدول او من إستعلام .

**Simple Query Wizard**

Which fields do you want in your query?  
You can choose from more than one table or query.

Tables/Queries  
Table: Suppliers

Available Fields:  
CompanyName  
ContactName  
ContactTitle  
Address  
City  
Region  
PostalCode  
Country

Selected Fields:  
CategoryID  
ProductID  
SupplierID

Cancel < Back Next > Finish

٢ - النافذه الثانيه تطلب احد اختياريين إما إظهار الحقول بالتفصيل وهي الافتراضي أو ملخصه .

**Simple Query Wizard**

Would you like a detail or summary query?

Detail (shows every field of every record)

Summary

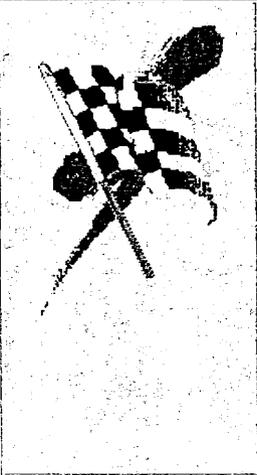
Summary Options...

Cancel < Back Next > Finish

٣ - النافذه الثالثه تطلب اسم للإستعلام و أحد اختيارين إما إظهار الإستعلام بالمعلومات وهو

الافتراضي أو تعديل التصميم.

**Simple Query Wizard**



What title do you want for your query?

Query2

That's all the information the wizard needs to create your query.

Do you want to open the query or modify the query's design?

Open the query to view information.

Modify the query design.

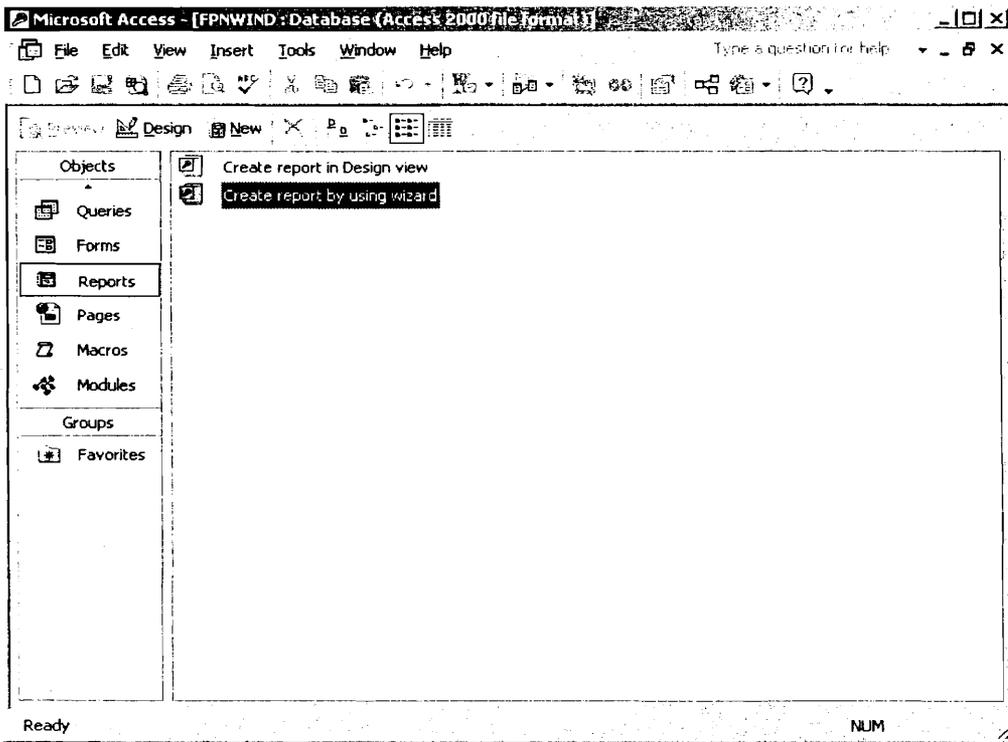
Display Help on working with the query?

Cancel < Back Next > Finish

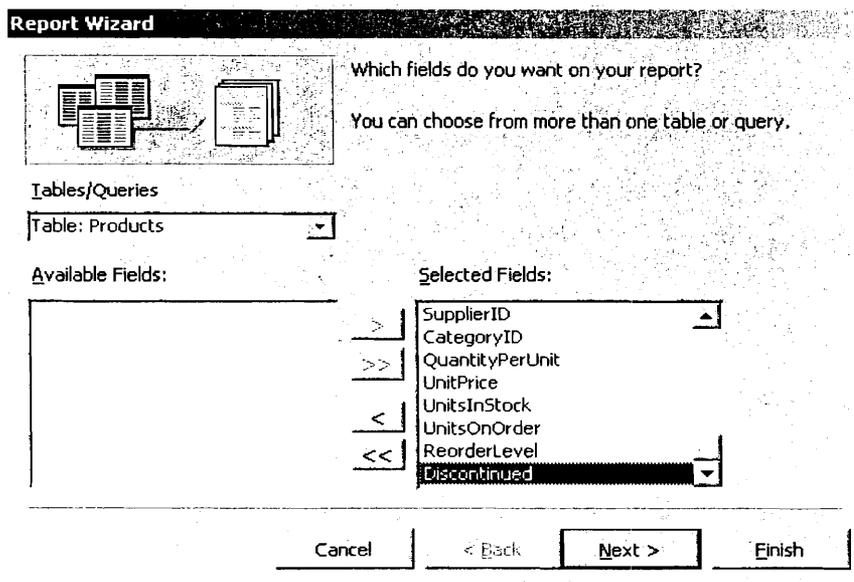
لا تنسي أن تعطي الإستعلام اسما وليكن الإستعلام الثاني .

## التقارير Reports

١. باستخدام مكتبة النماذج الجاهزة " للإستعلامات النمطية أو للمبتدئين " Wizards Using



Select Table & Items then press Next



# Add group

**Report Wizard**

Do you want to add any grouping levels?

ProductID	>
ProductName	<
CategoryID	<
QuantityPerUnit	<
UnitPrice	<
UnitsInStock	*
UnitsOnOrder	*
ReorderLevel	*
Discontinued	*

Priority

**SupplierID**

ProductID, ProductName, CategoryID, QuantityPerUnit, UnitPrice, UnitsInStock, UnitsOnOrder, ReorderLevel, Discontinued

Grouping Options ...    Cancel    < Back    Next >    Finish

# Select Sort Item & Type ASC or DES

**Report Wizard**

What sort order and summary information do you want for detail records?

You can sort records by up to four fields, in either ascending or descending order.

1	ProductID	Ascending
2	CategoryID	Descending
3	UnitPrice	Descending
4	UnitsInStock	Ascending

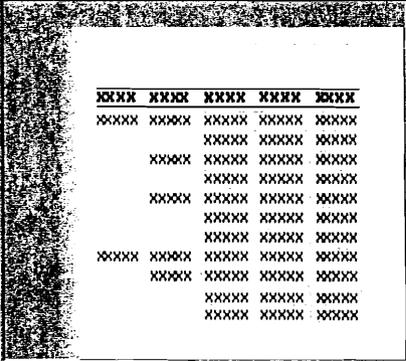
Summary Options ...

Cancel    < Back    Next >    Finish

Select Layout & Orientation

**Report Wizard**

How would you like to lay out your report?



Layout

- Stepped
- Block
- Outline 1
- Outline 2
- Align Left 1
- Align Left 2

Orientation

- Portrait
- Landscape



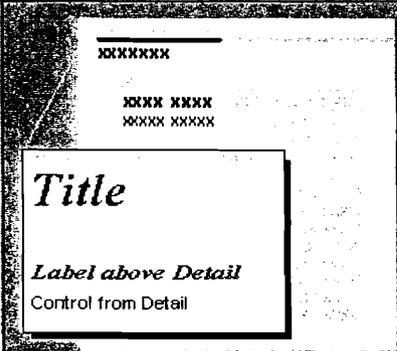
Adjust the field width so all fields fit on a page.

Cancel   < Back   Next >   Finish

Select Style

**Report Wizard**

What style would you like?



Bold  
Casual  
Compact  
Corporate  
Formal  
Soft Gray

Cancel   < Back   Next >   Finish

Assign Report Name , Report Status & Help display .

**Report Wizard**



What title do you want for your report?

ProductsRep1

That's all the information the wizard needs to create your report.

Do you want to preview the report or modify the report's design?

Preview the report.

Modify the report's design.

Display Help on working with the report?

Cancel < Back Next > Finish

Output View

Microsoft Access - [ProductsRep1]

File Edit View Tools Window Help

Type a question for help

100% Close Setup

### ProductsRep1

SupplierID	duct ID	Category	Unit Price	Stock	Product Name	Quantity	Order Level	Discon
1	1	Beverages	\$18.00	39	Chai	10 boxes x	0	10
	2	Beverages	\$19.00	17	Chang	24 - 12 oz	40	25
	3	Condiments	\$10.00	13	Aniseed Syrup	12 - 550 ml	70	25
2	4	Condiments	\$22.00	53	Chef Anton's Cajun	48 - 6 oz ja	0	0
	5	Condiments	\$21.35	0	Chef Anton's Gumb	36 boxes	0	0
	65	Condiments	\$21.05	76	Louisiana Fiery Hot	32 - 8 oz b	0	0
	66	Condiments	\$17.00	4	Louisiana Hot Spice	24 - 8 oz ja	100	20
3	6	Condiments	\$25.00	120	Grandin's Boysenb	12 - 8 oz ja	0	25
	7	Produce	\$30.00	15	Uncle Bob's Organi	12 - 1 lb pk	0	10
	8	Condiments	\$40.00	6	Northwoods Cranbe	12 - 12 oz j	0	0
4	9	Meat/Poultry	\$97.00	29	Mishi Kobe Niku	18 - 500 g	0	0
	10	Seafood	\$31.00	31	kura	12 - 200 ml	0	0
	74	Produce	\$10.00	4	Longlife Tofu	5 kg pkg	20	5
5	11	Dairy Products	\$21.00	22	Queso Cabrales	1 kg pkg	30	30
	12	Dairy Products	\$38.00	86	Queso Manchego L	10 - 500 g	0	0
6	13	Seafood	\$6.00	24	Konbu	2 kg box	0	5
	14	Produce	\$23.25	35	Tofu	40 - 100 g	0	0
	15	Condiments	\$15.50	39	Genen Shouyu	24 - 250 ml	0	5
7	16	Confections	\$17.45	29	Pavlova	32 - 500 g	0	10
	17	Meat/Poultry	\$39.00	0	Alice Mutton	20 - 1 kg ti	0	0

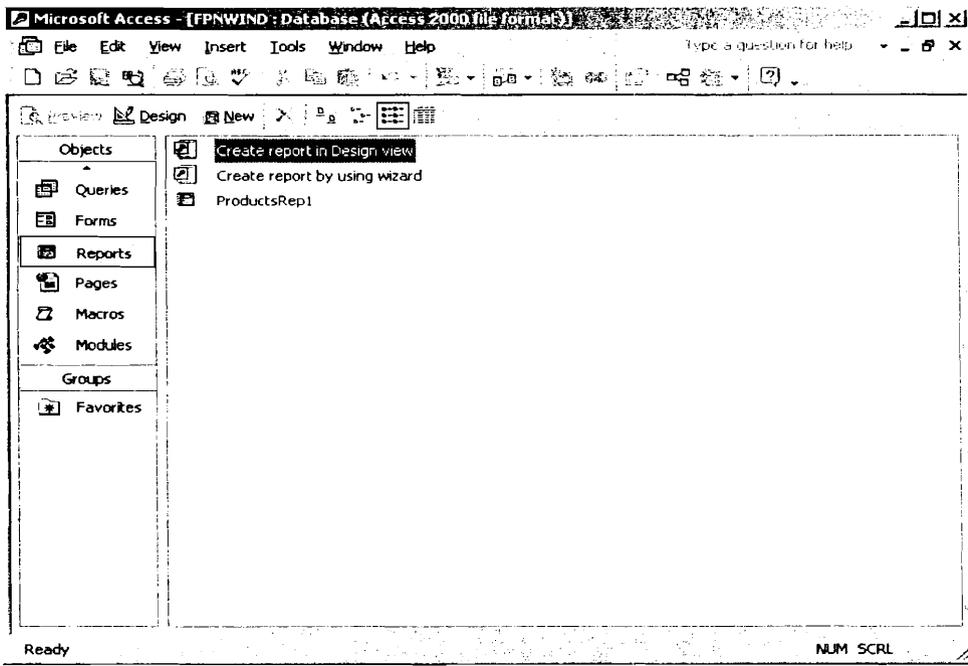
Page: 1/1

Ready

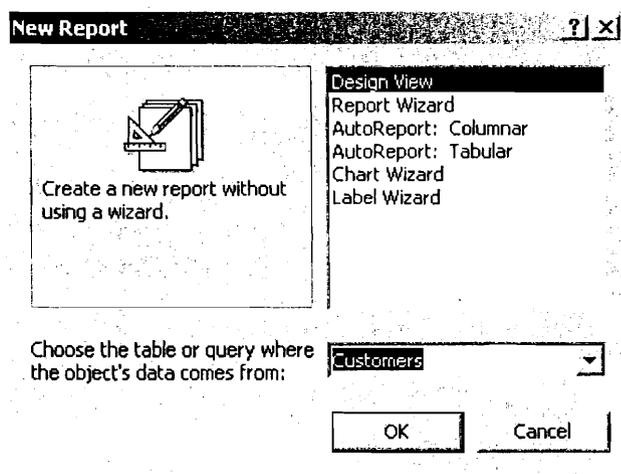
NUM SCRL

٢. تصميم إستعلام بدون مساعدات جاهزه " للإستعلامات المركبه أو للمحترفين " Design View

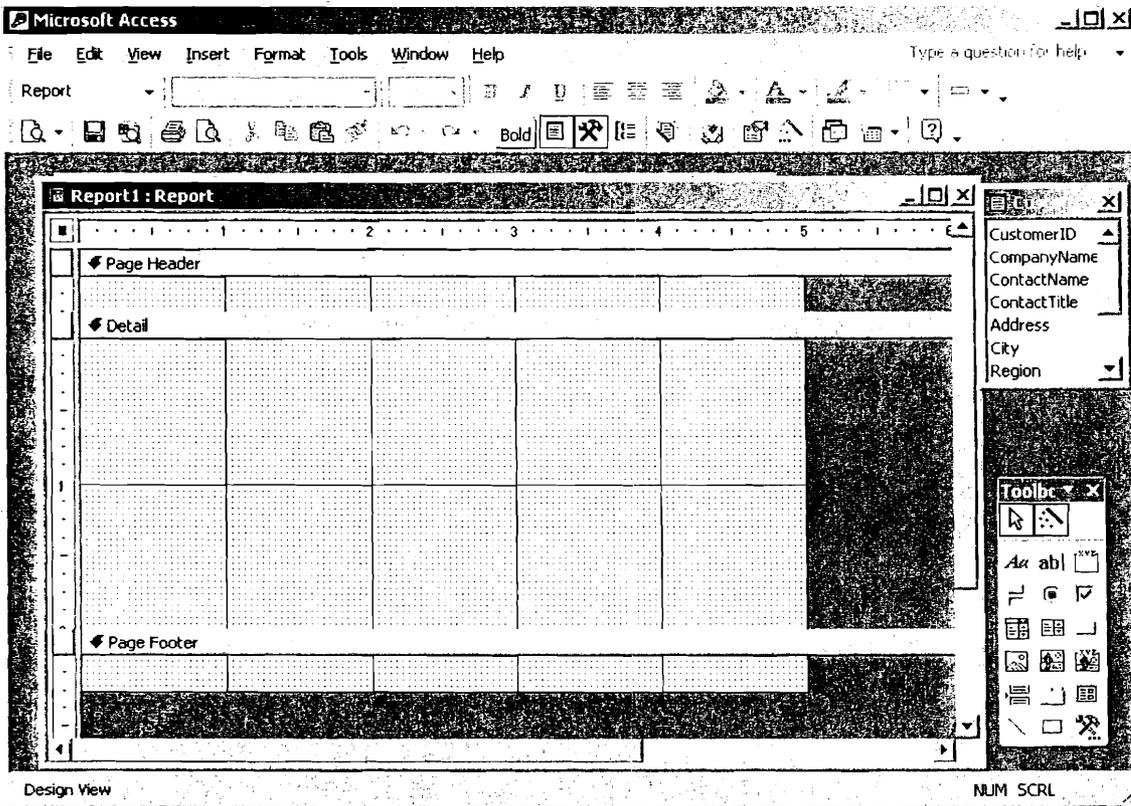
Select Create report in Design View & press New in Third line of Icons in upper lift corner



In New report Window select the table / Query for report

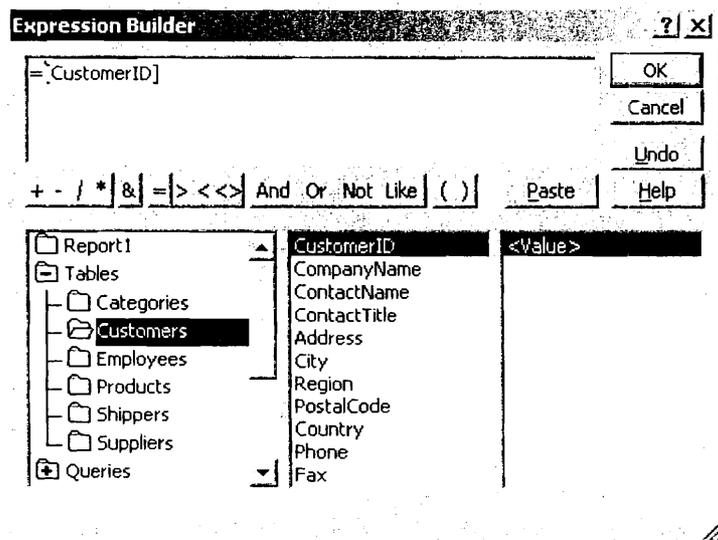


Blank Design Window is appeared , with both Tool Bar Window & Fields Window .

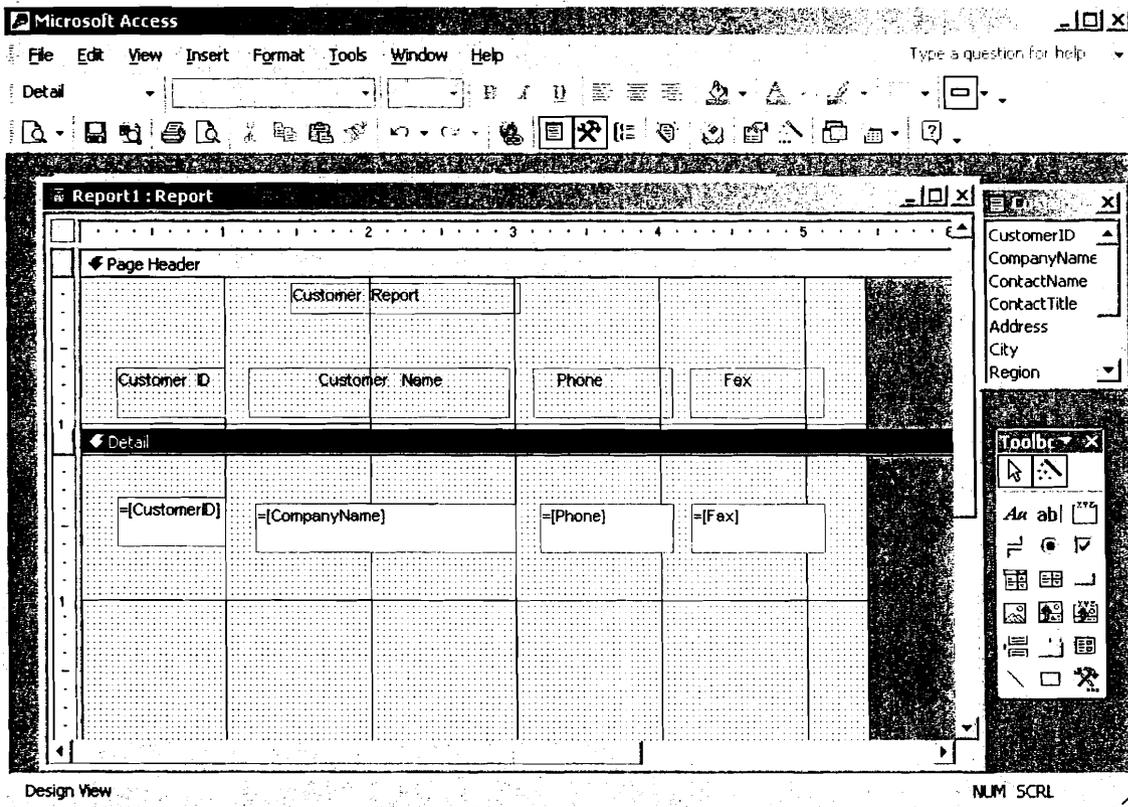


Fill Report parts ; Header , Fields Labels , Detail data Boxes & Footer

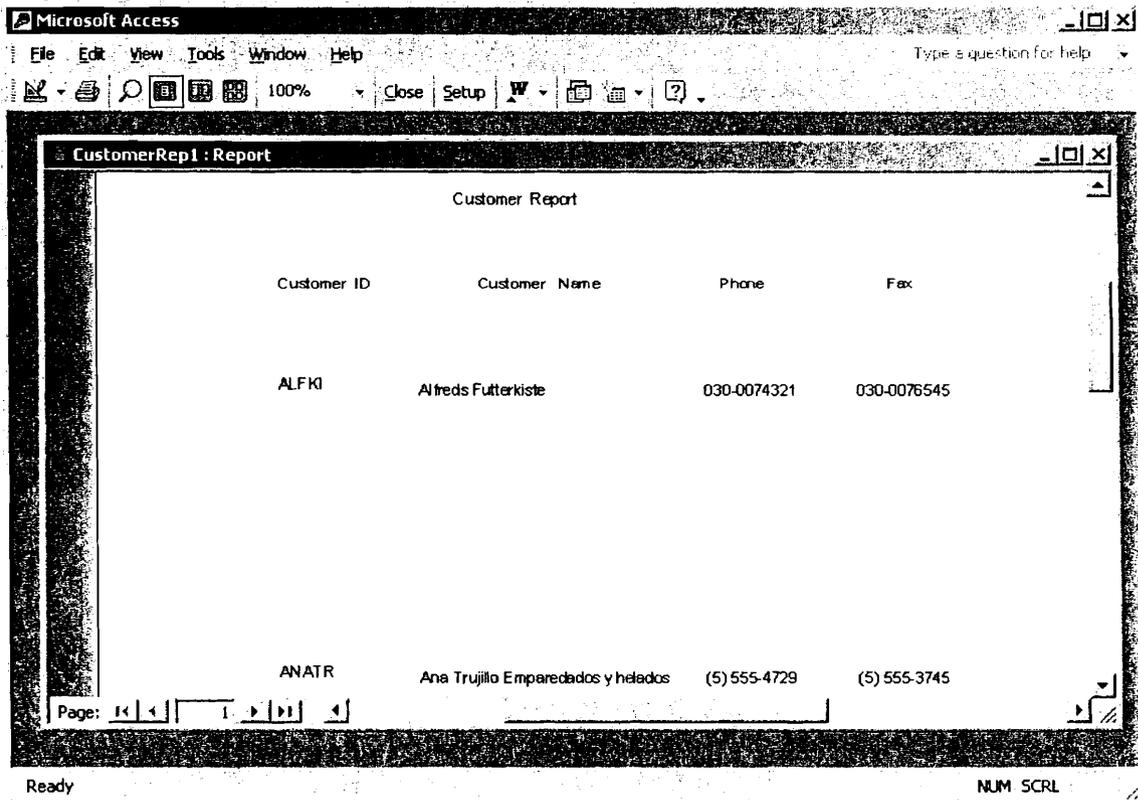
Assign Source Control & Format Properties for each Data Box



Finally the report design view will be

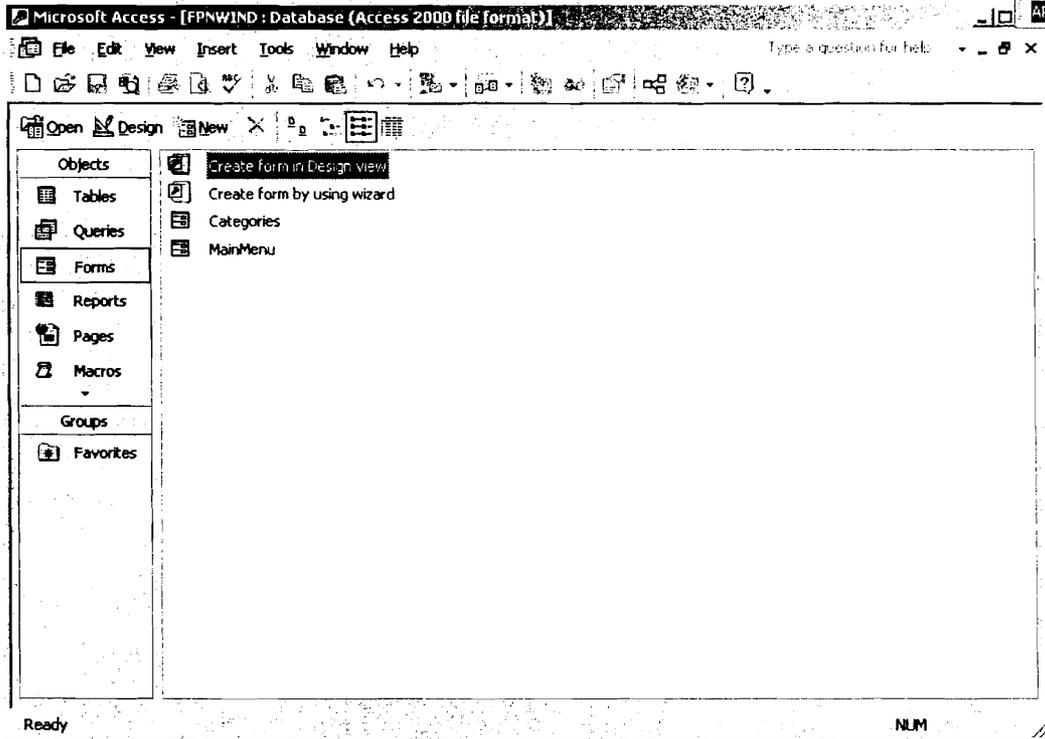


Output Report View will be

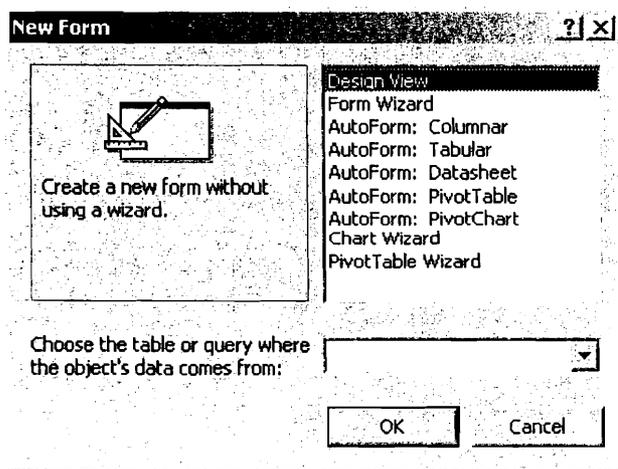


## Menu Design in Access XP, Access 2000

Select Forms → Create form in Design View → New



New Form Window is appeared → use default option and leave Table or Query Box Blank



Blank Form Window is opened , Write Title , New Button → Button Wizard Window is opened  
select suitable action

**Command Button Wizard**

What action do you want to happen when the button is pressed?  
Different actions are available for each category.

Categories:	Actions:
Record Navigation	Apply Form Filter
Record Operations	Close Form
<b>Form Operations</b>	Edit Form Filter
Report Operations	<b>Open Form</b>
Application	Open Page
Miscellaneous	Print a Form
	Print Current Form
	Refresh Form Data

Cancel    < Back    Next >    Finish

Then select Form

**Command Button Wizard**

What form would you like the command button to open?

Categories

MainMenu

Cancel    < Back    Next >    Finish

**Command Button Wizard**

Do you want the button to find specific information to display in the form?  
For example, the button can open a form and display the data for a specific employee or customer.

Open the form and find specific data to display.

Open the form and show all the records.

Cancel    < Back    Next >    Finish

**Command Button Wizard**

Do you want text or a picture on the button?

If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

Text: Open Form

Picture: Memo  
Minus Symbol  
MS Access  
MS Access Datasheet  
MS Access Form

Show All Pictures

Cancel < Back Next > Finish

**Command Button Wizard**

What do you want to name the button?

A meaningful name will help you to refer to the button later.

Category Form

That's all the information the wizard needs to create your command button:

Display Help on customizing the button.

Cancel < Back Next > Finish

Repeat For Report Button

**Command Button Wizard**

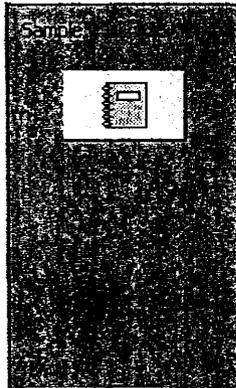
What action do you want to happen when the button is pressed?

Different actions are available for each category.

Categories:	Actions:
Record Navigation	Mail Report
Record Operations	Preview Report
Form Operations	Print Report
Report Operations	Send Report to File
Application	
Miscellaneous	

Cancel < Back Next > Finish

**Command Button Wizard**

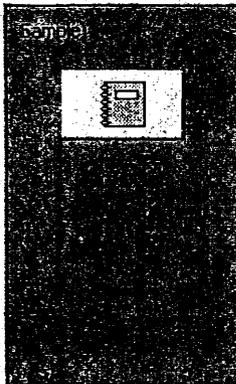


What report would you like the command button to preview?

- CustomerRep1
- ProductsRep1

Cancel < Back Next > Finish

**Command Button Wizard**



Do you want text or a picture on the button?

If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

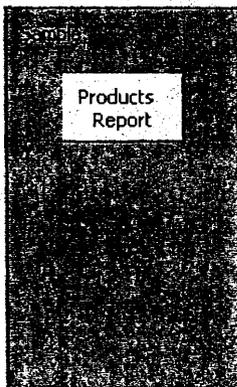
Text: Preview Report

Picture: MS Access Module MS Access Query MS Access Report 1 MS Access Report 2 MS Access Table 1 Browse... Show All Pictures

Cancel < Back Next > Finish

To display Report Name Text

**Command Button Wizard**



Do you want text or a picture on the button?

If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

Text: Products Report

Picture: Magnifying Glass MS Access Report 1 Preview (Sample) Preview Document Browse... Show All Pictures

Cancel < Back Next > Finish

**Command Button Wizard**

Sample

Products Report

What do you want to name the button?

A meaningful name will help you to refer to the button later.

Products Report

That's all the information the wizard needs to create your command button.

Display Help on customizing the button.

Cancel < Back Next > Finish

**Command Button Wizard**

Sample

Customer Report 1

What do you want to name the button?

A meaningful name will help you to refer to the button later.

Customer Report 1

That's all the information the wizard needs to create your command button.

Display Help on customizing the button.

Cancel < Back Next > Finish

Repeat for Exit Access Button !!!

Command Button Wizard



What action do you want to happen when the button is pressed?

Different actions are available for each category.

Categories:

- Record Navigation
- Record Operations
- Form Operations
- Report Operations
- Application
- Miscellaneous

Actions:

- Quit Application
- Run Application
- Run MS Excel
- Run MS Word
- Run Notepad

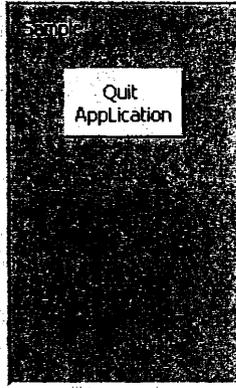
Cancel

< Back

Next >

Finish

Command Button Wizard



Do you want text or a picture on the button?

If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

Text:

Quit Application

Picture:

- Exit
- Stop Sign

Browse...

Show All Pictures

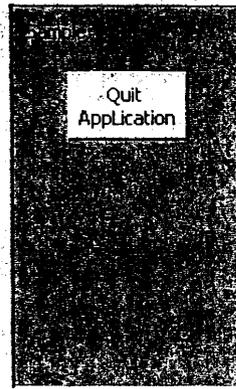
Cancel

< Back

Next >

Finish

Command Button Wizard



What do you want to name the button?

A meaningful name will help you to refer to the button later.

EXIT

That's all the information the wizard needs to create your command button.

Display Help on customizing the button.

Cancel

< Back

Next >

Finish

To Quit Application , Menu

**Command Button Wizard**

What action do you want to happen when the button is pressed?

Different actions are available for each category.

Categories:	Actions:
Record Navigation	Apply Form Filter
Record Operations	Close Form
<b>Form Operations</b>	Edit Form Filter
Report Operations	Open Form
Application	Open Page
Miscellaneous	Print a Form
	Print Current Form
	Refresh Form Data

Cancel < Back Next > Finish

**Command Button Wizard**

Do you want text or a picture on the button?

If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

Text: [QUIT MENU]

Picture: Exit Stop Sign Browse...

Show All Pictures

Cancel < Back Next > Finish

**Command Button Wizard**

What do you want to name the button?

A meaningful name will help you to refer to the button later.

QUIT MENU

That's all the information the wizard needs to create your command button.

Display Help on customizing the button.

Cancel < Back Next > Finish

To Run Query

**Command Button Wizard**

Sample

What action do you want to happen when the button is pressed?

Different actions are available for each category.

Categories:	Actions:
Record Navigation	Auto Dialer
Record Operations	Print Table
Form Operations	Run Macro
Report Operations	<b>Run Query</b>
Application	
<b>Miscellaneous</b>	

Cancel    < Back    **Next >**    Finish

**Command Button Wizard**

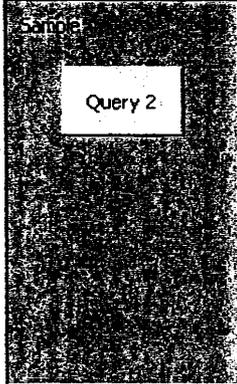
Sample

What query would you like the command button to run?

Query2  
QueryProdCatSup

Cancel    < Back    **Next >**    Finish

**Command Button Wizard**



Do you want text or a picture on the button?

If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

Text:

Picture: 

Append Query	▲
Delete Query	
Make-Table Query	
<b>MS Access Query</b>	
Select Query	▼

Show All Pictures

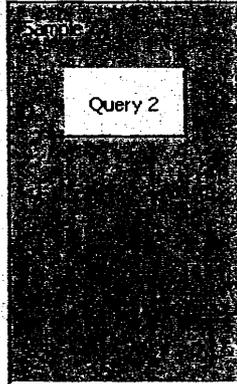
Cancel

< Back

Next >

Finish

**Command Button Wizard**



What do you want to name the button?

A meaningful name will help you to refer to the button later.

That's all the information the wizard needs to create your command button.

Display Help on customizing the button.

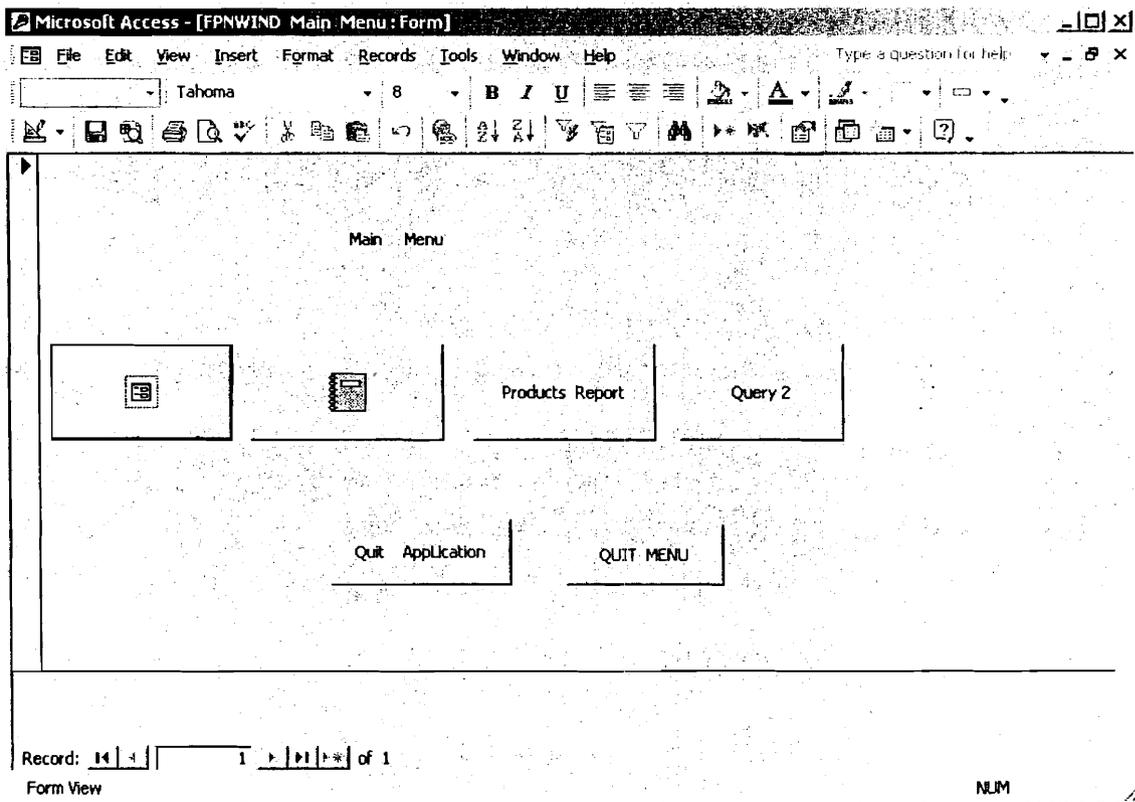
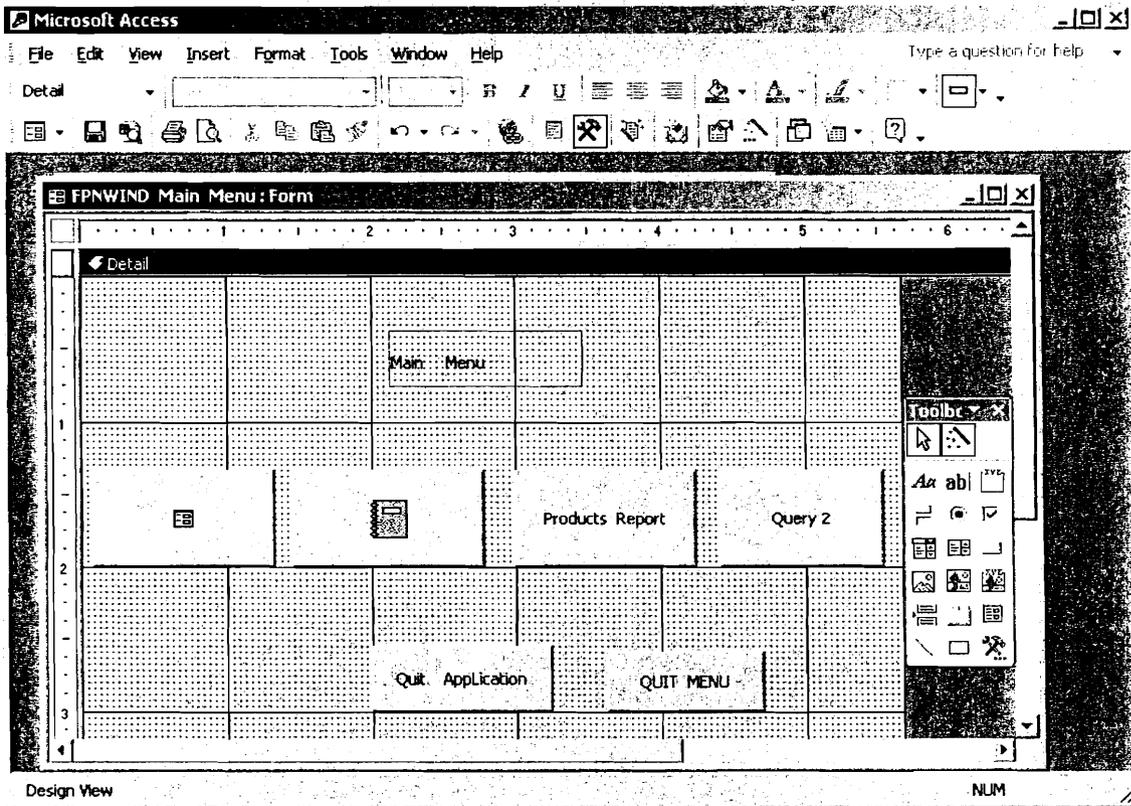
Cancel

< Back

Next >

Finish

Finally Output View of the Menu will be



To Run Another Menu

**Command Button Wizard**

What action do you want to happen when the button is pressed?

Different actions are available for each category.

Categories:	Actions:
Record Navigation	Apply Form Filter
Record Operations	Close Form
<b>Form Operations</b>	Edit Form Filter
Report Operations	<b>Open Form</b>
Application	Open Page
Miscellaneous	Print a Form
	Print Current Form
	Refresh Form Data

Cancel < Back **Next >** Finish

**Command Button Wizard**

What form would you like the command button to open?

Categories
Customers
<b>Forms Menu</b>
FPNWIND Main Menu
MainMenu

Cancel < Back **Next >** Finish

**Command Button Wizard**

Do you want text or a picture on the button?

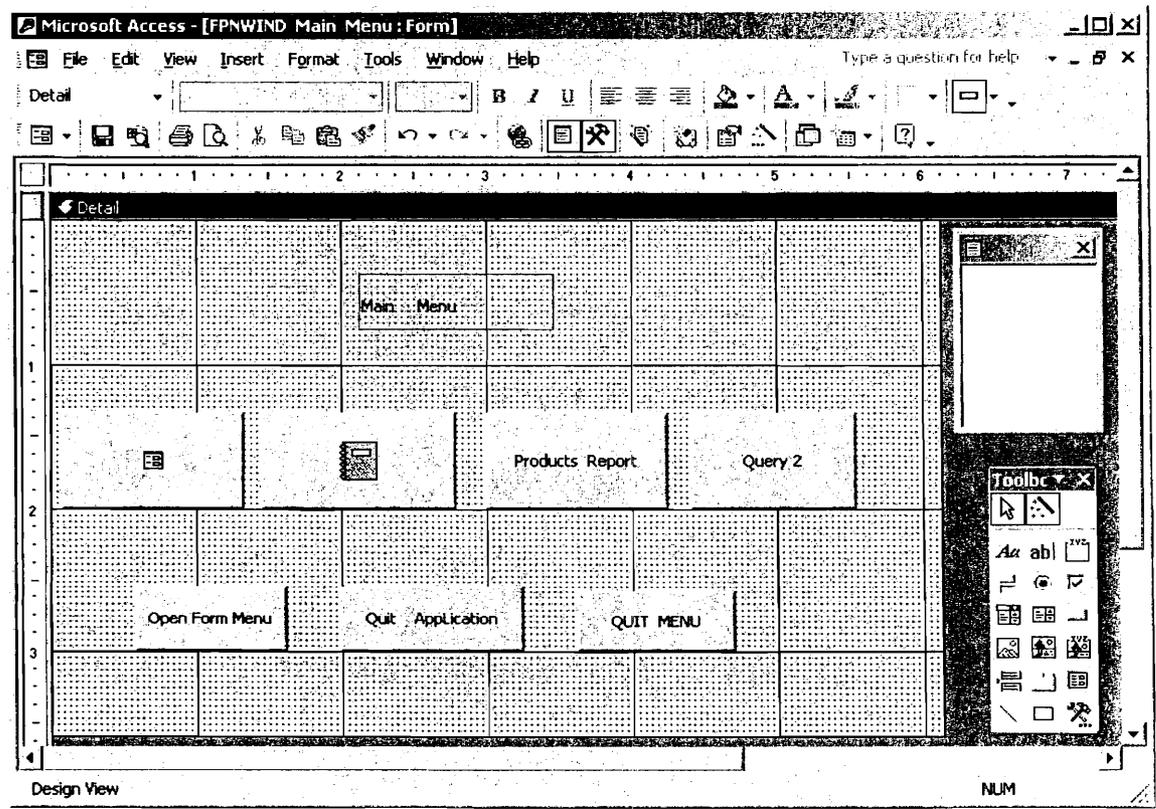
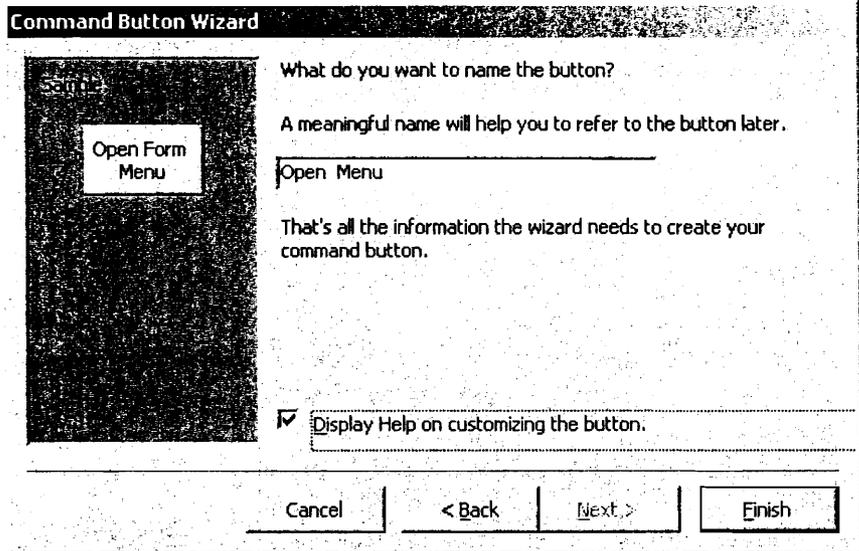
If you choose Text, you can type the text to display. If you choose Picture, you can click Browse to find a picture to display.

Text: Open Form Menu

Picture: MS Access Form

Show All Pictures

Cancel < Back **Next >** Finish



Microsoft Access - [FPNWIND Main Menu: Form]

File Edit View Insert Format Records Tools Window Help Type a question for help

Tahoma 8 B I U

Main Menu

		Products Report	Query 2
Open Form Menu	Quit Application	QUIT MENU	

Record: 1 of 1  
Form View NUM

## PART III: ORACLE SQLPLUS 9

### SQL PLUS Basics & Statements

#### DATA TYPES

DATATYPE	DESCRIPTION	COLUMN LENGTH ( BYTES )
CHAR ( size)	Fixed length character data of length " size "	Fixed for every row in the table ( with trailing space ) Max. size 255 bytes , default size 1 byte " per row "
VARCHAR2 ( size)	Variable length character data of max. size " size "	Variable for each row in the table , up to 2000 bytes per row
LONG	Variable length character data	Variable for each row in the table up to $2^{31}$ * bytes or two giga bytes per row
NUMBER ( p , s )	Variable length numeric data Max. precision p , and / or scale s	Variable for each row, range $10^{-130}$ to $10^{125}$ Max. space required for a given col. is 21 bytes per row . Max. precision is 38 digit , default is 1 digit
DATE	Fixed length , Default format DD-MMM-YY	Fixed at 7 bytes for each row in table Range from Jan 1,4712 BC to Dec 31,4712
ROWID	Binary data representing row address	Fixed at six bytes for each row in the table
RAW ( size )	Variable length binary data Max. size is " size "	Variable for each row in the table Up to 2000 bytes per row " Max. size must be specified "
LONG RAW	Variable length binary Data	Variable for each row in the table Up to $2^{31}$ bytes or 2 giga bytes per row .
LOB	Large Object can be BLOB for binary & CLOB for Char Doc	Used for storing Large Doc CLOB and multi media image, video & audio BLOB

#### Pseudocolumns

Are columns but not stored in tables . We can only perform query to get its value , but we can not do other data operations like insert , modify , or delete .

#### CURRVAL

Select SN1.currval from dual ;

#### NEXTVAL

Select SN1.nextval from dual ;

#### LEVEL

Root Node , Parent Node , Child Node & Leaf Node

Select SN1.currval from dual ;

#### ROWID

Sixteen Hex. Digit , divided into three parts 8 , 4 , and 4 for Data Block . Row Number in Data Block . File Number

Select rowid , fnl from tn1 ;

#### ROWNUM

Row number returned by a query , and first one is 1.

It is used to limit the number of returned rows from a query .

Select \* from tn1 where rownum < 7 ;

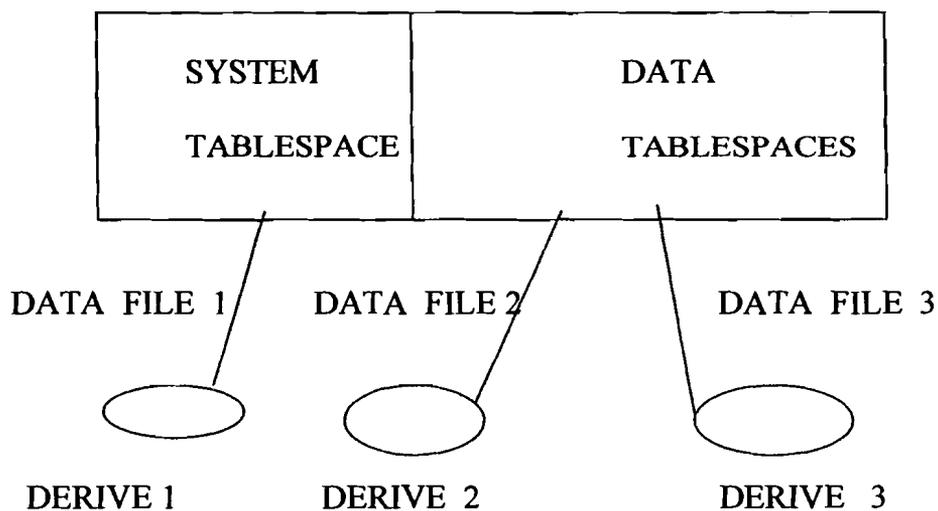
## SQLPLUS Tool

### SCHEMA

- Logical structure that directly refers to SQLPLUS objects
- SQLPLUS objects
  - TABLES
  - VIEWS
  - SEQUENCES
  - PROGRAM UNITS
    - PROCEDURES , TRIGGERS , FUNCTIONS & PACKAGES .
  - SYNONYM
  - INDEXES
  - CLUSTERS
  - DATABASE LINKS

### HINT

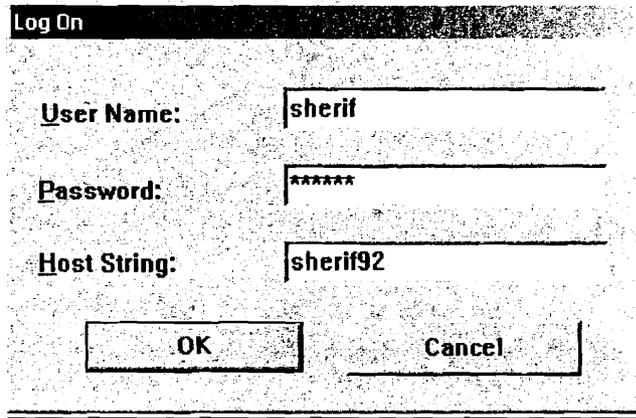
NO RELATION BETWEEN SCHEMA AND TABLESPACES



## Start Oracle SQLPLUS

1. **START - PROGRAMS - Oracle9i For Windows NT - SQLPLUS 8**

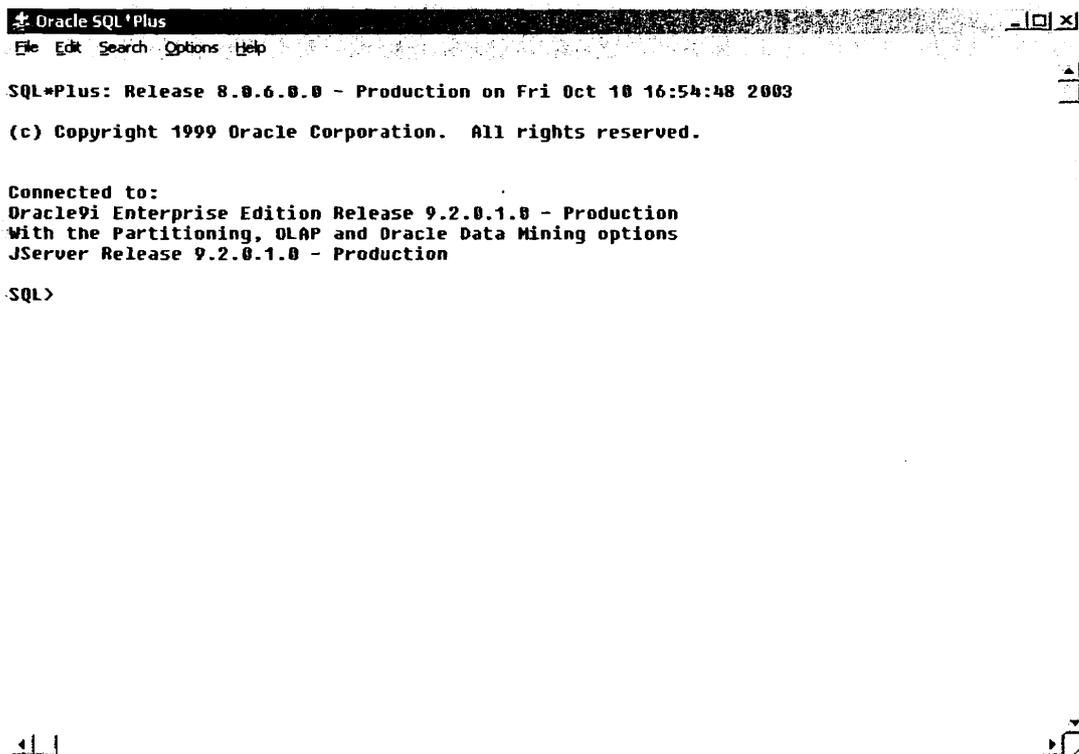
**START - PROGRAMS - OraHome9i - Application Development -  
SQLPLUS 8**



A dialog box titled "Log On" with three input fields and two buttons. The "User Name:" field contains "sherif", the "Password:" field contains "\*\*\*\*\*", and the "Host String:" field contains "sherif92". The "OK" button is on the left and the "Cancel" button is on the right.

Write your User Name , Password , and Host String " Network Interface "

Then press OK .



```
Oracle SQL*Plus
File Edit Search Options Help
SQL*Plus: Release 8.0.6.0.0 - Production on Fri Oct 10 16:54:48 2003
(c) Copyright 1999 Oracle Corporation. All rights reserved.

Connected to:
Oracle9i Enterprise Edition Release 9.2.0.1.0 - Production
With the Partitioning, OLAP and Oracle Data Mining options
JServer Release 9.2.0.1.0 - Production

SQL>
```

## SQL STATEMENTS

### 1- DDL Data Definition Language

Handles definition of Objects' structure .  
Examples CREATE , ALTER , DROP & DESCRIBE

### 2- DML Data Manipulation Language

Handles data in objects .  
Examples INSERT , UPDATE , DELETE & SELECT

### 3- TRANSACTION CONTROL STATEMENTS

- Manages changes made by DML statements
- Allows user or application developer to group changes into logical transactions
- Examples COMMIT , ROLLBACK & SAVEPOINT

### 4- EMBEDDED SQL STATEMENTS

Incorporates DDL , DML & Transaction control statements in procedural language program unit PL/SQL  
Examples OPEN , CLOSE , FETCH & EXECUTE .

### 5- SESSION CONTROL STATEMENTS

Allows control of current session including enabling / disabling ROLES and language setting .  
Examples ALTER SESSTION & SET ROLE

```
ALTER SESSION SET NLS_DATE_FORMAT =  
'DD/MM/YYYY'
```

### 6- SYSTEM CONTROL STATEMENTS

Changes properties of ORACLE SERVER INSTANCE  
Examples ALTER SYSTEM

## DDL STATEMENTS

Handles the structure of database objects . It uses following commands :

### A. Define new object

Ex1 CREATE table t1 ( f11 char , f12 date );

Ex2 CREATE table t1 as select \* from t2 ;

### B. Change parameters of existing object

Ex1 ALTER table t5 ADD( f11 char (2));

Ex2 ALTER table t5 MODIFY ( f11 char (2));

Ex3 ALTER table t6 ADD CONSTRAINT c1 unique key ( f17)

;

Ex4 ALTER table t6 DROP CONSTRAINT c1 ;

Ex5 ALTER table t7 ENABLE CONSTRAINT c1 ;

Ex6 ALTER table t7 DISABLE CONSTRAINT c1 ;

Ex7 ALTER table t8 DROP COLUMN f18 ;

Ex8 ALTER table t8 RENAME TO tt9 ;

( There are certain limitations in the changes ; eg , primary key field can not change ,..)

### C. Remove existing object

Example DROP table t1 ;

( If the table has any constraints , it will not be removed ;  
except , if you add the term " Cascade constraints " )

### D. Display the fields' specifications of an existing object

Example DESCRIBE t1

( OR abbreviated to ' DESC ' and without ' ; ' !!!! )

## SQLPLUS MAIN OBJECTS

### TABLES

- # Basic unit for data storage .
- # Every table is defined with a set of columns ( Fields / Attributes ) .
- # Every table can not have more than one primary key .

```
CREATE TABLE t_n ( f11 NUMBER , f12 CHAR(5) , f13 DATE ) ;
```

### VIEWS

- # Logical representation of one or more tables .
- # Provide additional level of security .
- # Hide data complexity , reduce syntactic complexity .

```
CREATE VIEW v_n AS SELECT ( f11 , f12 FROM t_n ) ;
```

### CONSTRAINTS

- # Conditions in creation of TABLES or VIEWS .
- # Can be modified with TABLE / VIEW or separately .
- # It is better to give a name for each constraint !!!

```
CREATE TABLE t_n ( f11 NUMBER CONSTRAINT c1 UNIQUE ) ;
```

### SEQUENCES

Generate serial number for fields in tables .

```
CREATE SEQUENCE s_n START WITH int1 INCREMENT BY int2  
MINVALUE int3 MAXVALUE int4 NOCYCLE NOCACH ;
```

### CLUSTERS

Grouping of records ( rows ) from a table / tables on certain condition .  
It has special handling for storage representation versus performance  
and always has one or more indexes .

### INDEXES

- # Up to 16 columns per index .
- # On tables ( after inserting data ) .
- # On clusters ( before any data insertion ) .

```
CRAETE INDEX i_n ON t_n ( f11 , f12 ) ;
```

```
CRAETE INDEX i_n ON CLUSTER c_n ( f11 , f12 ) ;
```

## DML STATEMENTS

Handles data in DB objects . It contains commands to :

### A. Enter a new record

Ex1    INSERT into table t8 ( f81 , f82 , f83 )  
         values ( 'a' , '1-feb-90' , 12 ) ;

Ex2    INSERT into table t1 values ( 'a' , '1-feb-90' , 12 ) ;

Ex3    INSERT into table t1 values ( 'a' , '1-feb-90' ) ;

### B. Change field's value of existing record

Ex1    UPDATE t1 set f11 = 'a' ;

Ex2    UPDATE t1 set f11 = 'a' where f12 = 11 and f13 = '1-feb-90' ;

### C. Remove existing record

Ex1    DELETE from t1 ;

Ex2    DELETE from t1 where f12 < 11 AND f13 = '1-may-99' ;

### D. Display records of an existing object

Ex1    SELECT \* from t1 where f12 < 11 OR f13 = '31-dec-79' ;

## INTEGRITY CONSTRAINTS

- Declarative way to define a rule for a col. of table .
- ORACLE provides integrity constraints and database triggers as solution to manage a database's data integrity rules .
- If a transaction attempt to violate an integrity condition ( constraint ) on the data of certain col. ORACLE rollback the invalid statement and return an error to the application .

- Following integrity constraints are supported by ORACLE

- NOT NULL

Must have entered data .

- PRIMARY KEY

- Only one per table .
- Must have unique value .
- Should not be Null .

- UNIQUE

The same as Primary key , but there can be more than one per table .

- FOREIGN KEY

- Must referee to either PK or UK in another table.
- Should not be Null .

- CHECK

Validate entered data ; Number , Char , or Date ; according to given criteria.

- Database trigger

is a stored procedure to define complex constraints . It is written using PL/SQL

statements . It is fired ( implicitly executed ) when the ignition condition occurs

## Some SQL Useful Commands

### Editing The SQL Buffer

SQL\*Plus has several commands to allow the user to edit or modify SQL statements. Once a new SQL statement has been typed in (ending with a ;) this statement is placed into a **buffer** and is considered to be the *current SQL statement*. All of the following commands operate on the current SQL statement in the buffer.

- / - Execute the current SQL statement in the buffer
- ALTER - Used to change user password .
- APPEND - Add text to the end of the current line of the SQL statement in the buffer
- CHANGE - Replace text on the current line of the SQL statement with new text
- CLEAR - Clear the buffer
- DEL - Delete the current line in the buffer
- EXIT - Exit the SQL\*Plus program
- GET - Load a SQL statement into the buffer but do not execute it
- INPUT - Add one or more lines to the SQL statement in the buffer
- LIST - List the current SQL statement in the buffer
- QUIT - Exit the SQL\*Plus program
- REMARK - Place a comment following the REMARK keyword
- RUN - Execute the current SQL statement in the buffer
- SAVE - Save the current SQL statement to a script file
- Show - Used to display system parameters or data like current user .
- START - Load a SQL statement located in a script file and then run that SQL statement
- SHOW - Show the current value of a variable
- SPOOL - Send the output from a SQL statement to a file

#### 1. To Display User Name

```
SHOW USER
SELECT USER FROM DUAL ;
```

#### 2. To Compile your one shot schema

```
GET Full path name of the schema file and press Enter key
Then press / and press Enter key
```

#### 3. To Compile your individual objects schema

```
START Full path name of the schema file and press Enter key
OR @ Full path name of the schema file and press Enter key
```

#### 4. To Clear the screen

```
CLEAR SCREEN and press Enter key
```

#### 5. To Deal with Spooling

Store the SQL output in a file

```
SPOOL Full path name of the spooled file and press Enter key
```

End Spool process

```
SPOOL OFF and press Enter key
```

Print the Spooled file

```
SPOOL OUT and press Enter key
```

Show the Spool status

```
SHOW SPOOL and press Enter key
```

#### 6. To Change user password

```
ALTER USER un IDENTIFIED BY new_pw ;
```

## SCHEMA

There are two ways for preparing Schema

### ONE SHOT & INDIVIDUAL OBJECTS

S/N	ASPECT	ONE SHOT	INDIVIDUAL OBJECTS
1	Schema Name	Required	Not Required
2	Separation between Obj.	NULL	Semi Comma ;
3	Objects	Tables & Views	ALL
4	Compilation	GET File_Name Then /	Start File_Name
5	Objects sequence	Not Required	Required
6	Mutual Referenced Obj.	Accepted	Not Accepted

There are some Schemas of both types at Appendix 2 of the Hand out ,  
compare , compile , and write your comments .

## FUNCTIONS

About 30 functions on char , number , date & Mathematical data type .  
Refer to SQL reference manual . Here are some important functions .

### 1. CHAR Functions

RPAD ( char1 , n )

```
SELECT RPAD ( F14 , 7 ) OUT FROM T1 ;
```

LPAD ( char1 , n )

```
SELECT RPAD ( F14 , 7 ) NEW FROM T1 ;
```

SUBSTR ( char1 , n [, m ] )

```
SELECT SUBSTR ( F14 , 3 , 6 ) NEW FROM T1 ;
```

REPLACE ( char1 , n [, m ] )

```
SELECT REPLACE ( F14 , 'DEF', 'FGDR HH' ) OUT  
FROM T1  
WHERE F11 <= 300 ;
```

UPPER ( char1 )

```
SELECT UPPPER ( F14 ) FROM T1 ;
```

LOWER ( char1 )

```
SELECT LOWER ( 'ASDFG HHbn' ) FROM DUAL ;
```

CONCAT ( char1 , char2 )

**SELECT CONCAT ( F14 , F23 ) FROM T1 , T2 ;**

**SELECT F14 || ',' || F23 FROM T1 , T2 ;**

INITCAP ( char1 )

**SELECT INITCAP ( F14 ) FROM T1 ;**

ASCII ( char )

**SELECT ASCII ( F44 ) ASCII\_NO FROM T1 ;**

LENGTH ( " String " )

**SELECT LENGTH ( F42 ) CHAR\_LENGTH FROM T4 ;**

RTRIM ( " String " )

**SELECT LENGTH ( RTRIM ( F42 ) ) CHAR\_LENGTH  
FROM T4 ;**

INSTR ( s1 , s2 , x )

**SELECT INSTR ( 'AGHF GHJK GH' , 'GH' , 1 ) NEW FROM  
DUAL ;**

**SELECT INSTR ( 'AGHF GHJK GH' , 'GH' , 5 ) NEW FROM  
DUAL ;**

**SELECT INSTR ( 'AGHF GHJK GH' , 'GH' , 7 ) NEW FROM  
DUAL ;**

## 2. NUMBER Functions

CEIL ( n )

**SELECT CEIL ( F13 ) OUT1 FROM T1 ;**

FLOOR ( n )

**SELECT FLOOR ( F13 ) NEW FROM T1 ;**

ABS ( n )

**SELECT ABS ( -123.27 ) POS\_NUM FROM DUAL ;**

TRUNC ( n , 1 )

**SELECT TRUNC ( F13 , 1 ) NEW1 FROM T1 ;**

ROUND ( n )

**SELECT ROUND ( F13 , 1 ) NEW2 FROM T1 ;**

MOD ( m , n )

**SELECT MOD ( 1234 , 3 ) OUT FROM DUAL ;**

### 3. DATE Functions

**SYSDATE**

```
SELECT SYSDATE FROM DUAL ;
```

**ADD\_MONTHS ( d1 , e )**

```
SELECT F43 , ADD_MONTHS ( F43 , 3 ) FROM T4 ;
```

**MONTH\_BETWEEN ( d1 , d2 )**

```
SELECT F15 , MONTHS_BETWEEN ( SYSDATE , F15 )  
DATE_D  
FROM T1 ;
```

```
SELECT F15 , CEIL ( MONTHS_BETWEEN ( SYSDATE  
, F15 ) )  
DATE_D FROM T1 ;
```

**NEXT\_DAY ( d , N )**

```
SELECT F43 , NEXT_DAY ( F43 , 1 ) NXT_DAY FROM  
T4 ;
```

```
SELECT SYSDATE , NEXT_DAY ( SYSDATE , 2 )  
NXT_DAY  
FROM DUAL ;
```

**WEEK DAYS SUN - SAT ARE NUMBERED 1 -**

#### 4. MATHEMATICAL FUNCTIONS

**COUNT ( \* / Field\_Name )**

**SELECT COUNT ( \* ) FROM T1 ;**

**SELECT COUNT ( F12 ) FROM T1 WHERE F12 > 30 ;**

**SUM ( Field\_Name )**

**SELECT SUM ( F11 ) FROM T1 ;**

**MAX ( Field\_Name )**

**SELECT MAX ( F13 ) FROM T1 ;**

**MIN ( Field\_Name )**

**SELECT MIN ( F22 ) FROM T2 ;**

**AVG ( Field\_Name )**

**SELECT AVG ( F14 ) FROM T1 ;**

**VARIANCE ( Field\_Name )**

**SELECT VARIANCE ( F13 ) FROM T1 ;**

**STDDEV ( Field\_Name )**

**SELECT STDDEV ( F13 ) FROM T1 ;**

## DATA CONVERSION

Available ORACLE conversion functions are

- TO\_CHAR ( n [ , fmt [ , ' NLSparams ' ] ] )

```
select to_char ( 34567 ,
'L099G999,'NLS_numeric_characters= '.,' ,
NLS_currency = "AUD" ) "char. Conv."
from dual ;
```

- TO\_NUMBER ( char [ fmt [ , ' NLSparams ' ] ] )

```
insert into tn1 values (to_number ( 'abc' ) , 'aaaa bbb' , '11-feb-
2002' ) ;
```

- TO\_DATE ( char [ fmt [ , ' NLSparams ' ] ] )

```
select to_date ( ' October 6 , 1973 , 02:00 P.M. ' ,
'DD/MM/YYYY ,
HH:MM ' , NLS_date_language = American ' ) "October War" from
dual ;
```

- CHARTOROWID ( char )

```
select name from tn1 where rowid = chartorowid
('0000000D.0001.0005') ;
```

- ROWIDTOCHAR ( rowid )

```
select rowid from tn1 where rowidtochar ( rowid ) like 'AB' ;
```

- HEXTORAW ( char )

```
update tn1 set fn1 = hextoraw ( '7dd' ) ;
```

- RAWTOHEX (raw)

tn1 ;  
select rowtohex ( raw\_column\_name ) " RAW Value " from

## SQL OPERATORS

Classified from number of operands point of view into :

- UNARY

applied only on one operand . Format operator Operand

Example start schema ;

- BINARY

applied on two operands . Format operand1 operator operand2

Example update t1 set f11 = 'a' ;

- Special

applied on several operands and has special format .

Example update t1 set f11 = 'a' where f12 = 1 ;

Classified from operations type into

- ARITHMETIC

\*, /, +, - (Precedence \*, /, +, -)

- CHARACTER

|| Concatenates character string

- COMPARISON

=, !=, >, <, IN, NOT IN, ANY, SOME,  
ALL, BETWEEN, EXISTS, LIKE & NULL

- LOGICAL

NOT, AND & OR (Precedence NOT AND OR)

- SET operators

UNION, UNION ALL, INTERSECT & MINUS.

## Compound QUERY

Using LIKE with ' % ' for any no of digits OR ' \_ ' for one digit is much quicker.

```
select empno ,sal ,deptno from emp2 where ename like '_L%';
```

EMPNO	SAL	DEPTNO
7499	1600	30
7698	2850	30
7782	2450	10

```
select empno ,sal ,deptno from emp2 where ename like '%L%'
```

EMPNO	SAL	DEPTNO
7499	1600	30
7698	2850	30
7782	2450	10
7934	1300	10

```
select distinct f11 from t5 ; Output without duplicate rows
```

```
select distinct * from t5 ; Output with duplicate rows
```

### 1. UNION & UNION ALL

```
SELECT fn1, fn2 , fn3 FROM tn1 WHERE [ Condition1 ]  
UNION  
SELECT fn14 , fn5 , fn6 FROM tn2 WHERE [ Condition2 ] ;
```

Results all records without duplicate from both tables tn1  
having condition1 & tn2 having condition2.

```
SELECT fn1, fn2 , fn3 FROM tn1 WHERE [ Condition1 ]  
UNION ALL  
SELECT fn14 , fn5 , fn6 FROM tn2 WHERE [ Condition2 ] ;
```

Results all records even duplicate from both tables tn1  
having condition1 & tn2 having condition2.

## 2. INTERSECT

```
SELECT fn1, fn2 , fn3 FROM tn1 WHERE [ Condition1 ]
```

INTERSECT

```
SELECT fn14 , fn5 , fn6 FROM tn2 WHERE [ Condition2 ] ;
```

Results all common records without duplicate from both tables tn1 having condition1 & tn2 having condition2.

## 3. MINUS

```
SELECT fn1, fn2 , fn3 FROM tn1 WHERE [ Condition1 ]
```

MINUS

```
SELECT fn14 , fn5 , fn6 FROM tn2 WHERE [ Condition2 ] ;
```

Results all non common records without duplicate from both tables tn1 having condition1&tn2 having Condition2.

## 4. ORDER BY ASC or DESC , GROUP BY & CONNECTED BY

ORDER BY is used to sort retrieved records either ascendingly , DEFAULT , or descendingly . It can be used also with GROUP BY .

```
SELECT fn1 , fn2 , fn3 FROM tn1 where fn3 operator ORDER BY fn1 , fn2 ;
```

# GROUP BY results collected records based on the followed fields after GROUP BY

clause. Usually use HAVING clause subjected to it to speed up the fetch process .

```
SELECT fn1 , fn2 , fn3 FROM tn1 where fn3 operator GROUP BY fn6 , fn7 ORDER BY fn3 DESC ;
```

```
SELECT fn1 , fn2 , fn3 FROM tn1 where fn3 operator GROUP BY fn6 , fn7 HAVING [Condition ] ;
```

# START WITH [ Condition ] & CONNECT BY [Condition]  
are used for executing subqueries ( Nested ).

```
SELECT fn1 , fn2 , fn3 FROM tn1 where fn3 operator  
START WITH [ Condition ] CONNECT BY [Condition ] ;
```

### 5. Correlated SubQuery ( Nested )

Is a subquery that is evaluated once for each record Processed by  
the parent statement .

```
SELECT fn1 , fn2 , fn3 FROM tn1 where fn3 operator  
( SELECT fn5 , fn6 , fn7 FROM tn2 where [condition] );
```

### 6. Recursive Query

Is a query that Access the same table two times by using plus join not a  
left

one as in MS Access.

```
SELECT fn1 , fn2 , fn3 FROM tn1 where fn3 operator  
  
AND/ OR [condition ( + ) ] ;
```

### 7. Tree Queries

Another form of recursive query is the tree query. A tree query decomposes the table such that each row is a node the tree and nodes are related in levels. Consider the Students table having following records :

- Bill tutors Alex, Mary and Sue.
- Mary tutors Liz and Ed
- Sue tutors Petra

Using the SQL SELECT statements CONNECT BY and START WITH clauses, we can form a set of relationships between the rows of the table that form a tree structure.

- START WITH - indicates which row the tree should start with.
- CONNECT BY - indicates how successive related rows are to be identified and included in the result.
- LEVEL - a pseudo-column that indicates which level of the tree the current row is assigned to.

The following example prints a tree structure modeled after the tutoring relationships in the Students table. We will start with Mary's student id (102) since no one tutors her.

```
SELECT          LPAD(' ',2*(LEVEL-1)) || students.name
                As TutorTree
FROM            students
START WITH     studentid = '102'
CONNECT BY PRIOR studentid = tutorid;
```

TUTORTREE

```
-----
Mary
  Bill
    Sue
      Sam
        Tom
          Alex
    Jane
```

7 rows selected.

From the tree we can see that Mary tutors Bill, Sue and Jane.

In turn, Sue tutors Sam. Finally, Sam tutors both Tom and Alex.



**Training Report  
Design & Management of  
Databases Course  
Jun. 28 - Jul. 14 , 2005**



**Background:**

The DMD held two sessions of seven days and four sessions of one long day. **Design and Management of Databases (DMD)** course for Ministry of Judicial participants on June 28-30, 2005, and on July 2-4, 13 & 14. Ten participants attended each session and applied workshop.

**Course Content:**

The first part focused on small personal Database, Microsoft Access that is used usually in daily work. The second part handled larger Database and applied on Oracle version 9.

Participants learned to adapt all language commands using given examples in handout and applied on a project at the end of the course.

Besides; participants learned how to search in the Internet to prepare two reports on some technical terms used in recent Database design.

**Process:**

The participants were encouraged to develop their skills through a variety of individual and group exercises including assignments, case studies, and final Project from real-life situations chosen by both the participants, the instructor based on thorough discussions and debriefings. The course put a strong emphasis on group work, as this approach is generally believed to lead to better organizational application design.

The process ran smoothly for this participants group, with good rates and interaction among the participants.

**Facilities:**

The training was held in American University Academic Center Building at Lab 606. The Lab was adequate for this type of training, for both sessions and applied workshop on computers.

The quality of the equipment in the Lab supplied by AUC was very good.

The handout was complete and written in easy English language and all Technical terms were explained on the level of participants.

Refreshments were served on time, but quantities were about enough. I would recommend replacing the refreshment by quick meal.

### **Recommendations**

The second course; System Analysis and design, is essential to complete the first course; Design and management of Databases.

Currently; applications trend goes towards Web Application, which based mainly on Java & XML.

At least 7 out of the ten current participants have high skills and to grow up their expert I suggest replacing the remaining two courses by two of the following courses

1. Fundamentals of Java
2. Databases and Java
3. Object Oriented Programming
4. HTML concepts
5. Introduction to XML



**SHERIF ELKIKI**

**Course Instructor**



*Dr. K. S. / M. A. - J. K.*