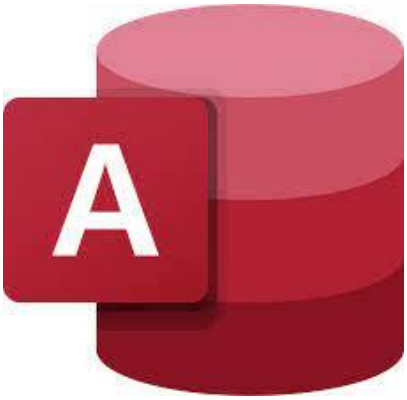
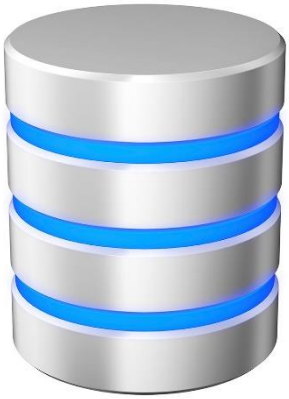
Database Fundamentals
And
Microsoft Access
For Beginners





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IBM Data Analyst Professional Certificate

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SQL Server 2005

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Introduction:

لما كانت قوة أى مؤسسة تكمن فى سرعة إتخاذها القرار ومواجهة تغيرات السوق والمنافسة ونقل المؤسسة من مكانة إلى أخرى أفضل عن طريق الحصول على أكبر عائد ، وتقليل التكاليف ومعرفة مواطن القوة والضعف فيها وفى البيئة التى تحيطها ، ولأن البيانات والمعلومات هى القوة الاساسية الداعمة لاتخاذ اى قرار باى مؤسسة ، ولما كانت البيانات فى حد ذاتها لا تعين على اتخاذ القرار الصحيح ، ولكن يلزم لها ان تجيب على الاسئلة المحددة والدقيقة و الدائرة فى اذهان متخذى القرار حتى يتثنى لهم الرؤية الواضحة للامور على اساس متين يعول عليه بعد إعدادها وتقديمها فى صورة تقارير ومخططات واضحة جليه.

ولما كان التعامل مع قواعد البيانات والحصول على البيانات المطلوبة بصورة دقيقة وسريعة هو أمر هام لكل من يعمل في مجال البيانات أو من أراد أن يغزو عالم قواعد البيانات ،لذا فقد كان لزاما على كل من يهتم بأى من هذه الأمور ان يتعلم مبادئ قواعد البيانات وكيف تعمل وكيفية التعامل معها ، حتى تكون أساس له في المجال الذى اختاره سواء في تحليل البيانات أو تصميم البرامج التي تعتمد في خلفيتها على الاتصال بقواعد البيانات أو البدء فى تعلم إدارة قواعد البيانات وتصميمها.

وعليه فقد قمت باعداد هذا البرنامج التدريبى الذى يشرح للمتدرب كيف تعمل قواعد البيانات وكيف يقوم بتصميم قاعدة بيانات من البداية .

ولما كان يلزم للمتدرب ان يلمس بيده احدى قواعد البيانات ليتعامل معها فقد فضلت ان تكون التدريبات العملية على واحدة من أقدم وأجمل وأقوى برامج إدارة قواعد البيانات في العالم وهى ميكروسوفت أكسيس ، وذلك لسهولة التعامل مع أجزاء البرنامج وهو في النهاية ملف واحد يحوى كل العناصر اللازمة لعمل قاعدة بيانات كامله .

وقد قمت بعرض المادة العلمية عن طريق مهام وأنشطة يقوم المتدرب بنفسه بتنفيذها خطوة خطوة حتى تتضح له الفكرة بصورة جلية وترسخ في ذهنه مبادئ هذا العلم الواسع المجال.

أرجو ان تكون هذا المادة العلمية وسيلة لايضاح مفاهيم قواعد البيانت وتبسيط التعامل معها حتى تكون نواه لمن أراد ان يكون واحدا من محترفى هذا المجال سواءا مع قاعدة بيانات ميكروسوفت أكسيس في الجزء القادم بصورة أكثر تقدما أو اى برنامج من برامج قواعد البيانات الأخرى الأكثر تعقيدا .
أتمنى ان تكون فائدة للزملاء وكل من يرغب في معرفة هذا المجال والبدء فيه.

وفقنا الله الى ما يحبه ويرضاه

مهندس سعيد فوزى محمد هدى
مدير مركز المعلومات – مدير الجودة
إدارة العطاءات
المقاولون العرب

القاهرة 1 يونيو 2023

Chapter 1: What is a Database.

1.1 Definitions:

Database:

- A database is a collection of related data. By data, we mean known facts that can be recorded and that have implicit meaning. For example, consider the names, telephone numbers, and addresses of the people you know.
- . A database has the following implicit properties:
    - A database represents some aspect of the real world, sometimes called the **miniworld** or the **universe of discourse** (**UoD**). Changes to the **miniworld** are reflected in the database.
    - A database is a logically coherent collection of data with some inherent meaning. A random assortment of data cannot correctly be referred to as a database.
    - A database is designed, built, and populated with data for a specific purpose. It has an intended group of users and some preconceived applications in which these users are interested.

Examples of Database:

- **Traditional database Application** (store text and numeric information).
- **Multimedia databases** (store images, audio clips and video streams).
- **Geographic Information Systems (GIS)** (stores Maps, weather data ,and satellite images).
- **Data warehouses and online analytical processing (OLAP)** (Extract and analyze business information and support decision making).

Database management system (DBMS)

- it is a computerized system that enables users to create and maintain a database. The DBMS is a general-purpose software system that facilitates the processes of defining, constructing, manipulating, and sharing databases among various users and applications.

Example: Student Database:

STUDENT

Name	Student_number	Class	Major
Smith	17	1	CS
Brown	8	2	CS

COURSE

Course_name	Course_number	Credit_hours	Department
Intro to Computer Science	CS1310	4	CS
Data Structures	CS3320	4	CS
Discrete Mathematics	MATH2410	3	MATH
Database	CS3380	3	CS

SECTION

Section_identifier	Course_number	Semester	Year	Instructor
85	MATH2410	Fall	07	King
92	CS1310	Fall	07	Anderson
102	CS3320	Spring	08	Knuth
112	MATH2410	Fall	08	Chang
119	CS1310	Fall	08	Anderson
135	CS3380	Fall	08	Stone

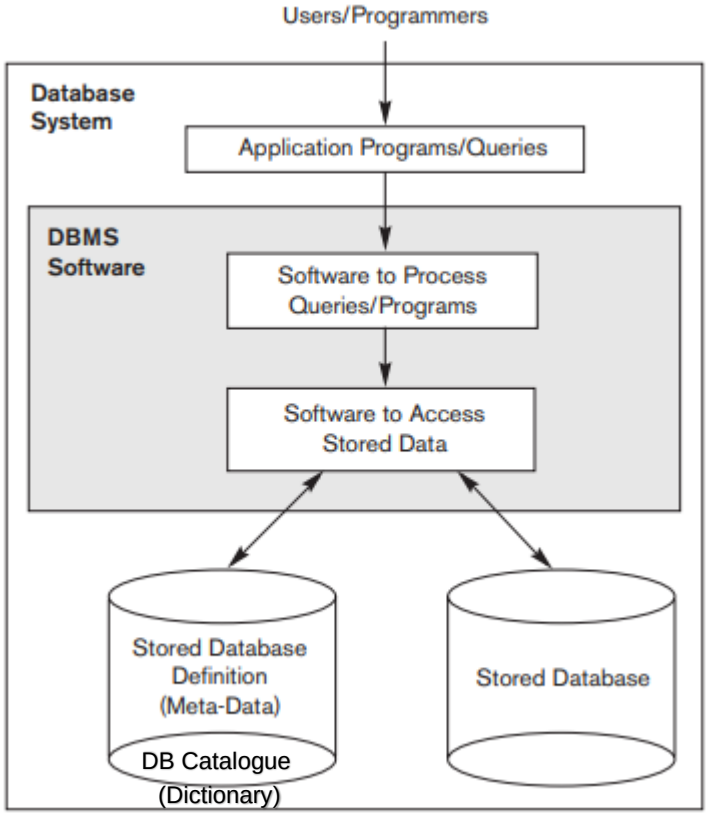
GRADE_REPORT

Student_number	Section_identifier	Grade
17	112	B
17	119	C
8	85	A
8	92	A
8	102	B
8	135	A

PREREQUISITE

Course_number	Prerequisite_number
CS3380	CS3320
CS3380	MATH2410
CS3320	CS1310

1.2 Database System Environment:



1.3 Actors on the Scene:

- **Database administrator (DBA)** is responsible for authorizing access to the database, coordinating and monitoring its use, and acquiring software and hardware resources as needed.
- **Database designers** are responsible for identifying the data to be stored in the database and for choosing appropriate structures to represent and store this data.
- **End users** are the people whose jobs require access to the database for querying, updating, and generating reports.
- **Software developers (Software engineers):**
    - **System analysts** determine the requirements of end users, especially naive and parametric end users, and develop specifications for standard canned transactions that meet these requirements.
    - **Application programmers** implement these specifications as programs; then they test, debug, document, and maintain these canned transactions.

1.4 Data Models, Schemas, and Instances:

Data Model:

- a collection of concepts that can be used to describe the structure of a database—provides the necessary means to achieve this abstraction.
- By structure of a database, we mean the data types, relationships, and constraints that apply to the data.
- we can categorize into:
    - **conceptual data models (high level):** provide concepts that are close to the way many users perceive data.
    - **physical data models (low-level):** provide concepts that describe the details of how data is stored on the computer storage media.
    - **representational (or implementation) data models:** provide concepts that may be easily understood by end users but that are not too far removed from the way data is organized in computer storage.

Database Schema:

- The description of a database is called the **database schema**, which is specified during database design and is not expected to change frequently.
- Most data models have certain conventions for displaying schemas as diagrams.
- A displayed schema is called a **schema diagram.**

Instance:

- The data in the database at a particular moment in time is called a **database state** or **snapshot**.
- It is also called the *current* set of **occurrences** or **instances** in the database.

1.5 Cycle of Creating Database and its Users:

step 1: Analysis and Requirements gathering

- Responsible: **System analyst**
- Gathering requirements from client.
    - what is the type of the business?
    - why you need database.
    - the main transaction in Database (update, retrieve, data analysis).
    - how many users will use Database and their job types.
    - Volume and rate of growth of data
    - what is the infrastructure of the organization networks.

- What is the budget assigned to the new project?

step 2: Design Database

Responsible: **Database Designer**

- convert requirements into design.
- create data model (conceptual schema).
- suggest the structure of the database.
- how tables and database objects should look like.

Step 3: implementation

Responsible: **Database Administrator (DBA)**

- Convert the design into tables and Database objects.
- Install DBMS.
- Create DB schema and populate data.
- Create Users and authorize access to DB.
- Users include Application Programmer
- Maintain DB performance.

Step 4 Application Development

Responsible: **Application Programmer**

- Develop, test and debug the application.
- create the user interface.
- test the system.
- train the end user.

1.6 DBMS Architecture (Three Schema Architecture)

- External Schema
- Conceptual Schema
- Physical schema

- We use 3 schemas. Why? for data independence
- that means if a change in low level schema happened the high level do not notice.

External schema

- concerns what the user will see and how the how the data will be presented to the user.
- Ex: Financial schema, HR Schema

Conceptual schema (the logical model)

- concerned with what is represented.
- define database structures.
- Ex: tables and constrains

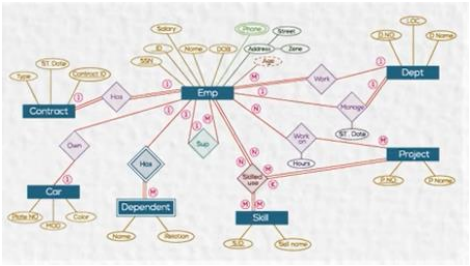
Physical schema (the physical Model)

- how the data is represented in the database.
- how data structures are implemented.
- explain the allocation of data on hard disk.
- it is like a map how my data is allocated on the hard disk (data, free spaces)

1.7 Data Models

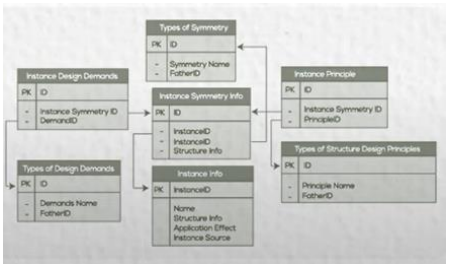
Conceptual Data Model

- provide concepts that are close to the way many users perceive data entities, attributes, and relationships.
- EX: ERD



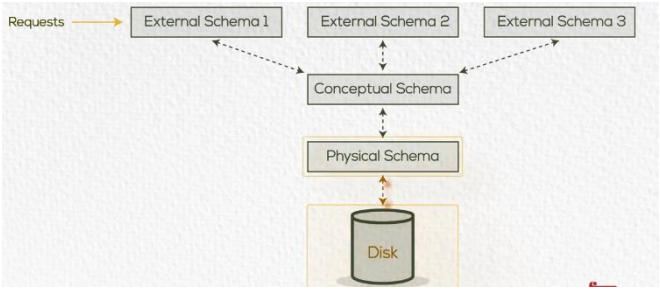
Physical data model

- Describe how data is stored in the computer and the access path needed to access and search for data.



1.8 Mappings

It is the process of transforming requests and results between levels.



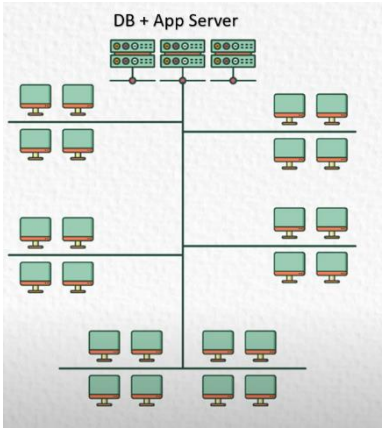
1.9 DBMS other functions

- store Text/Number/Image/Audio/Video
- Store Special Data
- Store Time series
- have in Data mining algorithm.

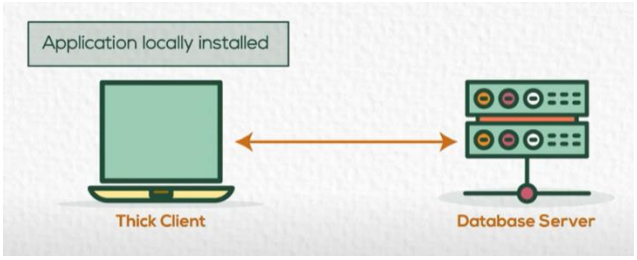
1.10 Database Environment

Centralized Database Environment

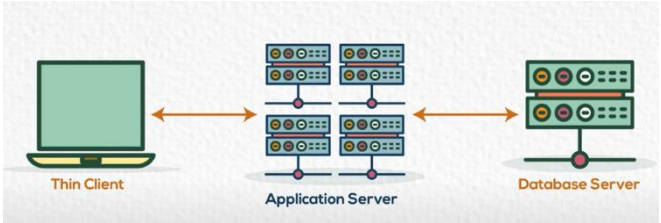
- **Mainframe environments.**



- **Client Server environment.**

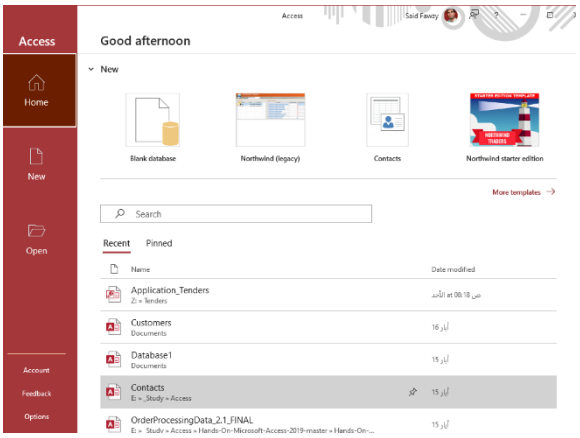


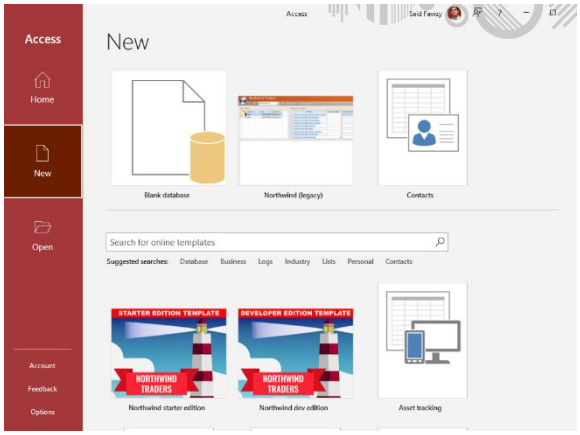
- **Internet computing environment.**

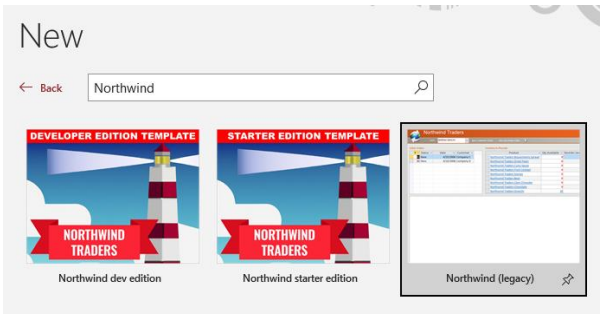


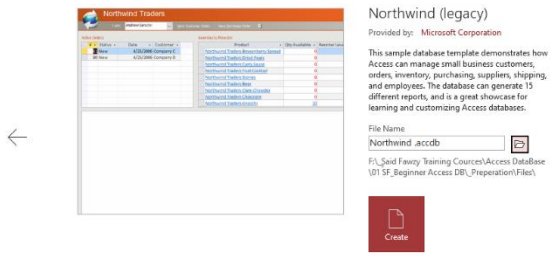
Chapter 2: Exploring MS Access

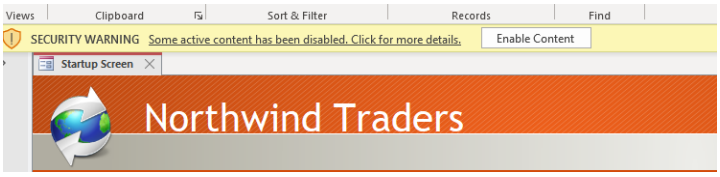
2.1 Task 1: Creating Database from template.

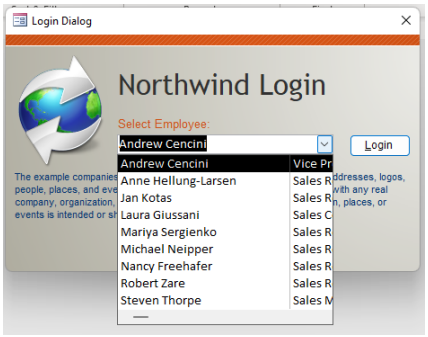




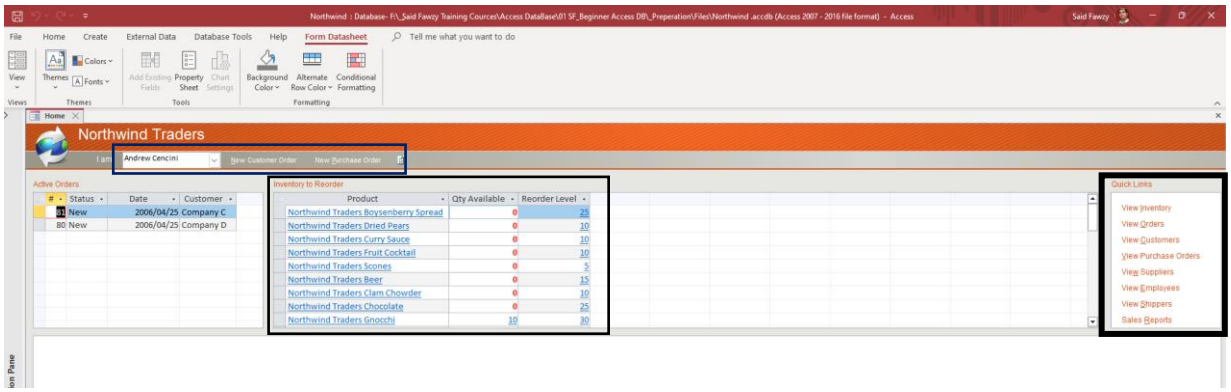




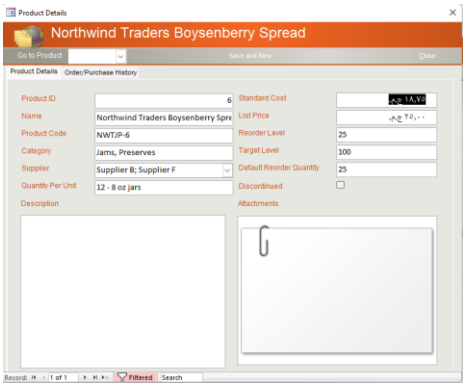




Home form :

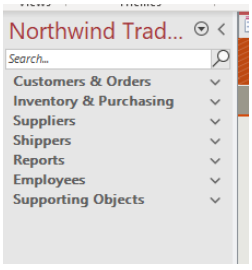


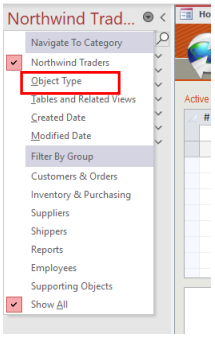
- Click on the first product.

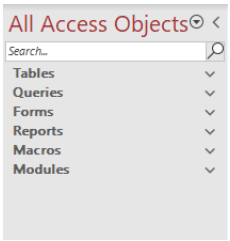


- Then close.
- Notice the collapsed navigation pane.

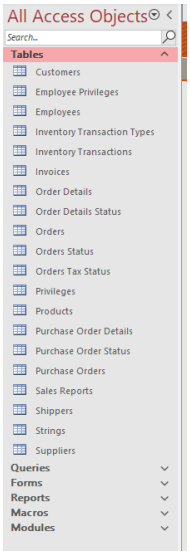
- Expand the Navigation pane.
- Get the view to the default view.
- Then explore each object type.

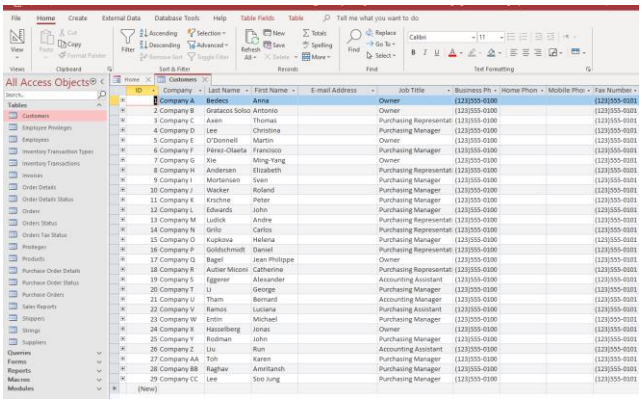


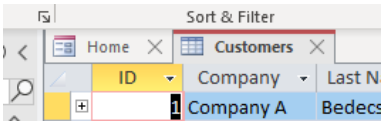




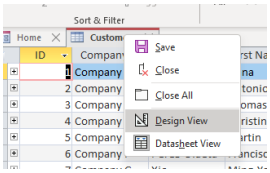
- Explore customer table.
- This Data sheet view.
- Columns are fields.
- Rows are records.
- Represent a company.

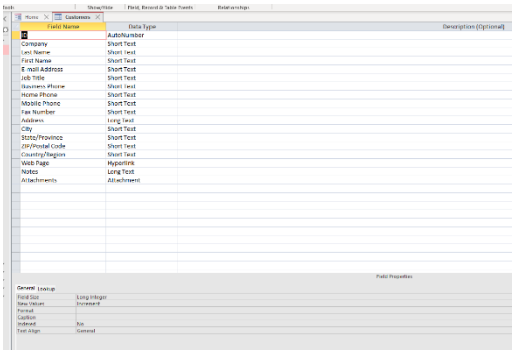




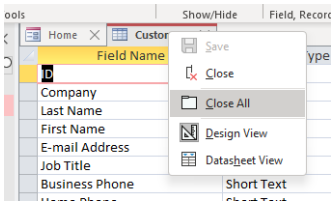


- Select design view.
- You use to create Tables.

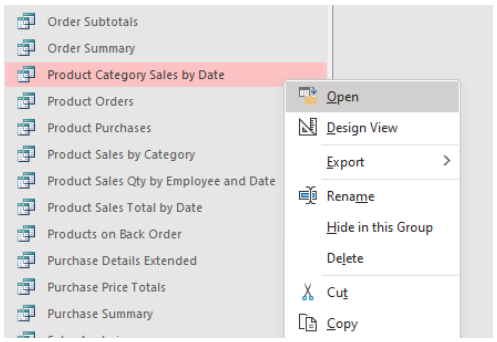




- Close all



- Explore query: Product Category Sales by Date.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Order Summary
Product Category Sales by Date
Product Orders
Product Purchases
Product Sales by Category
Product Sales Qty by Employee and Date
Product Sales Total by Date
Products on Back Order
Purchase Details Extended
Purchase Price Totals
Purchase Summary
Open
Design View
Export
Rename
Hide in this Group
Delete
Cut
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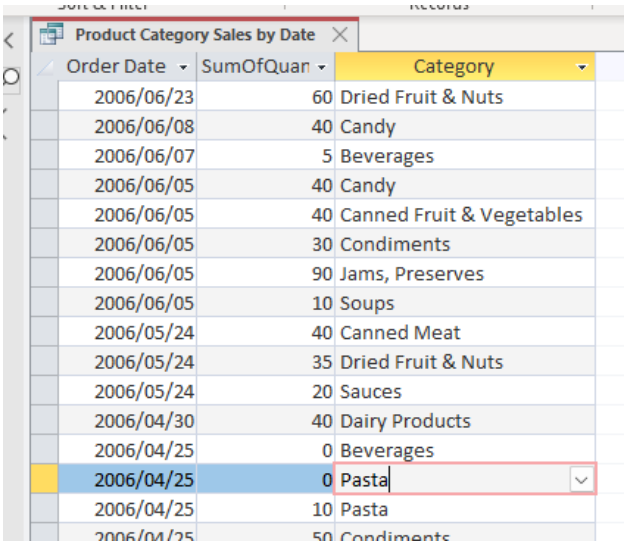
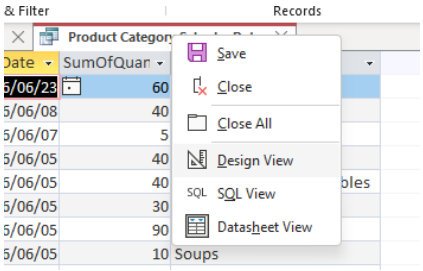

Product Category Sales by Date
Order Date
SumOfQuan
Category
2006/06/23 60 Dried Fruit & Nuts
2006/06/08 40 Candy
2006/06/07 5 Beverages
2006/06/05 40 Candy
2006/06/05 40 Canned Fruit & Vegetables
2006/06/05 30 Condiments
2006/06/05 90 Jams, Preserves
2006/06/05 10 Soups
2006/05/24 40 Canned Meat
2006/05/24 35 Dried Fruit & Nuts
2006/05/24 20 Sauces
2006/04/30 40 Dairy Products
2006/04/25 0 Beverages
2006/04/25 0 Pasta
2006/04/25 10 Pasta


& Filter
Records
Save
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Design View
SQL View
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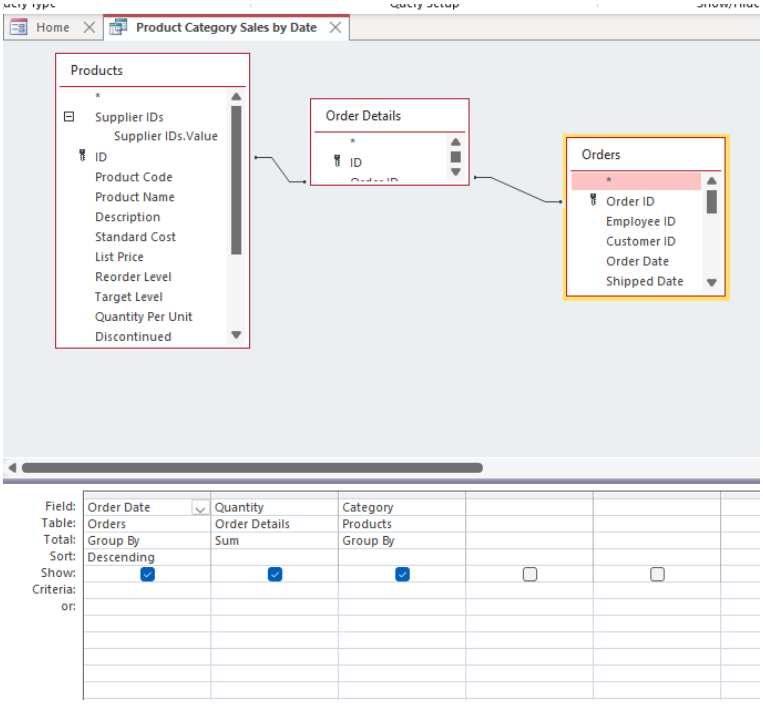
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Supplier IDs.Value
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Description
Standard Cost
List Price
Reorder Level
Target Level
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Order Details
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Orders
Order ID
Employee ID
Customer ID
Order Date
Shipped Date
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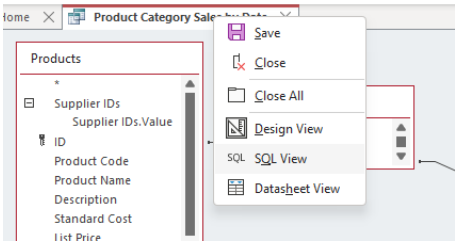
Total: Group By | Sum | Group By
Sort: Descending
Show:
Criteria:
or: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Close
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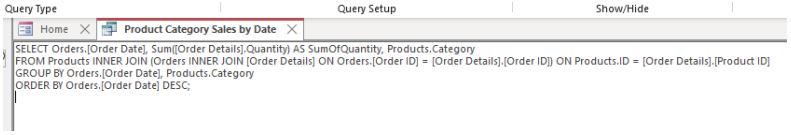
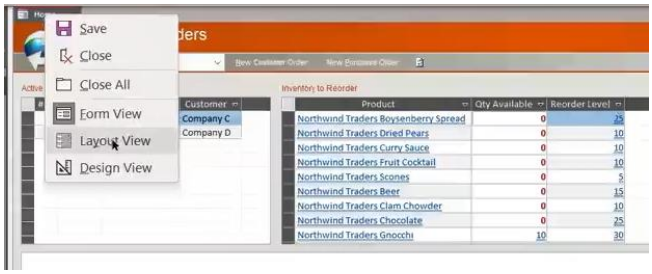
Design View
SQL View
Datasheet View
Products
Supplier IDs
Supplier IDs.Value
ID
Product Code
Product Name
Description
Standard Cost

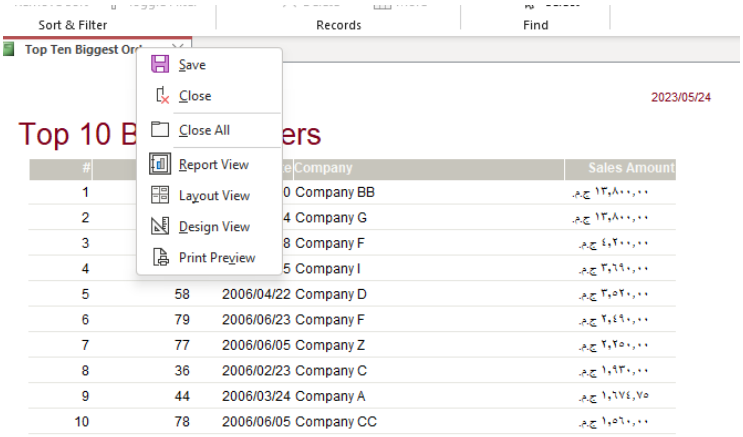

Query Type
Query Setup
Show/Hide
Home
Product Category Sales by Date
SELECT Orders.[Order Date], Sum([Order Details].Quantity) AS SumOfQuantity, Products.Category
FROM Products INNER JOIN (Orders INNER JOIN [Order Details] ON Orders.[Order ID] = [Order Details].[Order ID]) ON Products.ID = [Order Details].[Product ID]
GROUP BY Orders.[Order Date], Products.Category
ORDER BY Orders.[Order Date] DESC;

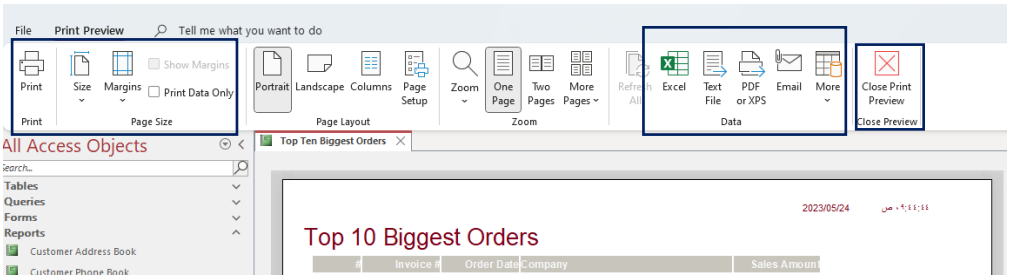
- Explore Home Form
- The layout view enables you to see the data while editing.
- Design view make you design and manipulate objects,



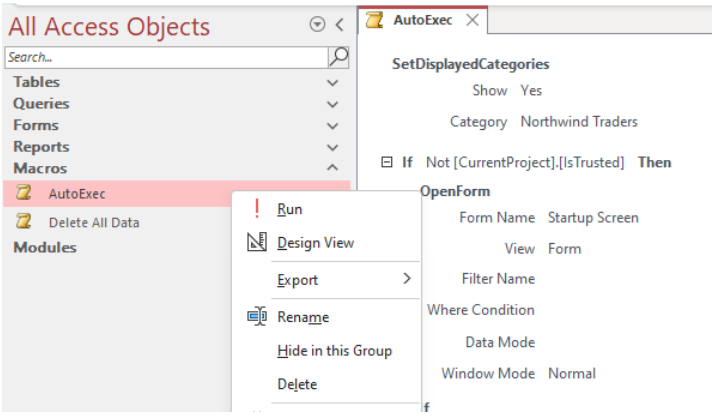
But you cannot see the data only fields names and labels.

- Explore Report: Top Ten Biggest Orders.
- Notice the Ribbon that appears when you are in Print Preview.

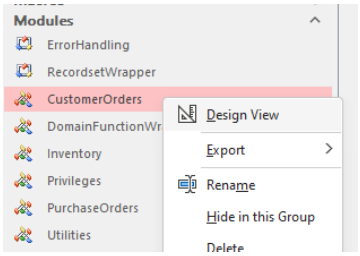


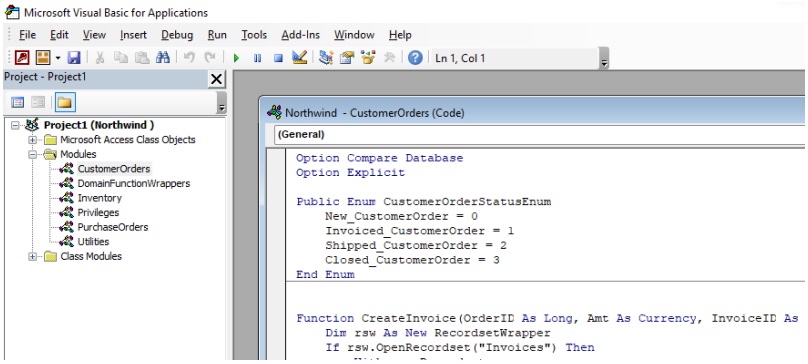


- Explore AutoExec Macro.

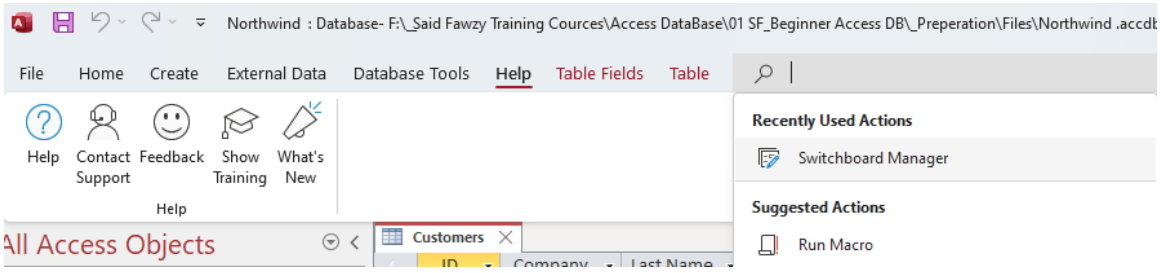


- Explore Customer Order Module and VBA Code.
- You can create Macro and convert it into VBA code.

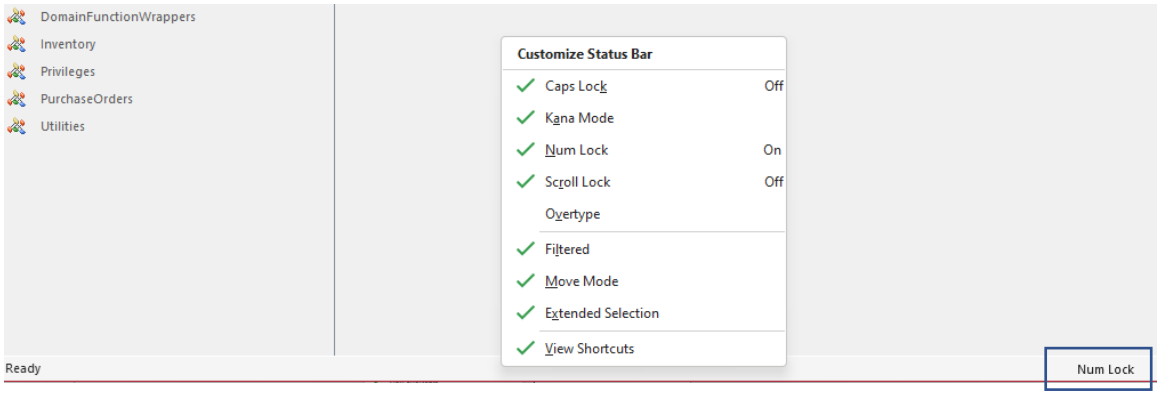




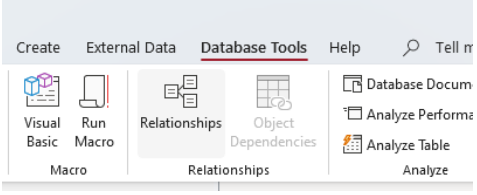
- Open Customer table and try to explore the Ribbons available.
- In Hep tab try: tell me what you want to
- This help you to reach area of the program you forget where is it.
- search for Switchboard Manager

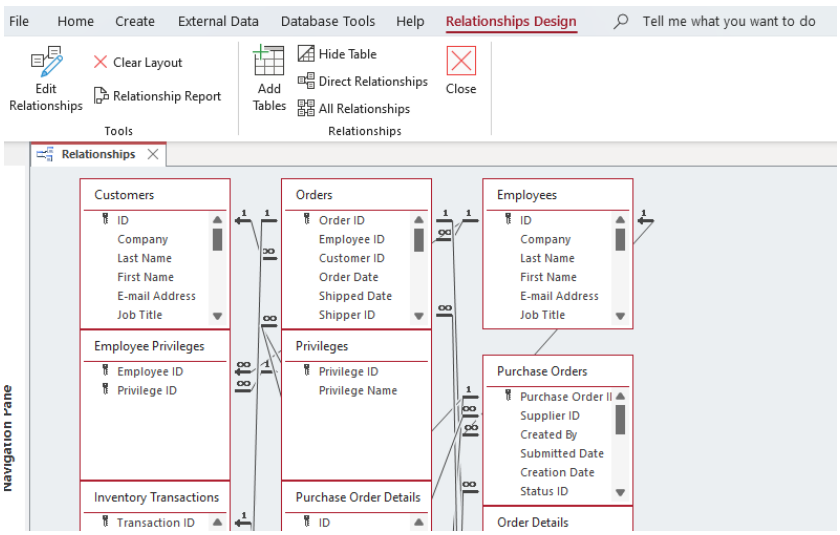


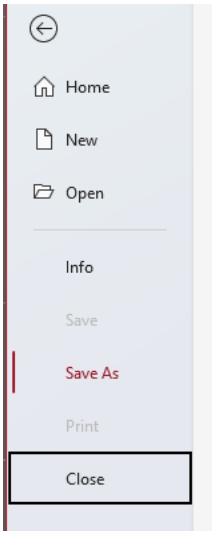
- Explore Status Bar try Cabs Lock ,Num Lock



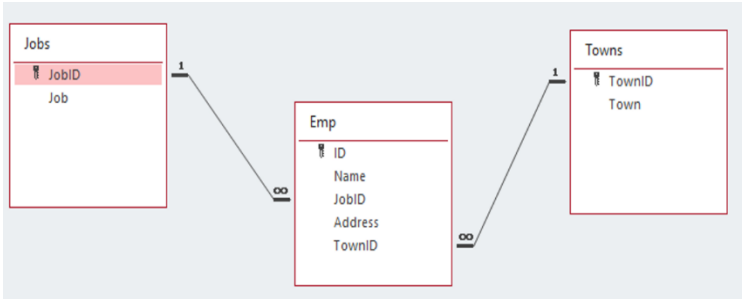
- Explore Relationship Diagram
- Then Close the Nortwind Database.







2.2 Task 2: Be a RDMS for a 10 minutes.



Chapter 3: Entity Relationship Diagram ERD

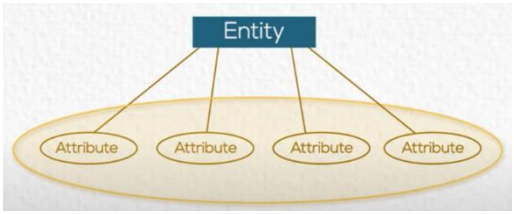
3.1 Definitions

Entity Relationship Modeling

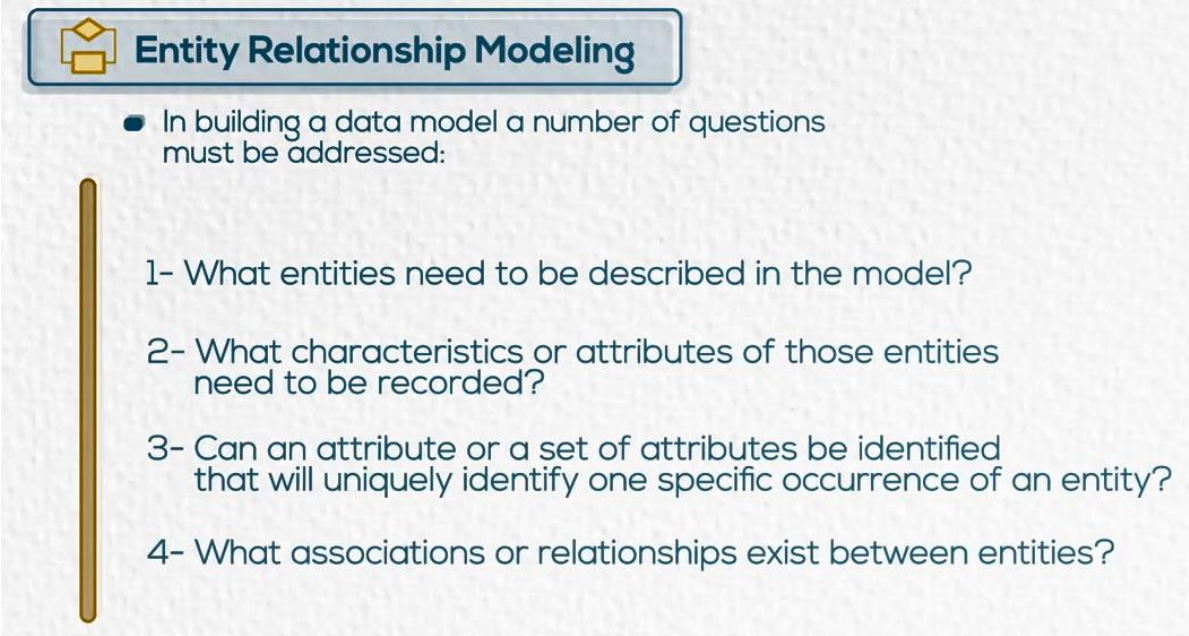
- It is a way to help me create conceptual design.
- Identifies Information required by the business.
- displaying relevant entities and,
- relationships between them

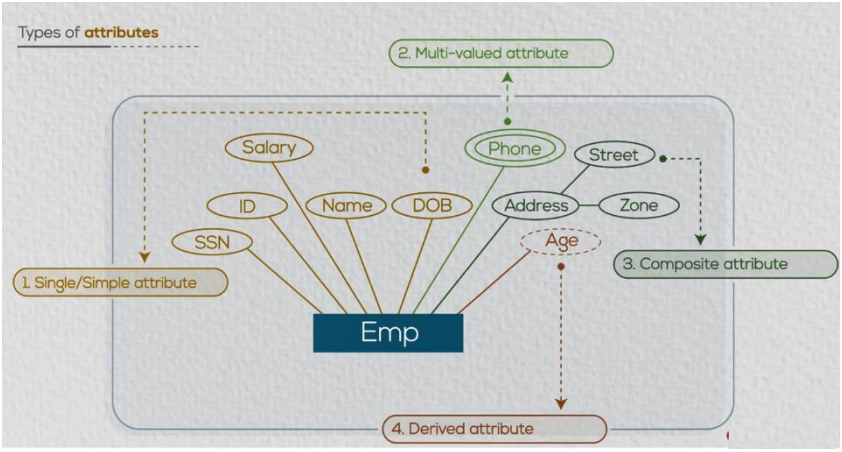
Entity

- Is a thing in the real world with an independent existence, physical existence or conceptual existence.



3.2 Build ERD





3.3 Task 3: Create ERD

We want to build ERD for a company to record data about.

- Employees
  - SSN, ID, Name, Salary, DOB, Phone, Address(street, Zone) , Age

- Departments
  - D No, D Name, LOC
- Contracts
  - Type, ST. Date, Contract ID
- Projects
  - P No, P Name
- Skills
  - S.ID, Skill Name
- Dependents
  - Name, Relation
- Cars
  - Plate No, MOD, Color

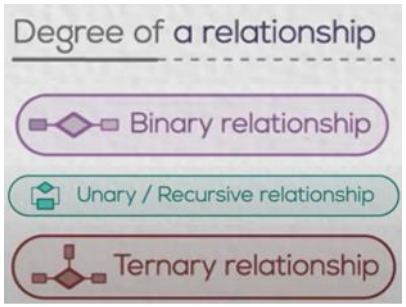
  Use the template in the following Page.

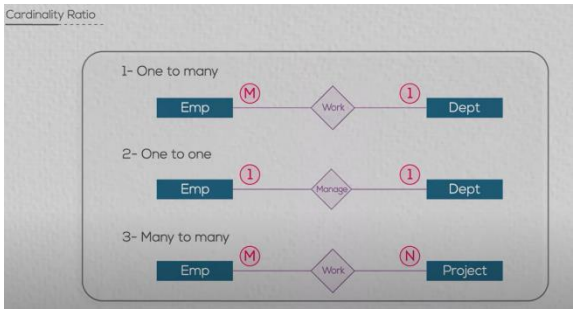
3.4 Activity 1: Create your own ERD

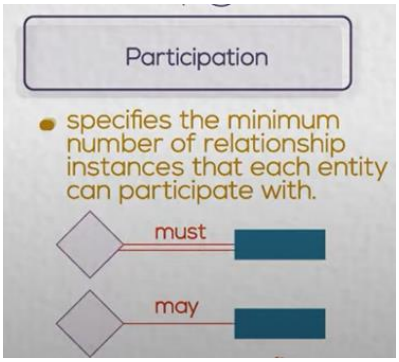
- Divide Class into groups.
- Each group chose a DB project.
- Define Entities
- Define Attributes
- Define Unique Identifiers.

3.5 Relationship

- A relationship is a connection between entity classes.
- For each relation we must define:
  - Degree of relationship
  - Cardinality of relationship
  - Participation







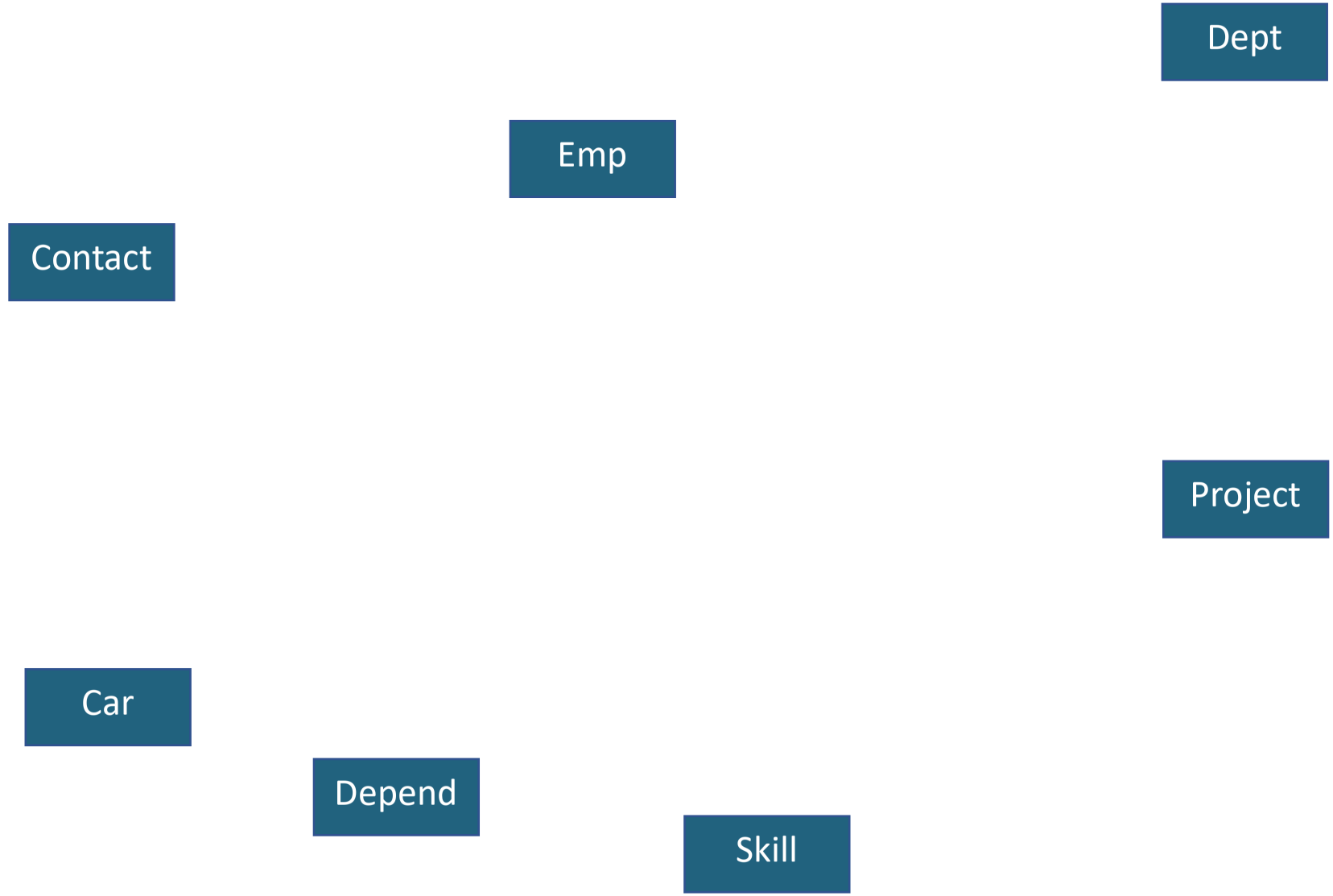
3.6 Task 4: Define Relationship in ERD

- Use your previous ERD from Task 3 to define relationships:
    - Degree of Relationship
    - Cardinality Ration
    - Participation

3.7Activity 2: Define Relationships

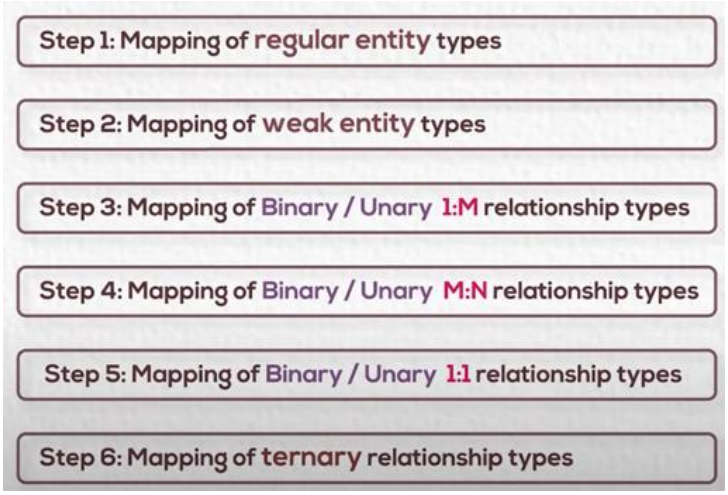
- Divide Class into groups.
- Each group complete its chosen DB project.
- Define Relationships:
    - Degree of Relationship
    - Cardinality Ration
    - Participation

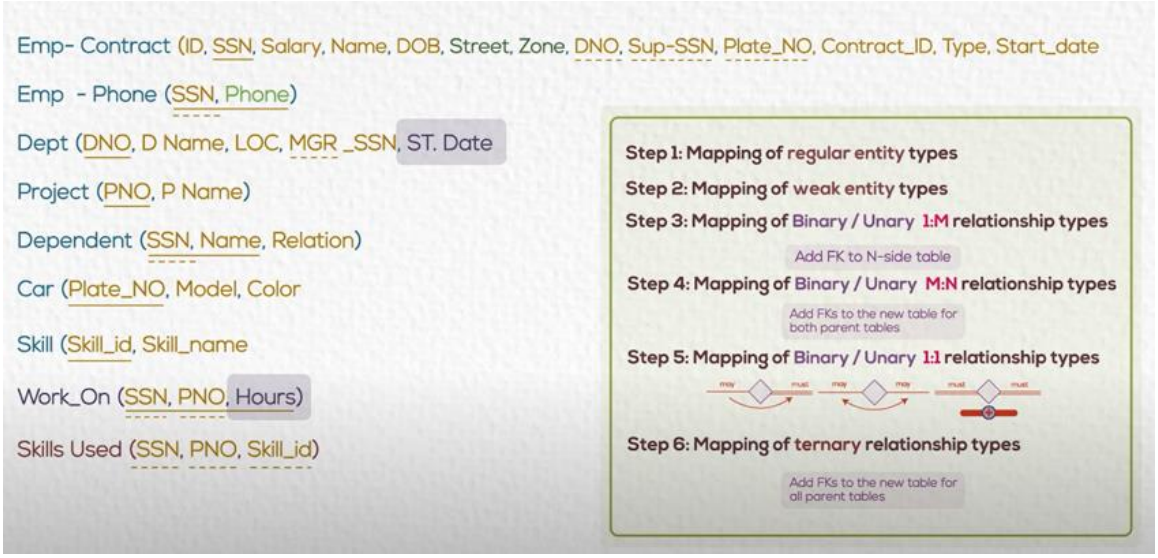
Entity relationship diagram (ERD)



Chapter 4: Logical Model

4.1 Task 5: ERD Mapping to tables



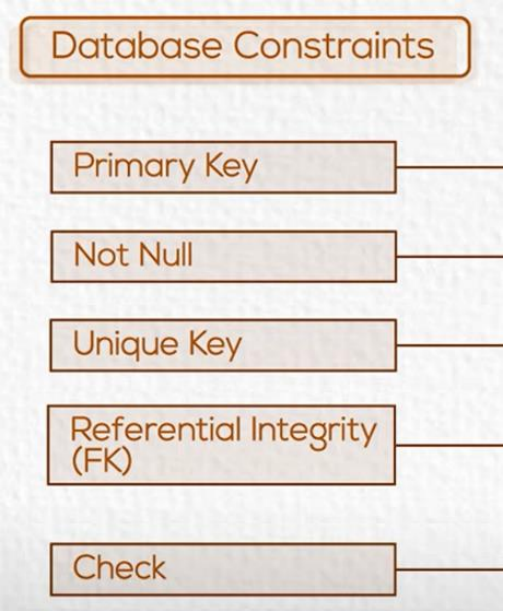


4.2 Activity 3: Map your Conceptual model to table.

- Use your conceptual model in activity to convert them into tables.

4.3 Database Constraints

Restrictions on Database table or object to help **maintain Integrity of data**.



Chapter 5: Tables in MS Access

5.1 Task 6: Create ERD for Customer Database

We need to collect data about:

- **Customer**: ID, Name, Address (address1, Address2, City, State, Zip), Phone, Email, Active State.
- **Employee**: ID, Name (First, Last), Extension
- **Category**: ID, Name.
- **Product**: ID, Name, Price, Manual
- **Order**: ID, Order Date, Ship Date, Quantity of each product.

Rules:

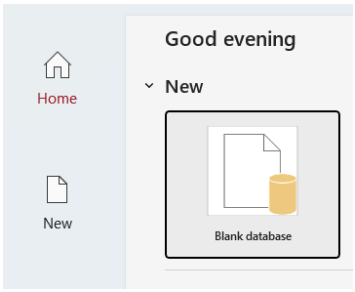
- Each order is for one customer.
- A customer may have many orders.
- An Employee can serve many customers.
- A customer is served by one employee.
- Products are classified into categories.

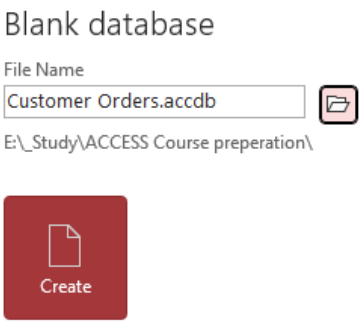
5.2 Task 7: Convert ERD to Logical Design

- Convert the customer Conceptual design into tables Relationship diagram.

5.3 Task 8: Create Tables in MS Access

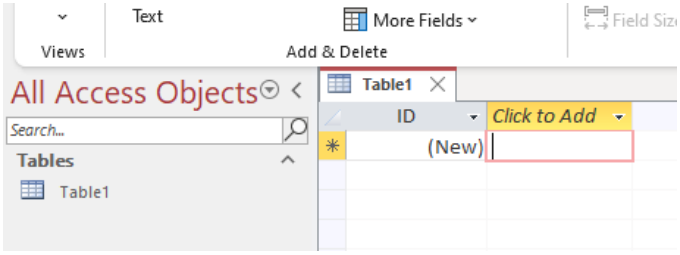
- Create Blank Database Customers

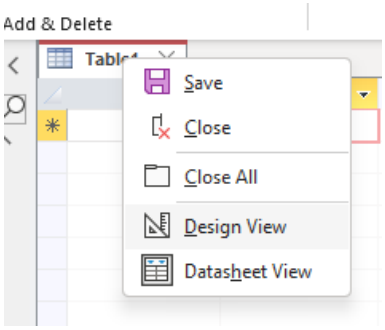




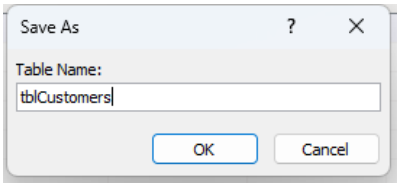
- You got a blank table (table one) with one field ID in **Datasheet view.**

- Switch to **design View.**

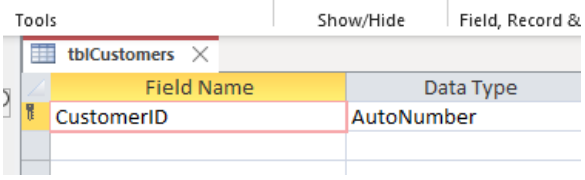




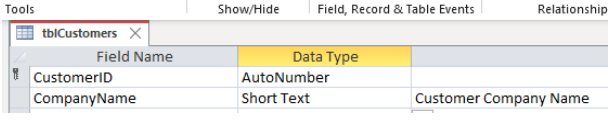
- Name the table **tblCustomers.**



- Rename the field to CustomerID.
- Notice the key beside the field, as it is the PK.
- Keep the Data Type as AutoNumber.
- Notice Description is optional.

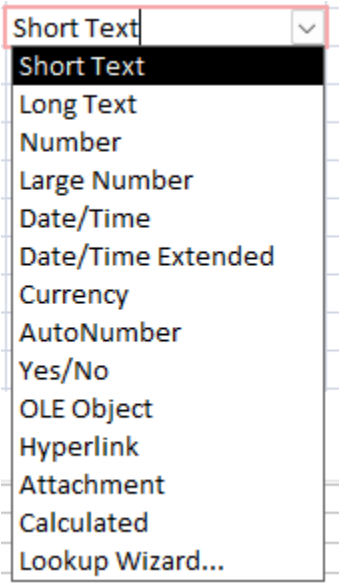


- Create Company Name Field with type Short Text (255 Character).
- Add a Description to the field: Customer Company Name



- Description shows in the status bar of **Forms** or **Datasheet view**.

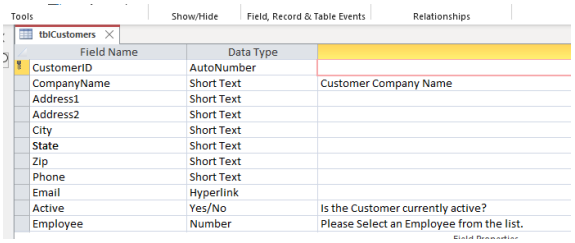
- Open the Menu to explore other Data Types available.



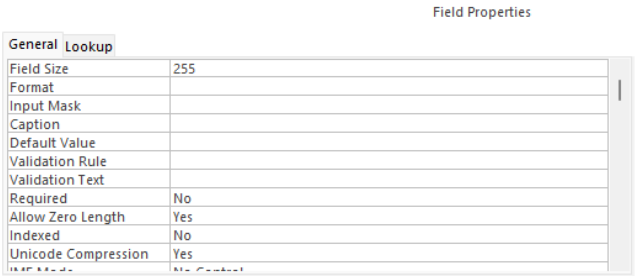
- Now complete the rest of the fields:

    - Address1(short Text).
    - Address2(short Text).
    - City (short Text).
    - State (short Text).
    - Zip (short Text).
    - Phone (short Text).
    - Email (Hyperlink).
    - Active (Yes/No).
    - EmployeeID (Number).

- Your screen should look like this.

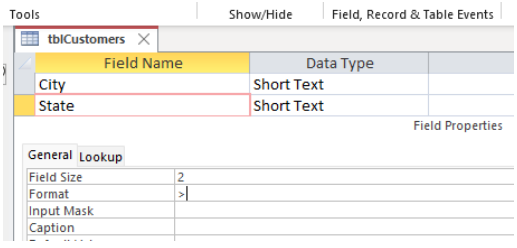


- Notice you have on the bottom half of the screen the field property.
- You have two tabs, General and Lookup.
- The property changes depending on the data type of the field.

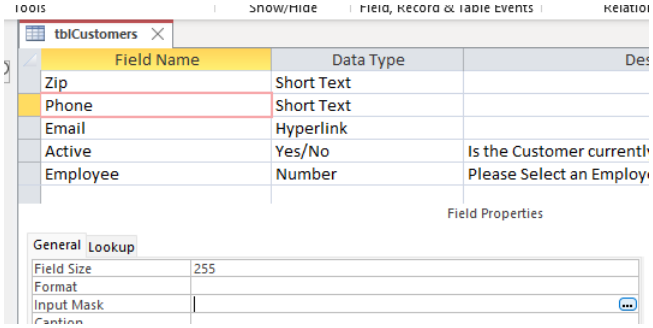


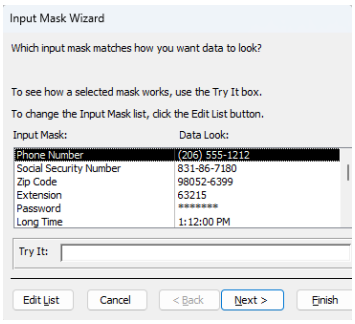
-

- Make the State field size 2 character only, and make it Capital changing its format to >

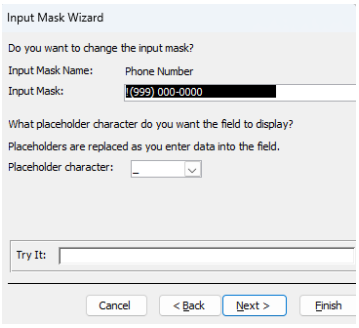


- For Phone use the input mask wizard to make the format standard for all input.



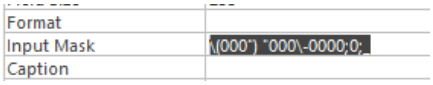


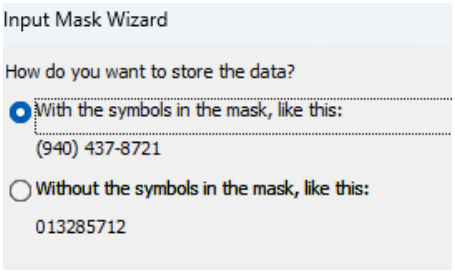
- (999) ..9 Means an optional Number (no area code is required).
- ! means if the optional is not entered start with the right part.
- We need area code to be required so delete (!) and change the (999) to be (000).



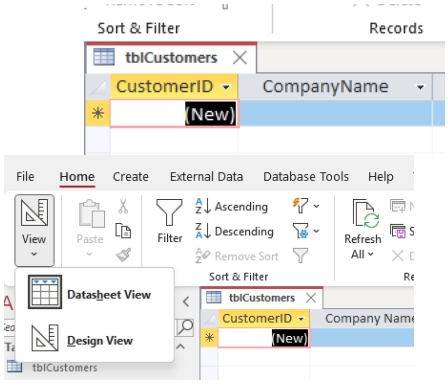
- Chose to export data with the phone format.

- Finish the wizard to get the input mask.

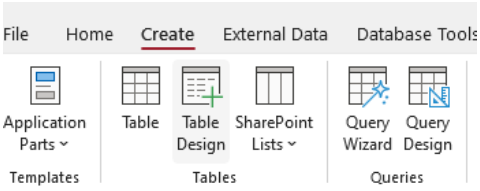




- Go to **the Data sheet** view of Customer table.
- Notice the header of CompanyName is the same as the field name.
- Get back to **Design view** and change the Caption property to **Company Name**.



Create Employee Table

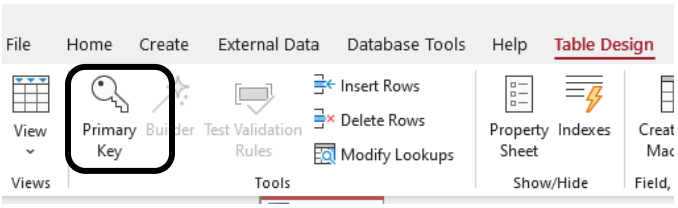


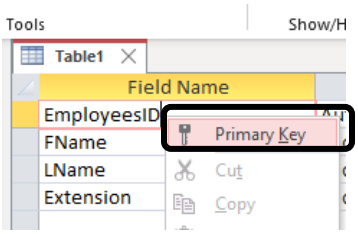
- Go to Create ➔ table Design.
- Create tblEmployees table.
- Create the fields:
  - EmployeeID (AutoNumber) PK.

- FName (Short Text).
- LName (Short Text).
- Extension (Short Text).

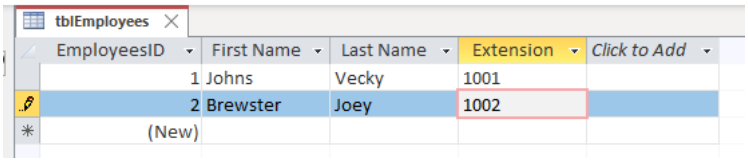
- **Question**: why we did not use Number data type for extension?

- Make EmployeeID a **PK**



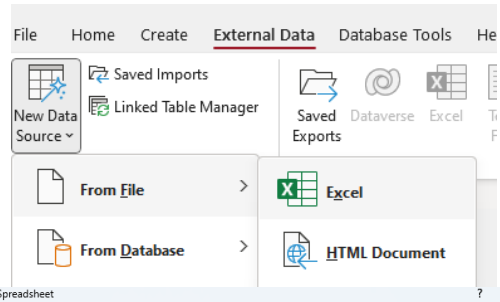


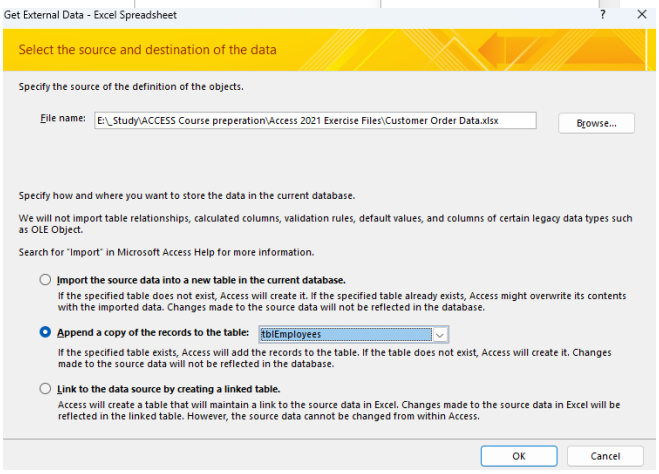
- Make the **Extension** size 4 Characters.
- Change Caption for **FName** and **LName** to First Name and Last Name.
- Take a look at **Datasheet view**.
- Enter Two Records in the table manually.
- Notice the Pencil icon while record is in Edite mode, and it disappears when it is saved.



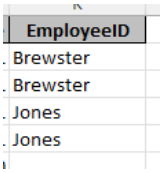
Import External Data to a table

- Go to External Data ➔ Import & Link Group ➔New Data ➔From File ➔ Excel.
- Browse to the **Custmer Order Data.xlsx** file.
- Chose to **append data** to **tblEmployees** table.
- Chose **Employees** sheet.
- Finish the wizard.
- Open tblEmployees table in Datasheet View to review that the data imported successfully.





- We want to import Customers data from excel file.
- Open the excel file to see the data before you import.
- Notice EmployeeID is text not number.
- Close the file Do the same steps to import customer Data.
- Chose customer worksheet.
- Accept the error that appears.



EmployeeID
Brewster
Brewster
Jones
Jones

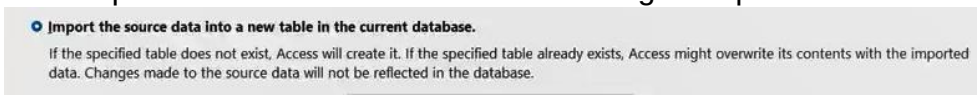
- Open tblCustomers and notice all data has been imported but EmployeeID
-

CustomerID	Company Name	Address1	Address2	City	State	Zip	Phone	Email	Active	EmployeeID
1	Astro Advertising	1 Adams Way		Atascadero	CA	93422	(805) 555-1234		☑	
2	Bearcat Boosters	2 Bounty Blvd		Boise	ID	83713	(208) 555-3423	betty@bearbo	☑	
3	Cavalier Crafts	3 Clark Dr		Clackamas	OR	97015	(503) 555-3890	chris@cavcraft	☑	
4	Dashing Daisies	4 Duke Drive		Downers Grov	IL	60515	(630) 555-8977	darlene@dash	☑	
5	Eastern Eardrums	5 Elm Ave		Ellicott City	MD	21042	(227) 555-2456	esther@easte	☐	
6	Firebird Fire Sprinklers	6 Foster St		Falls River	MA	02720	(339) 555-3422	fred@firesprir	☐	
7	Grappling Grapes	7 Grove Way		Grapevine	TX	76051	(817) 555-4443	grace@grapgra	☑	
8	Harry's Hardware	8 Hive St		Homedale	ID	83628	(208) 555-8797	harry@harrysh	☑	

- Use XLookup function in Excel to get the EmployeeID and paste it in the EmployeeID Field:

```
=XLOOKUP(K2;Employees!$B$2:$B$28;Employees!$A$2:$A$28)
```

- Now import the rest of data to new table using the option:



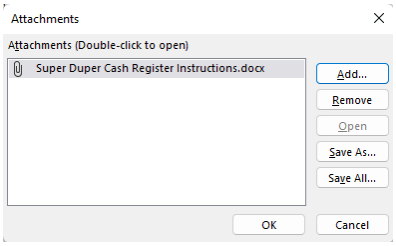
-

- Import Data and Create the tables :
  - Category
  - Product
  - Order
    OrderDetails.
- Take care to:
  - Do not change Data Type in Wizard.
  - Choose your PK for each table.
  - Change the names of tables to:
    - tblCategory
    - tblProduct
    - tblOrder
    - tblOrderDetails

Go to tblProdutc

- In **Design View**.

- Notice PK is short Text and see the data in Excel sheet.
- Go to **Datasheet View**.
- Notice that Manual is 1 and 0
- Go to **Design View**
- Change Captions for Product Name.
- Try to Change ProductManual to Attcahment
- An Error Message appears.
- Insert a line before CategoryID
- Create a new field Manual as attachment type.
- Delete ProductManual Field
- Go to **Datasheet View** and notice the paper clip icon in Manual field.
- Right click **Super Duper Cash Register** Product in the Manual field and chose Manage Attachment to add an attachment file from the File Folder of your Material.



- Do the same for **Simple Cash Register** Product.
- Notice that you get (1) in the manual field.
- To view the attachment do the same but chose **Open** instead of **Add.**
- Also use the same for remove or add more attachments.
- Go Back to **Design View** and give Manual field a Caption.

Go to tblOrder table :

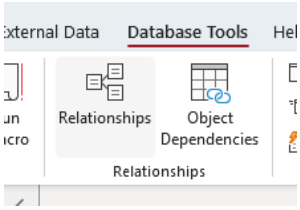
- try to Change OrdedrId to Autonumber ➔ Error.
- Create a new PK field Autonumber and delete the old one.
- Create Caption to OrderDate and ShipDate Fields.

Go to tblOrderDetails table:

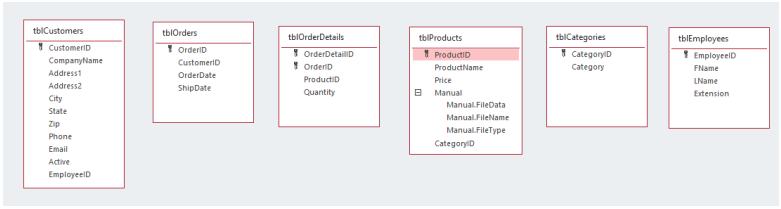
- Create new PK AutoNumber Field for OrderDetailsID a before.
- Create a Composite PK from OrderDetailID and OrderID.

5.4 Task 9: Creating Relationships

- Go to Database tools ➔ Relationships.
- The tables are in the Add Table Panel.
- Select all tables and press add selected tables.

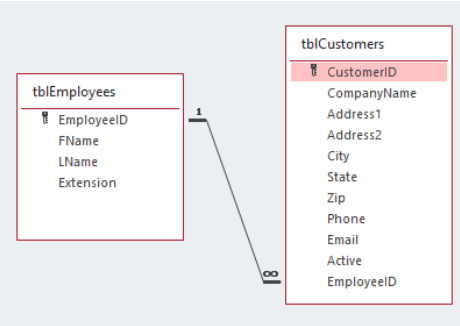


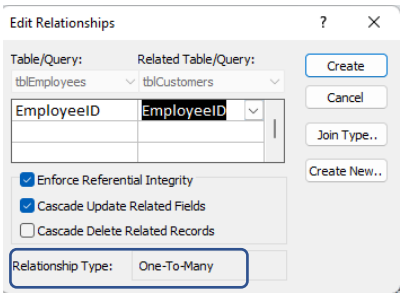
- Arrange the tables and make fields appear as much as you can.
- Notice the Manual field contains 3 parts.
- Collapse Navigation Pane and Add tables Pan to have more space.



- Drag and Drop field **EmployeeID** form tblEmployees to the **EmployeeID** field in tblCustomners.

- In the Edit Relationship Dialogue box chose **Enforce Referential Integrity** (it means not allow orphaned records**)** and **Cascade Update Related** Fields.



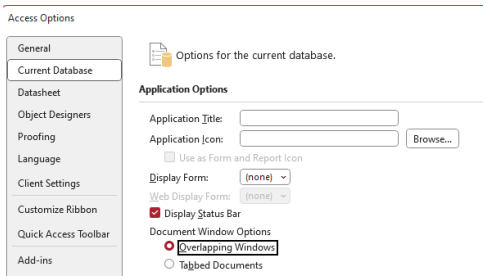


- Create Relation between tblProducts and tblOrderDetails.

- Try to connect tblCustomers with tblOrders ➔Error.
- That is because we brought data from Excel with wrong data types.

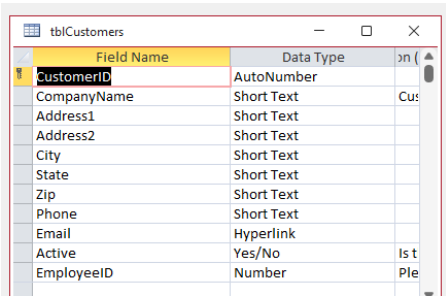
- Save your Relationship diagram and close.

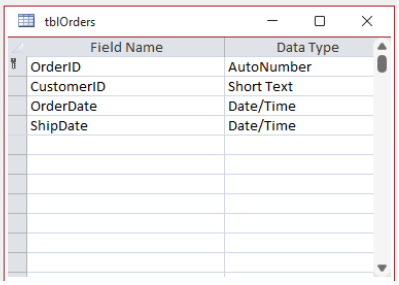
- Go to File ➔ options ➔ Current Database
- Change the Document window option ➔ overlapping windows.
- Close and reopen your database.



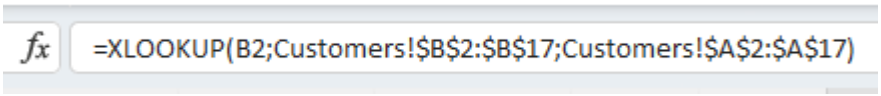
- Open tblCustomers in Design View and resize it.
- Do the same to tblOrders.
- Side by side compare data types.
- Go to tblOrders in datasheet view and see the data.
- Notice CustomerID is Text Data.
- Get Back to Design View
- Change the Data type to Number.

- That would delete all data in the field.
- Go and see the datasheet view or tblorders.
-

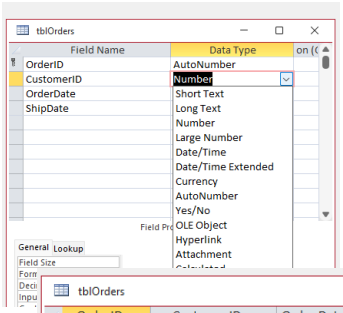


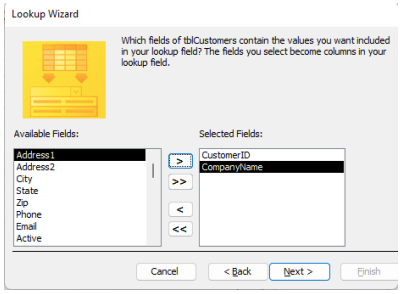


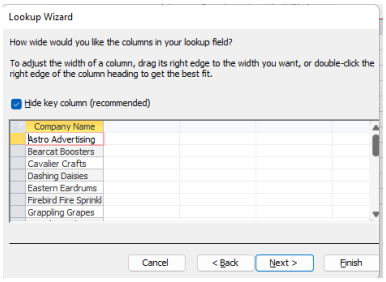
- In Excel Orders sheet use XLookup to get the CustomerID and paste in tblOrders.
-

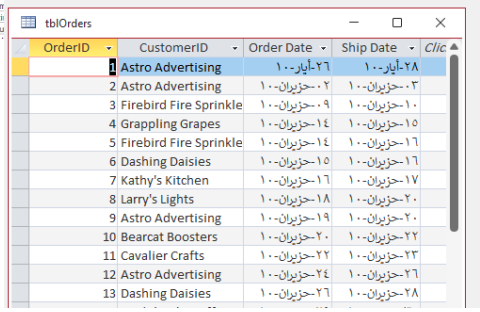


- Go to tblOrder Design view and use Lookup Wizard in data type to get the data from tblCustomers and show the Name of Customer but save its ID.
- It is one Advantage of Access Database.
- It also Create relationship for you.







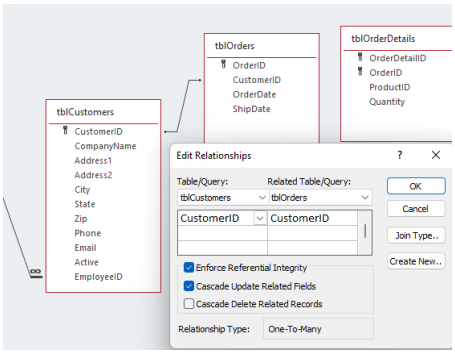


- Close all and go to Relationship Diagram

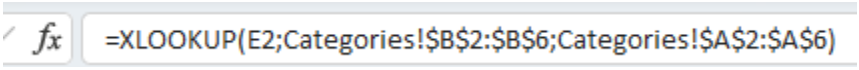
- Edit the new relationship created for you between tblOrders and tblCustomers.

- Now try to have relation between tblOrders and tblOrderDetails ➔ Error.

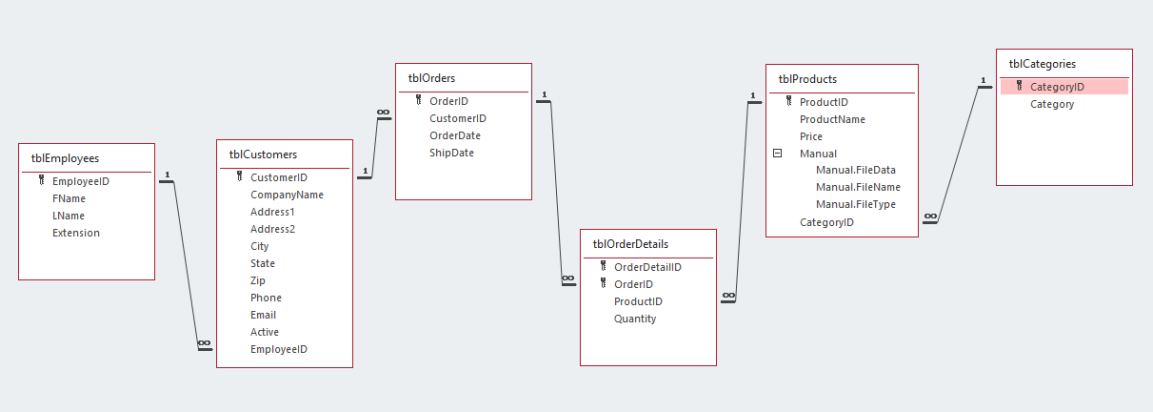
- Go to design views and fix the problem (hints change OrderId to long integer in



order details to match). Then Create the relationship.

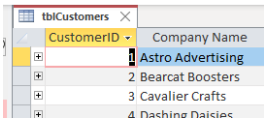
- Also, you will get error when trying to link tblCategories and tblProducts.so try to fix yourself as we did before.
    - Change CategoryID intblCategory to AutoNumber.
    - Change CategoryID to Number in tblProducts
    - Use XLookup in Excel to get data and
    - use lookup wizard in Design view.
    - Modify the relationship.
- 

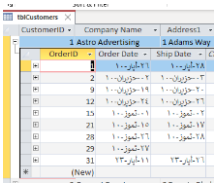
Your final Relationship Diagram

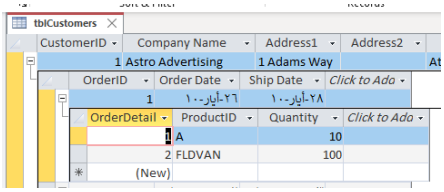


Note

- If you go now to tblCustomers.
- Notice there are “+” sign before each customer.
- If you click it will give you all orders this customer has.
- Also if you click the “+” in order table you got the order details.







Chapter 6: Structured Query Language (SQL)

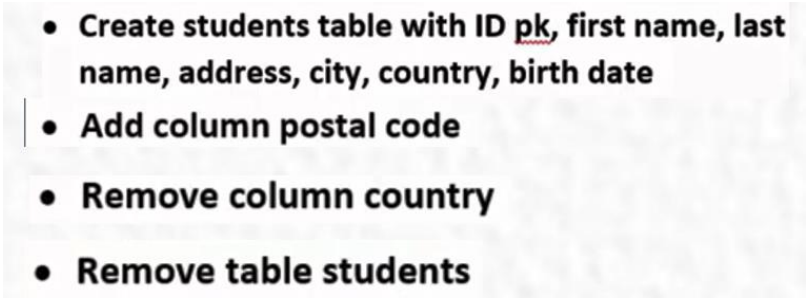
- SQL is the language we use to deal with databases.
- It has 3 main Categories:
    - **DDL** (Data Definition Language).
    - **DML** (Data Manipulation Language).
    - **DCL** i(Data Control Language).

6.1 DDL (Data Definition Language)

- They are the commands responsible for the structure of Data.
- It helps me to Create, Edit, and Delete the Data structure.
- It includes commands:
    - **CREATE**
    - **ALTER**
    - **DROP**
    - **TRUNCATE**

6.2 Task 10: DDL Language

- Create new database **Students**.
- Create Query and change to SQL and chose data definitions.
- Do the following:



You can use data in **01 SQL-DDL Commands.txt** file.

Chapter 7: Query Basics in MS Access

- We usually use query to get different view of data or
- Filter the data on criteria.

7.1 Task 11: Create Query Using Wizard

- Get your current database to be tabbed documents again from optins.
- Open tblCustomers in **Design View** and convert EmployeeID field to a lookup from tblEmployees ➔ Error.
- Close the table first, Go and delete the relationship.
- Go back to lookup wizard.
- We need to show the LName.
- Finish your table design and go to adjust the created Relationship.

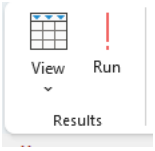
- Go to Create ➔ Queries Group ➔ Query Wizard
- Chose: Simple Query Wizard
- Select tbProducts: ProductID,ProductName,Price CategoryID.
- Chose to show detailed Query.
- Name your query: **qryProducts**
- It will shows in Queries Object in Navigation Pane.
- Close the query.

- Create another simple query.
- Use tblCustomers table.
- Fields: CompanyName, Phone, Address1,City,State,Zip,EmployeeID.
- Name your query: **qryCustomers.**

7.2 Task 12: Create Query using design view

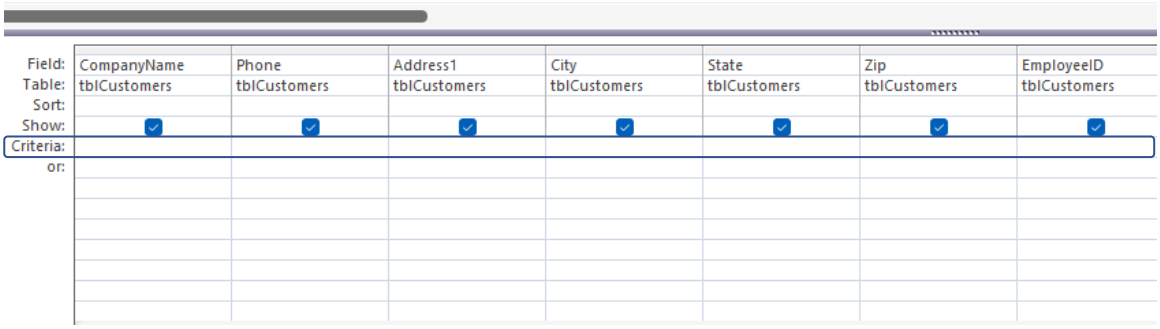
- Right click your qryProducts and open in Design view.
- This is the view if you create a query using design view.
- Delete your qryProducts.
- We will recreate using design view
- Go to Create➔ Queries ➔ Query Design
- A query one tab open
- From Add Table pane select tblProducts
- Double click fields:ProductId,ProductName,Price,GategoryID.

- Name your query:qryProducts.
- In Query Design Ribbon select **Datasheet view**.
- Or run the query.

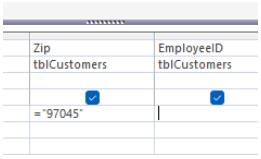


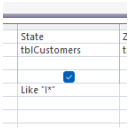
7.3 Task 13: Customize Query with Criteria

- Open qryCustomers in Design View.
- We want to see customers that live in a specific zip code.
- Notice that in the grid you have a criteria cell.



- In Criteria cell under zip code write : =97045.
- Press tab key and notice it puts “” around the number.
- Run the query.
- You got only 2 customers.
- Go back to Design View.
- Delete the criteria you entered before.
- Now we want see customers that their State starts with letter “I”.
- To do so use **Wild Cards.**
- In State criteria write I* then press tab key
- *** Means any number of characters.**
- Notice that Access adds key word: **Like.**
- Run your query.
- Get back to Design view.
- Delete your criteria and close query.
- You can right click the query and paste it with different names and change criteria in each and save.



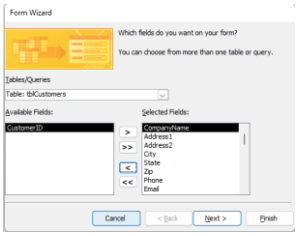


Chapter 8: Form Basics in MS Access

- We usually do not enter data directly into tables.
- We use forms to make it easy.

8.1 Task 14: Creating a Form Using Wizard

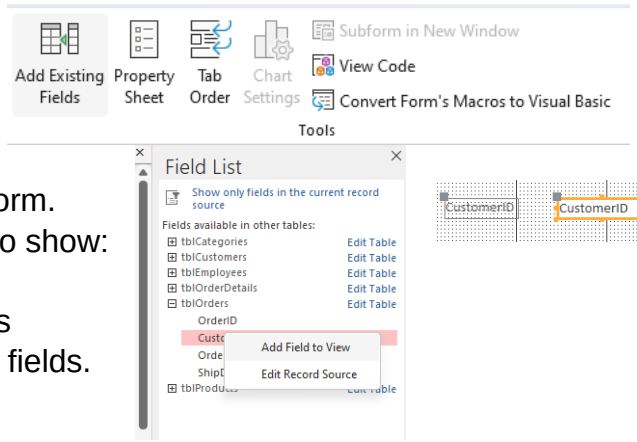
- Go to Create ➔ Forms Group ➔ Form Wizard
- Chose tblCustomes.
- Include all fields except CustomerID.
- Use >> then <
- CustomerID is an AutoNumber.
- Choose Columnar as Layout.
- Name the form: **frmCustomers**.



- Go to form **Layout View.**
- It is the view you can change design while seeing your data.
- Change Title to: **Customer Information Form**.
- Expand and adjust the title.
- Go back to **Form view.**
- Close and save your form.
- Let us create another form using Wizard.
- Create a form based on tblEmployees
- We need all fields except EmployeeID
- Go to Layout View
- Rename the title to **Employees Form**
- Save and close.

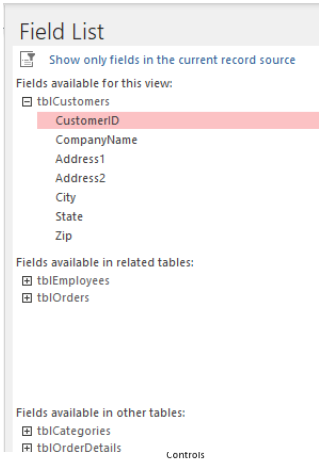
8.2 Task 15: Create a form Using Design View

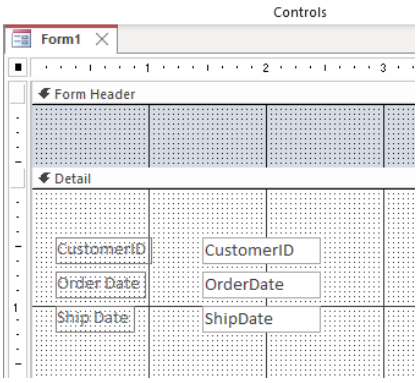
- Go to Create ➔Forms Group➔Form Design
- In Ribbon Tab Form Design click on Add **Existing Fields** in the Tools Group to open **Field List** Pane.
- Click the link: **Show all Tables**.
- Expand tblOrders.
- Right click field CustomerID and chose: **Add Field to View**.

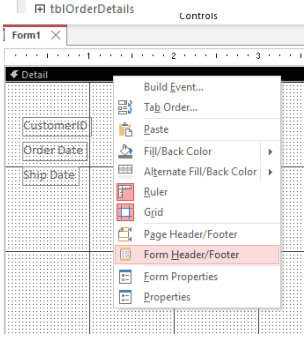


- Access Add **Label** and **Field** to your form.
- Notice now that the field list changed to show:
  - Fields from tblCustomers table.
  - Fields available in related tables
  - Other tables and their available fields.

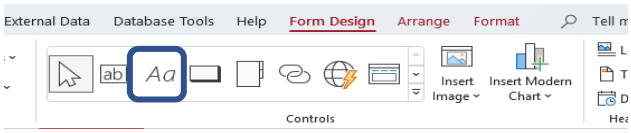
- Expand **tblOrders** table again and add field **OrderDate**.
- You can double click.
- Notice the tbleOrders has expanded in the **Fields available in this view** area.
- Add **ShipDate** Field.
- Go to **Form View** to see your design.
- Go back to Design View.
- Notice you are working on the **details section**.
- Right click the section and chose **Form Header Footer**.
- Expand the Header section so you have more space.





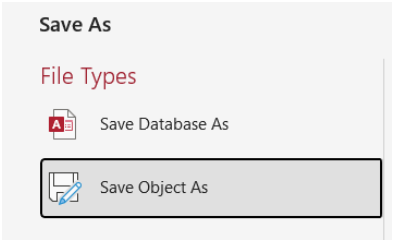


- Notice that you have many controls under the form Design Ribbon.
- Select **Label** Control.
- Draw a label in Header section.
- Write Title: **Customer Order Date Information**.
- Click outside label and arrange the label.
- Go to **Form view** to check.
- Save the form as **frmCustomerOrderDate**.

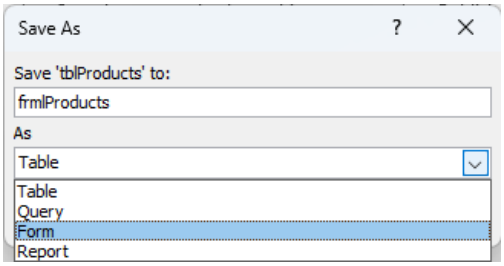


8.3 Task 16: Create a Form from a table

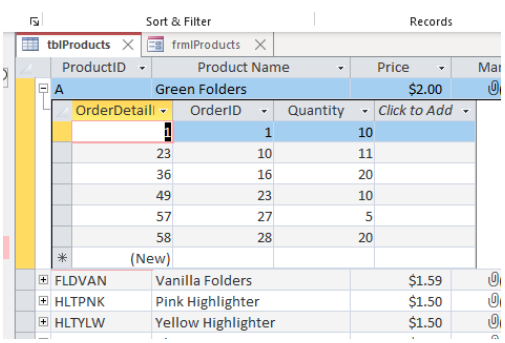
- Open tblProducts in datasheetview.
- Go to File ➔ Save As
- Select **Save Object As** and Click **Save As** button.
- Under As select **Form** and change the name to be **frmProducts**.

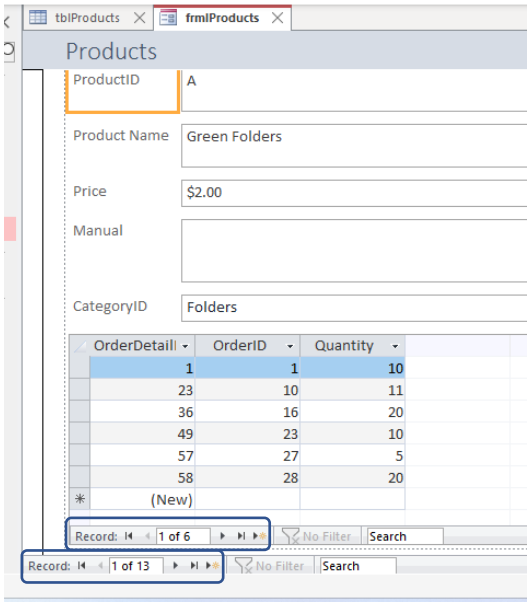


- The form opens in **Layout View**.
- Delete the Icon form access add.
- Change the Title to : **Product Information Form**.
- Notice that because I created the form from the table and as table show details of each record also the form shows details of each record.



- Notice that you have two Record Navigators one for the main form and one for the sub form.

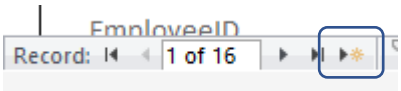


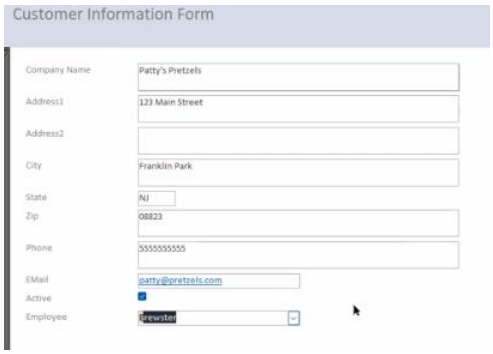


- Go and navigate through Records of main and sub form.
- Right click on tab and choose close All.

8.4 Task 17: Add Record to a Form

- Open **frmCustomer** form and add a new record.
- Press the tab button to save the record.
- Close the form.
- Go to tblCustomers to see the new record added.





Chapter 9: Report Basics in MS Access

9.1 Task 18: Create Report from a query

- Open qryProducts in **Datasheet view**.
- Go to File ➔ Save As ➔ Save Object As
- Save it as **Report** and name it **rptProducts**.
- The report opens in **Layout View**.
- Get red of the report icon.
- Rename the report title: Product Information report.
- Expand and adjust the total box.
- Look at the report in the **Report View**.
- Look at the report in the **Print View**.
- Close the report.

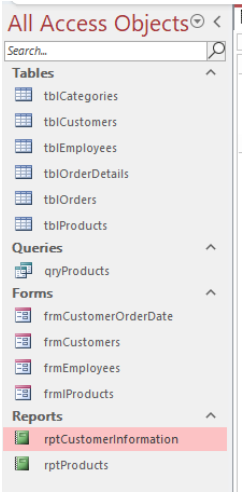
9.2 Task 19: Create Report in Design View

- Go to Create➔Reports Group➔ Reports Design
- It is like the form design view.
- It contains Heard, details and footer section.
- From ribbon design ➔tools➔Add existing fields.
- Field list pane appears.
- From tblCustomers table add all fields except CustomerId and Address2.
- Right click Page Header and click Page Header footer to make it disappear.
- That is because they appear in each page.
- Right click details and select Report header and footer.
- They appear in the start and end of the report.
- Go to Print Preview.
- Go to Layout View
- Make ComanyName Field wider.
- Scroll down to make sure it is wide enough for all company names.
- Go to Design View.
- In Report Header add label and add text : Customer Information.
- Go to the Format tab on the ribbon.
- Increase text to 16.
- Go to Report Design tab in the ribbon.
- In Group: Header/Footer ➔ Logo.
- Select the logo file.
- Drag it to the right adjust.
- Check your report in print preview.

- Go back to design view.
- Save the report as: **rptCustomerInformation**.
- Close report.

9.3 A look at Navigation Pane

- Notice the Icons appears beside each object type table, query, form, report.



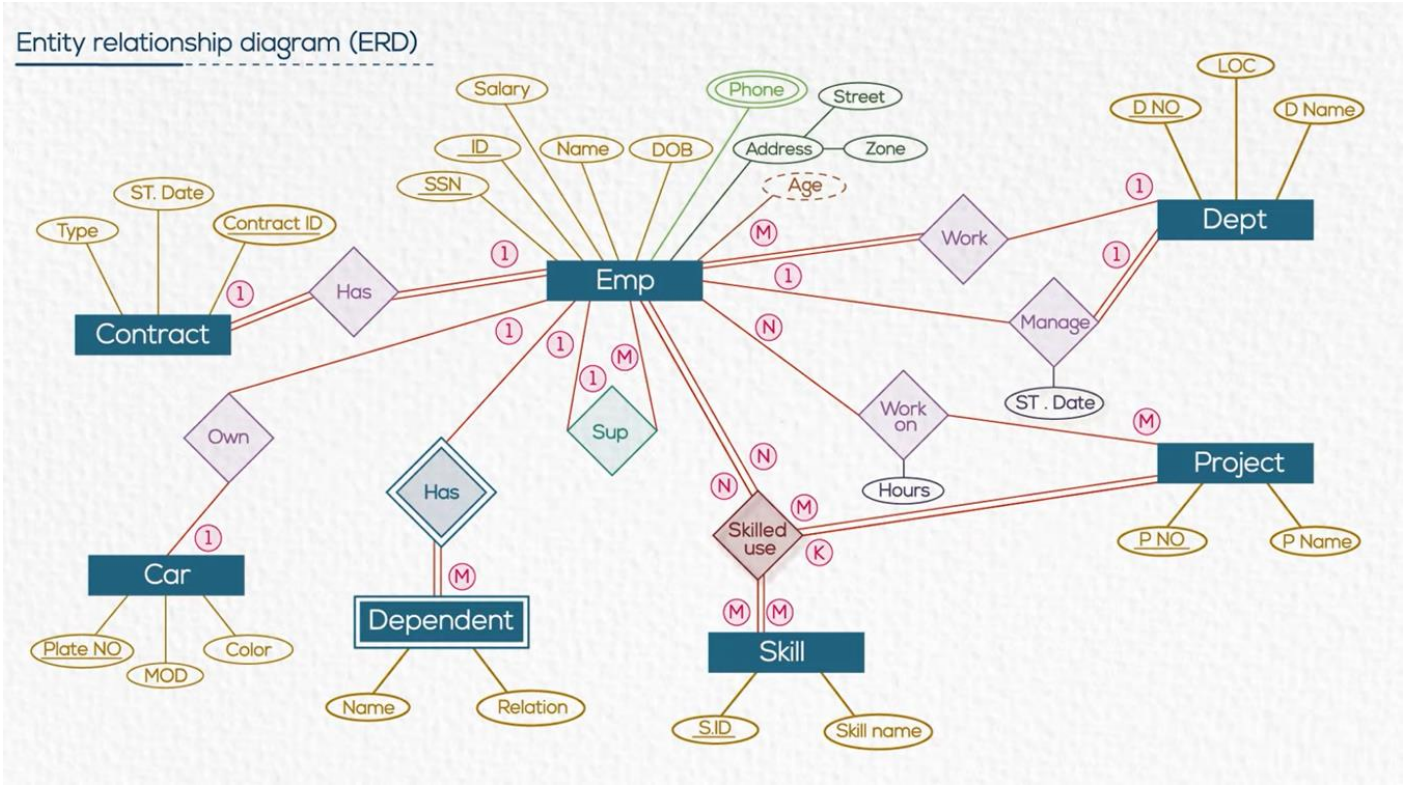
Chapter 10: Project

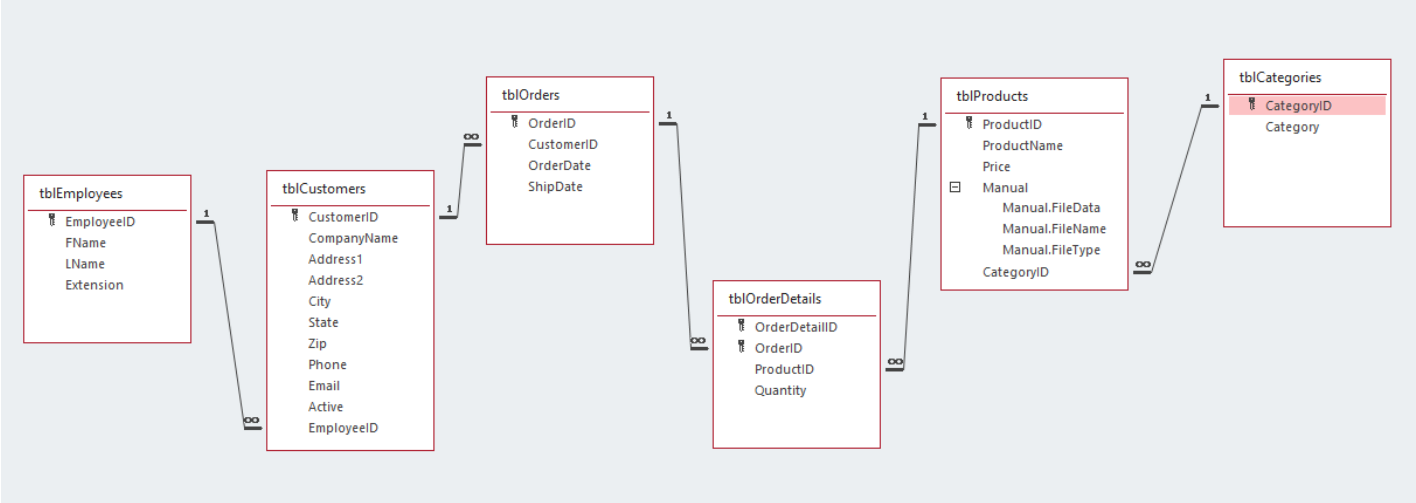
- Create Project as Instructed.
- Get Reviewed and Graded
- Project Solution.

References:

- Fundamentals of Database Systems 7th Edition (**Ramez Elmasri - Shamkant B. Navathe**).

Index A : Charts


Entity relationship diagram (ERD)
Salary
Phone
Street
LOC
D NO
D Name
ID
Name
DOB
Address
Zone
SSN
Age
ST. Date
Type
Contract ID
Dept
Work
Has
Emp
Manage
Contract
Own
Sup
Work on
ST . Date
Has
Project
Hours
Skilled use
Car
P NO
P Name
Dependent
Plate NO
Color
MOD
Skill
Name
Relation
S.ID
Skill name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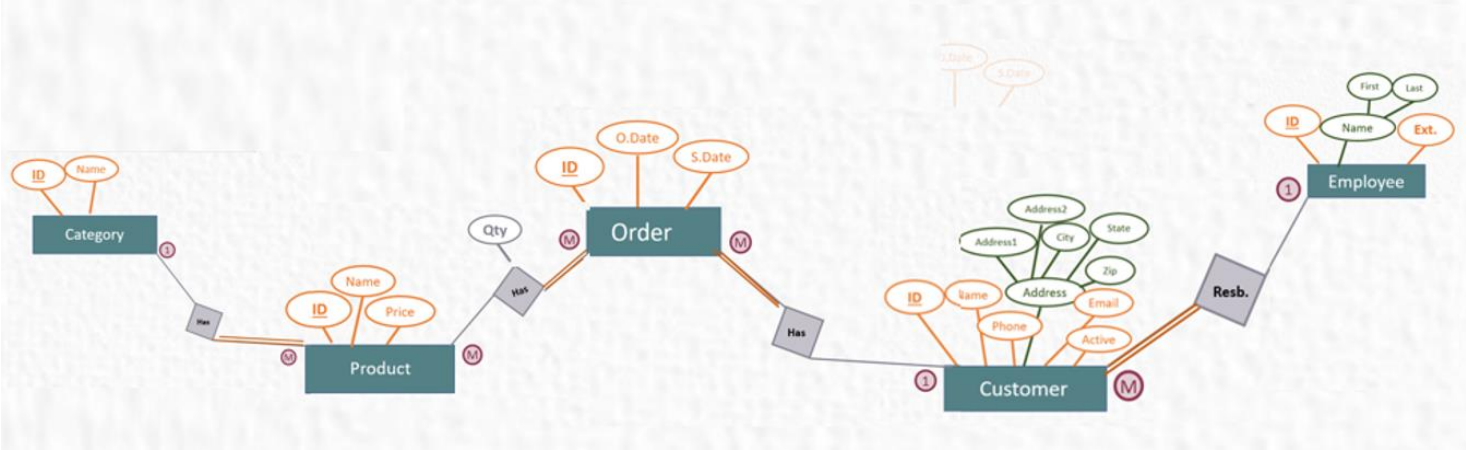
EmployeeID
FName
LName
Extension
tblCustomers
CustomerID
CompanyName
Address1
Address2
City
State
Zip
Phone
Email
Active
EmployeeID
tblOrders
OrderID
CustomerID
OrderDate
ShipDate
tblOrderDetails
OrderDetailID
OrderID
ProductID
Quantity
tblProducts
ProductID
ProductName
Price
Manual
Manual.FileData
Manual.FileName
Manual.FileType
CategoryID
tblCategories
CategoryID
Category



Relationship Diagram