

ITEC102 – INFORMATION TECHNOLOGIES

LECTURE 9 – DATABASE PROGRAMS



EASTERN MEDITERRANEAN UNIVERSITY

SCHOOL OF COMPUTING AND TECHNOLOGY

Aim of The Course

The aim of this course is to provide,

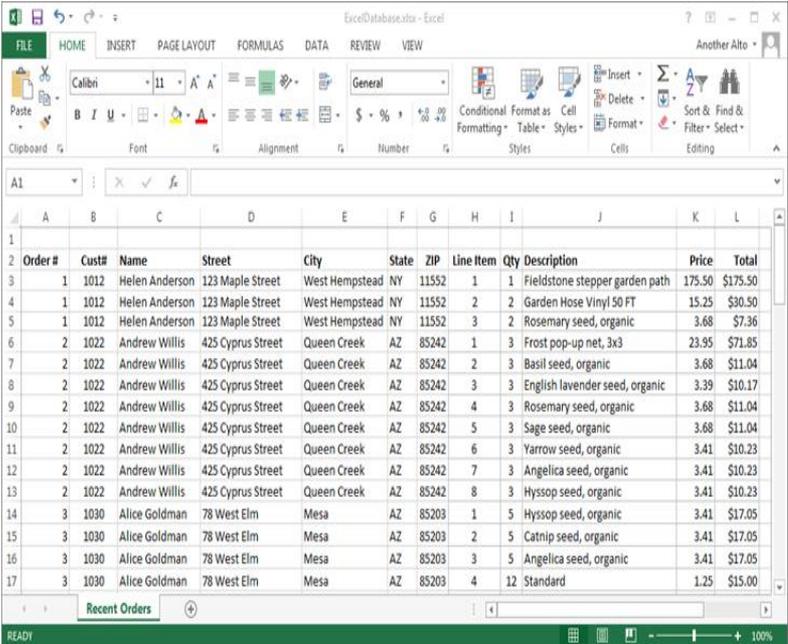
- What is a Database
- What is Access
- Components of Microsoft Access 2013
- Understanding views
- Relational Database

What is Database?

- ▶ A database is an organized collection of information
 - ▶ The primary function is to store data
 - ▶ If the data is well-organized, retrieving the data is easy
- ▶ The key to designing a database successfully lies in understanding the nature of the data

Databases in Spreadsheets

- ▶ Many databases begin as data entered into a spreadsheet
 - ▶ the rows and columns are easy to understand
 - ▶ all the data is stored in one location
- ▶ Spreadsheet databases often contain a considerable amount of repeated data
 - ▶ This leads to large file size
 - ▶ Complex data relationships cannot be represented



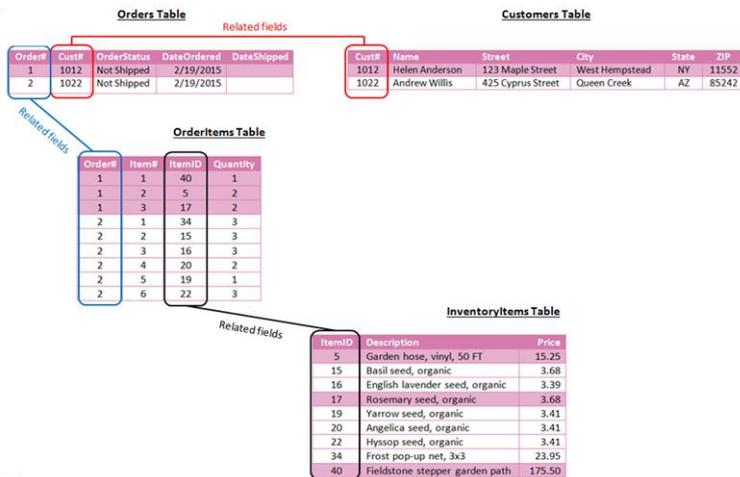
The screenshot shows an Excel spreadsheet titled 'ExcelDatabase.xlsx - Excel'. The spreadsheet contains a table with the following data:

Order #	Cust#	Name	Street	City	State	ZIP	Line Item	Qty	Description	Price	Total
1	1012	Helen Anderson	123 Maple Street	West Hempstead	NY	11552	1	1	Fieldstone stepper garden path	175.50	\$175.50
4	1	1012	Helen Anderson	123 Maple Street	West Hempstead	NY	11552	2	2 Garden Hose Vinyl 50 FT	15.25	\$30.50
5	1	1012	Helen Anderson	123 Maple Street	West Hempstead	NY	11552	3	2 Rosemary seed, organic	3.68	\$7.36
6	2	1022	Andrew Willis	425 Cyprus Street	Queen Creek	AZ	85242	1	3 Frost pop-up net, 3x3	23.95	\$71.85
7	2	1022	Andrew Willis	425 Cyprus Street	Queen Creek	AZ	85242	2	3 Basil seed, organic	3.68	\$11.04
8	2	1022	Andrew Willis	425 Cyprus Street	Queen Creek	AZ	85242	3	3 English lavender seed, organic	3.39	\$10.17
9	2	1022	Andrew Willis	425 Cyprus Street	Queen Creek	AZ	85242	4	3 Rosemary seed, organic	3.68	\$11.04
10	2	1022	Andrew Willis	425 Cyprus Street	Queen Creek	AZ	85242	5	3 Sage seed, organic	3.68	\$11.04
11	2	1022	Andrew Willis	425 Cyprus Street	Queen Creek	AZ	85242	6	3 Yarrow seed, organic	3.41	\$10.23
12	2	1022	Andrew Willis	425 Cyprus Street	Queen Creek	AZ	85242	7	3 Angelica seed, organic	3.41	\$10.23
13	2	1022	Andrew Willis	425 Cyprus Street	Queen Creek	AZ	85242	8	3 Hyssop seed, organic	3.41	\$10.23
14	3	1030	Alice Goldman	78 West Elm	Mesa	AZ	85203	1	5 Hyssop seed, organic	3.41	\$17.05
15	3	1030	Alice Goldman	78 West Elm	Mesa	AZ	85203	2	5 Catnip seed, organic	3.41	\$17.05
16	3	1030	Alice Goldman	78 West Elm	Mesa	AZ	85203	3	5 Angelica seed, organic	3.41	\$17.05
17	3	1030	Alice Goldman	78 West Elm	Mesa	AZ	85203	4	12 Standard	1.25	\$15.00

Relational Database Management Systems (RDBMS)

- ▶ A RDBMS allows you to define, create and maintain databases while providing controlled access to the data
- ▶ All database applications use SQL to access stored data in a standard manner
- ▶ Structured Query Language (SQL) is the standard language used to create and interact with databases

Multiple, Related Tables



- The data in a relational database is stored in multiple tables
- Each table stores data about a specific aspect of the information
- A complete set of information can be retrieved for a desired entity because the data stored in each table is "related" to the data stored in other tables of the database

What is Access?

- ▶ Access 2013 is a RDBMS and a complete application development environment
 - ▶ Includes the tools you need to develop user-friendly interfaces and reports
 - ▶ Provides a user-friendly environment for accomplishing database tasks even without prior knowledge
 - ▶ Uses SQL code behind the scenes

Database Objects

- ▶ Tables – store data in rows and columns. In a table, each row is a record, and each record consists of one or more fields
- ▶ Forms – function as user-friendly interfaces for working with data
- ▶ Reports – print and summarize data
- ▶ Queries – extract subsets of data from one or more tables, allowing you to view exactly the data you want
- ▶ Macros – add functionality to database objects and are often used to automate certain database tasks
- ▶ Modules – also add functionality to a database, and are stored collections of Visual Basic for Applications (VBA) programming language statements and procedures

Desktop Databases and Access Apps

- ▶ An Access app is a new type of database that you create, design and modify in Access 2013 and then use in a standard web browser
- ▶ You share Access apps with other users as SharePoint apps
- ▶ To build an app, select the type of data you want to track and Access creates the database structure for you



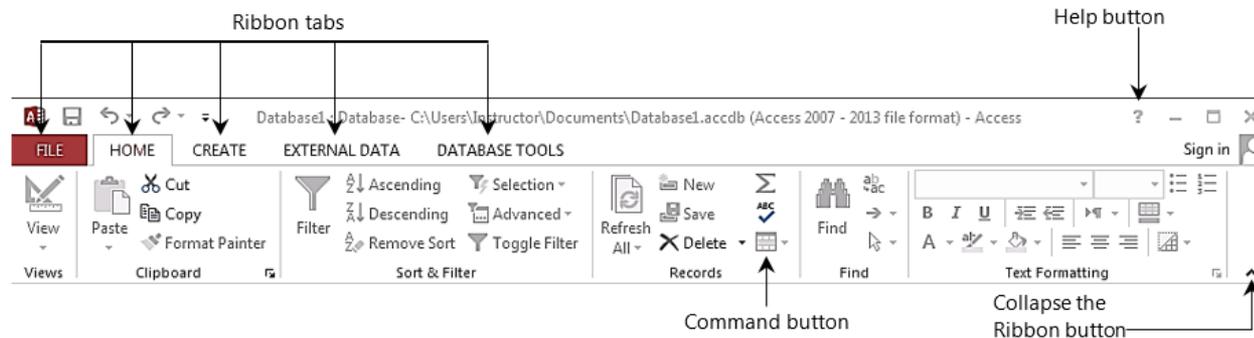
Contacts

Components of the Access 2013 User Interface

- ▶ Ribbon
- ▶ Navigation Pane
- ▶ Backstage view

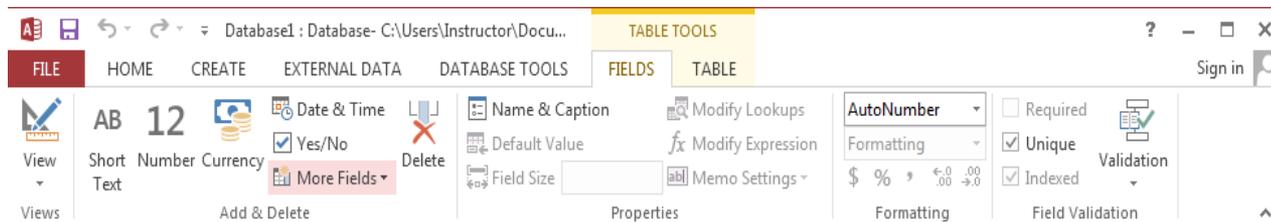
The Ribbon

- ▶ The Ribbon contains the commands and options you use to perform database tasks. Each tab contains a group of related commands.

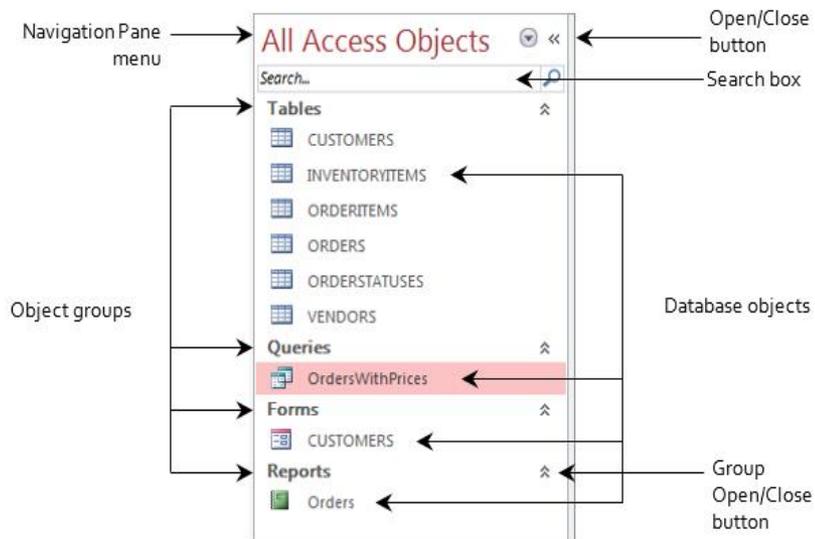


The Ribbon

- ▶ To reduce screen clutter, contextual tabs appear only when they are applicable. For example, the Table Tools tab appears only when a table is open.



The Navigation Pane

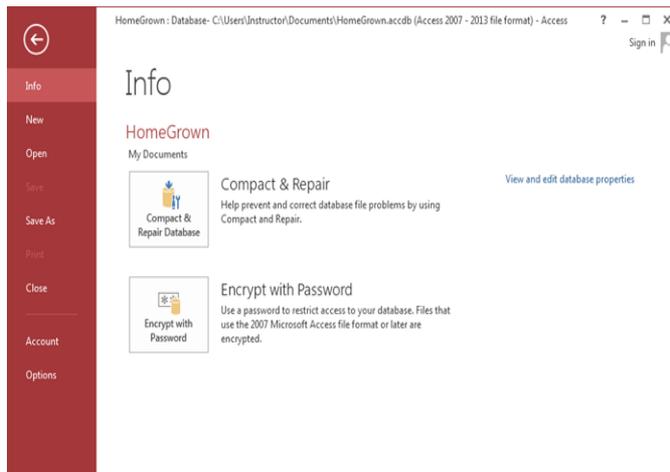


- The Navigation Pane is a central location from which you can use any type of database object
- The Navigation Pane replaces the Database window found in versions of Access previous to 2007.

The Navigation Pane includes:

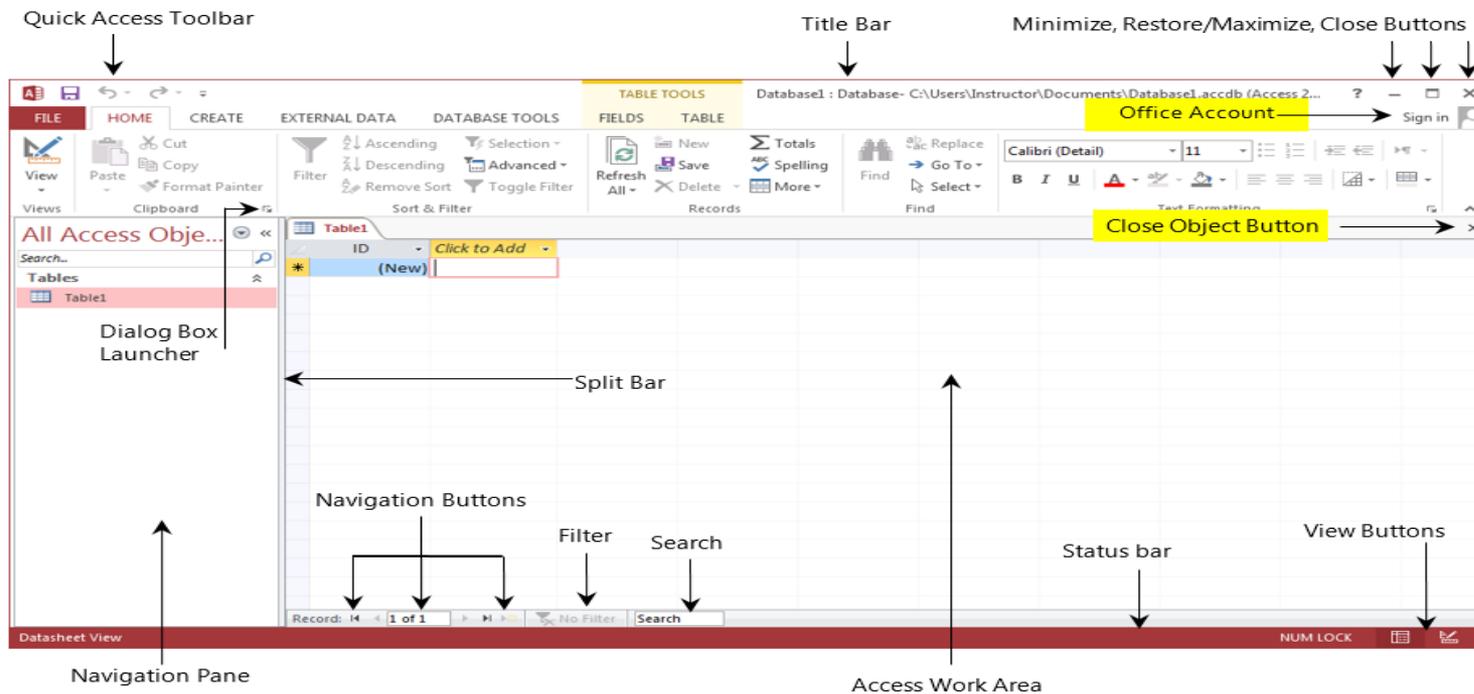
Navigation Pane menu	Click the drop-down arrow to open a menu that allows you to specify which objects to show. The default selection is All Access Objects.
Open/Close buttons	Collapses the Navigation Pane so only its Open/Close button and shutter bar display.
Object groups	Organize the objects in a database so you can find what you are looking for.
Database objects	The tables, queries, forms and other objects that exist in the database. Each object appears in its appropriate group.
Search box	You can type the name of an object you want to find

Backstage View

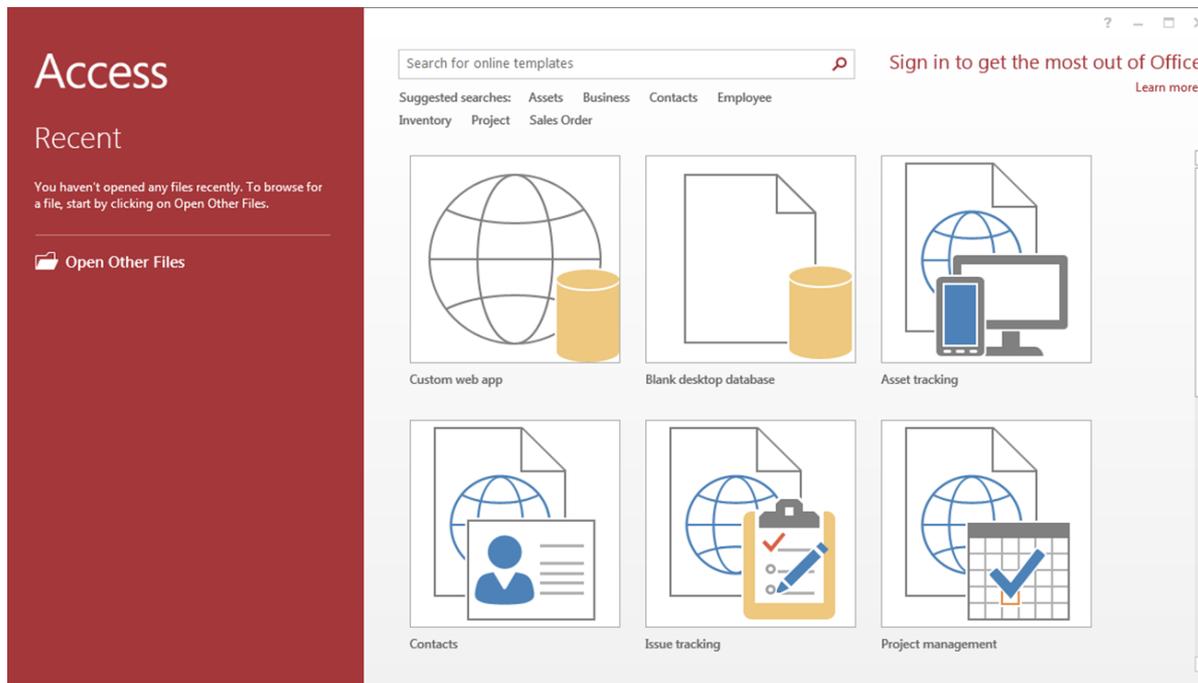


- Used to create, open, save, print and manage databases
- Includes commands and options related to things you can do with a database itself
- Shows the commands and options available on the File tab of the Ribbon

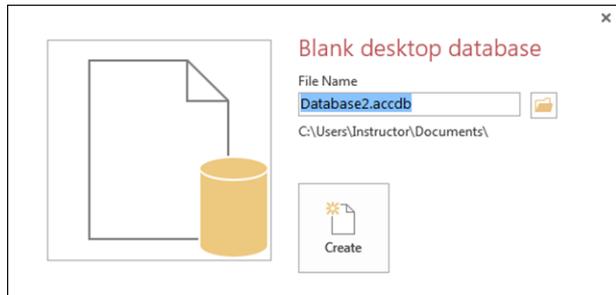
Looking at the Screen



Starting Access



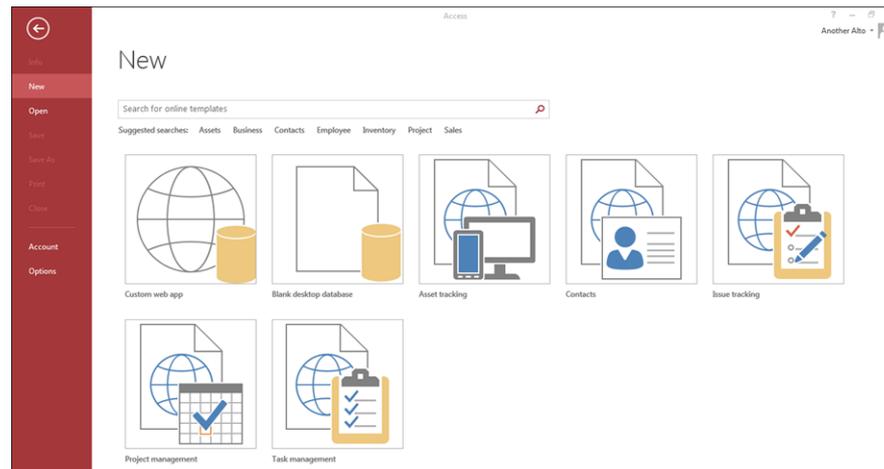
Creating a New Blank Database



- The Blank database template creates an empty database file
- Click the **Browse for a location** button to specify a name and location for the new database
- Specify a file name and location and click **OK** to save your specifications
- Click the **Create** button to create the blank database file

Creating a Database from a Template

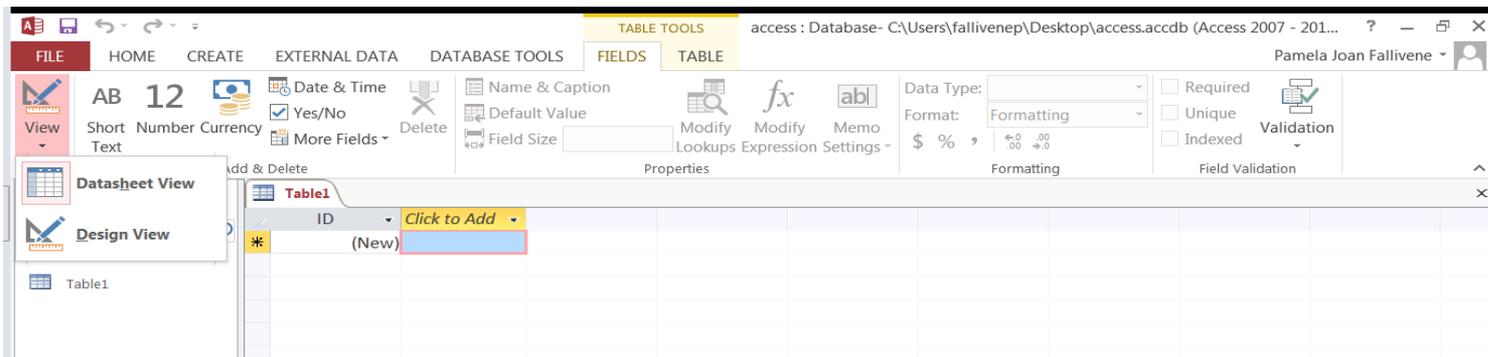
- ▶ Click a template in the gallery
- ▶ Specify a name and location
- ▶ Click **Create**



Access opens in a new table in **Datasheet View**

Understanding Views

- ▶ There are multiple ways to view a database object. The two views for tables are Design View and Datasheet View.
- ▶ **Design View** is used to set the data types, insert or delete fields, and set the Primary Key
- ▶ **Datasheet View** is used to enter and view the data for the records



Creating a Table

- ▶ A table is a collection of data about a specific topic, such as employee information, products or customers. The first step in creating a table is entering the fields and data types. This can be done in either Datasheet View or Design View but it is recommended to set up the table in Design View.
- ▶ **Understanding Fields and Their Data Types**
- ▶ **Field** - an element of a table that contains a specific item of information, such as a last name.
- ▶ **Field's Data Type** - determines what kind of data the field can store.

Fields and Their Data Types

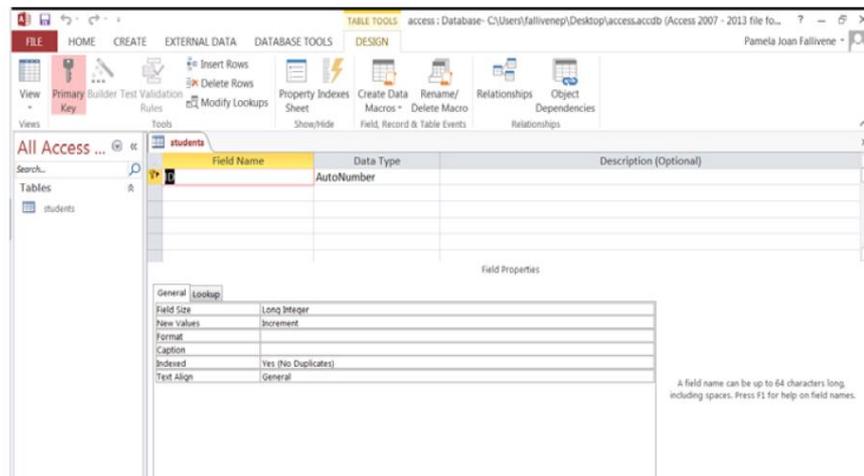
Format	Use to display
Short Text	Alphanumeric data (names, titles, etc.) - up to 255 characters
Long Text	Large amounts of alphanumeric data: sentences and paragraphs – 64,000 characters
Number	Numeric data
Date/Time	Dates and times
Currency	Monetary values
AutoNumber	Unique value generated by Access for each new record
Yes/No	Yes and No values and fields that contain only one of two values
OLE Object	Pictures, graphs, or other ActiveX objects from another Windows-based application
Hyperlink	A link address to a document or file on the Internet
Attachment	You can attach files such as pictures, documents, spreadsheets, or charts; each Attachment field can contain an unlimited number of attachments per record, up to the storage limit of the size of a database file.
Calculated	You can create an expression that uses data from one or more fields. You can designate different result data types from the expression.
Lookup Wizard	Displays either a list of values that is retrieved from a table or query, or a set of values that you specified when you created the field. The Lookup Wizard starts and you can create a Lookup field. The data type of a Lookup field is either text or number, depending on the choices that you make in the wizard.

To Create a Table in Design View:

1. Click on the Create tab
2. Click on Table
3. Switch over to Design View on the Home tab
4. If prompted to save the table, enter a name and click on OK
5. Type the field names and select the appropriate data type for each field
6. Continue until all fields are added

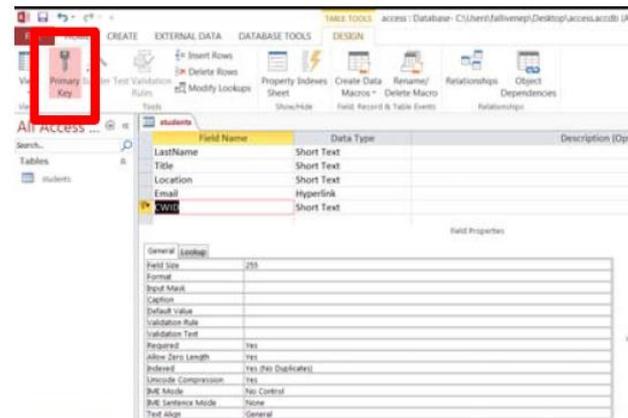
To Create a Table in Design View:

Note: The order that you enter the field names is the order the fields will appear in the table.



Setting a Primary Key

- ▶ The Primary Key is the unique identifier for each record in a table. Access will not allow duplicate entries in a primary key field. When creating a new table, Access automatically creates a field "ID" with the autonumber data type, and assigns this as the Primary Key.



The screenshot shows the Microsoft Access interface for a table named 'students_info'. The table design view is displayed with the following fields:

Field Name	Data Type	Description (Optional)
stdid	AutoNumber	
name	Short Text	
surname	Short Text	
department	Short Text	
regist_date	Number	

The 'regist_date' field is selected, and its properties are shown in the 'Field Properties' pane below:

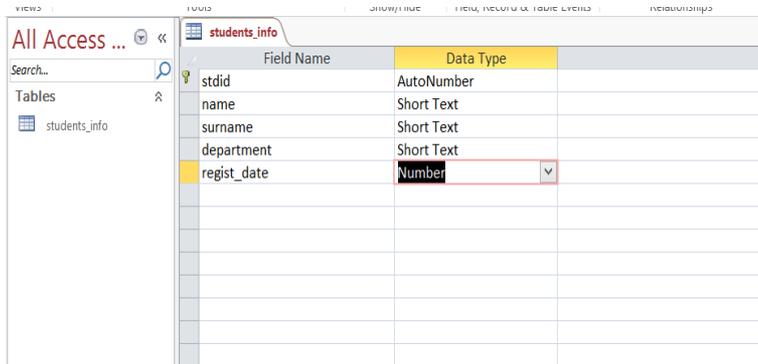
Property	Value
Field Size	Long Integer
Format	
Decimal Places	Auto
Input Mask	
Caption	
Default Value	0
Validation Rule	
Validation Text	
Required	No
Indexed	No
Text Align	General

The data type determines the kind of values that users can store in the field. Press F1 for help on data types.

Create a table information you should define Field name and Data type and click S

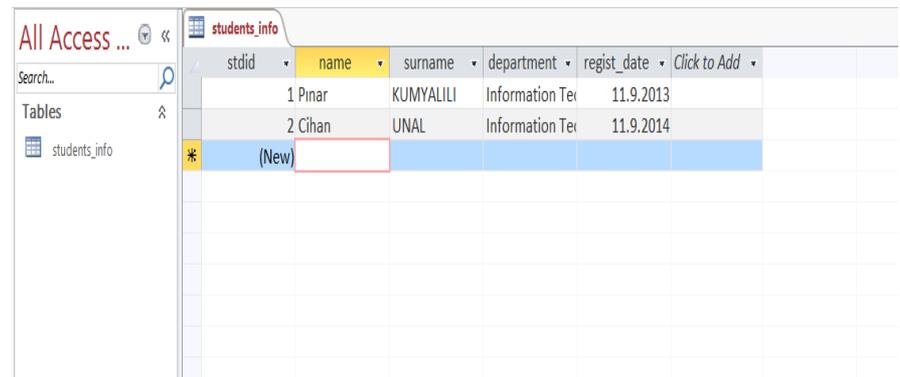
Entering Data in a Table

- ▶ The Datasheet View button under the Home tab must be clicked to enter the registration information to be placed under the Field Name.



The screenshot shows the 'students_info' table structure in Microsoft Access. The table has the following fields and data types:

Field Name	Data Type
stdid	AutoNumber
name	Short Text
surname	Short Text
department	Short Text
regist_date	Number



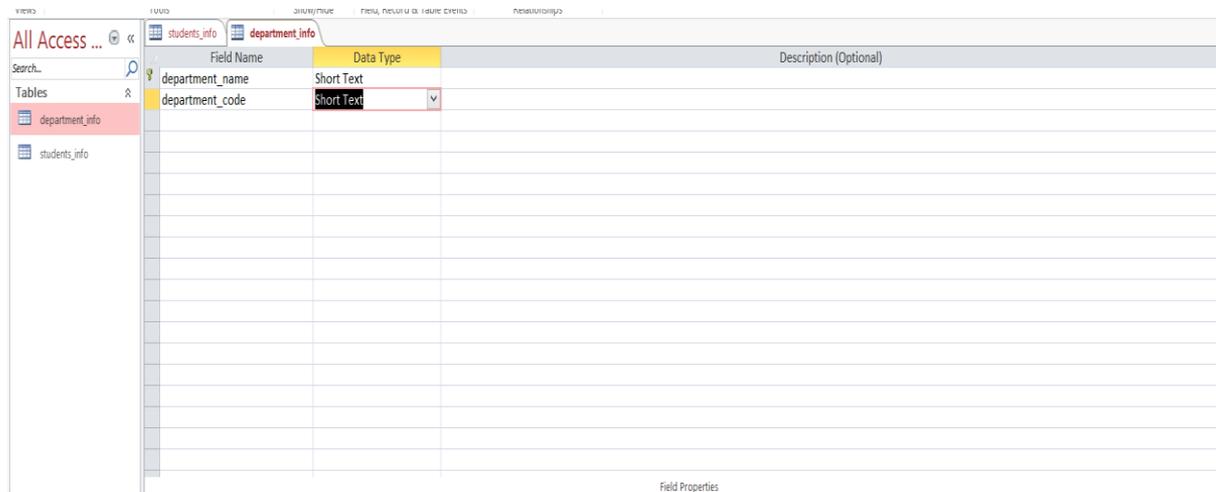
The screenshot shows the 'students_info' table in Datasheet View. The table contains two rows of data and a new row being added:

stdid	name	surname	department	regist_date	Click to Add
1	Pinar	KUMYALILI	Information Tex	11.9.2013	
2	Cihan	UNAL	Information Tex	11.9.2014	
*	(New)				

Relational Database

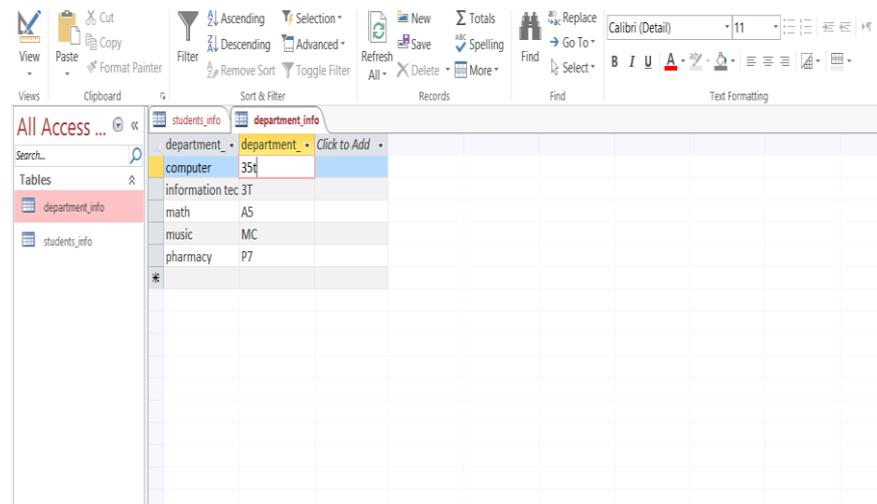
- ▶ A **relational database** is a set of formally described tables from which data can be accessed or reassembled in many different ways without having to reorganize the database tables.
- ▶ For example, it is possible to format the Section column in the Student_info table using information in a table named department_info. For this, a second table must be created first.
- ▶ To add a new table, click the Table button on the Create tab.
- ▶ To switch to the design screen, click the Design View button and enter the table name in the Save As window.

Relational Database



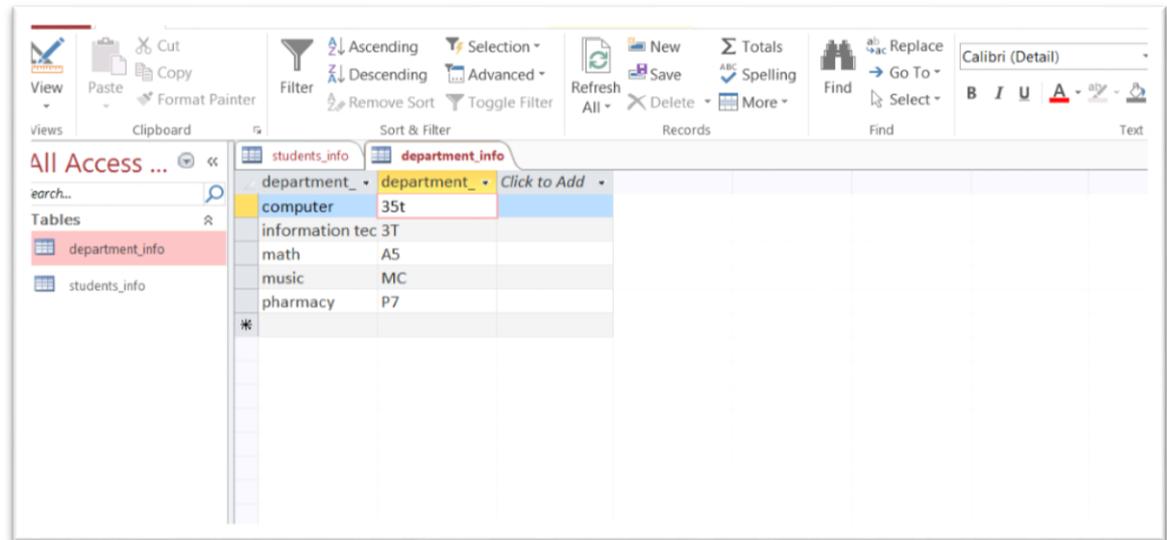
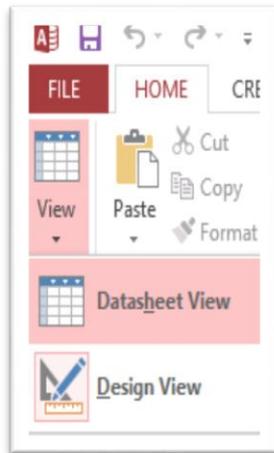
Relational Database

- From the Design View, you must specify the Field Name and Data Type for each column separately.
- The Save button should be clicked once the design phase is complete.



Relational Database

After returning to the Datasheet View window, the data can be entered.



Relational Database

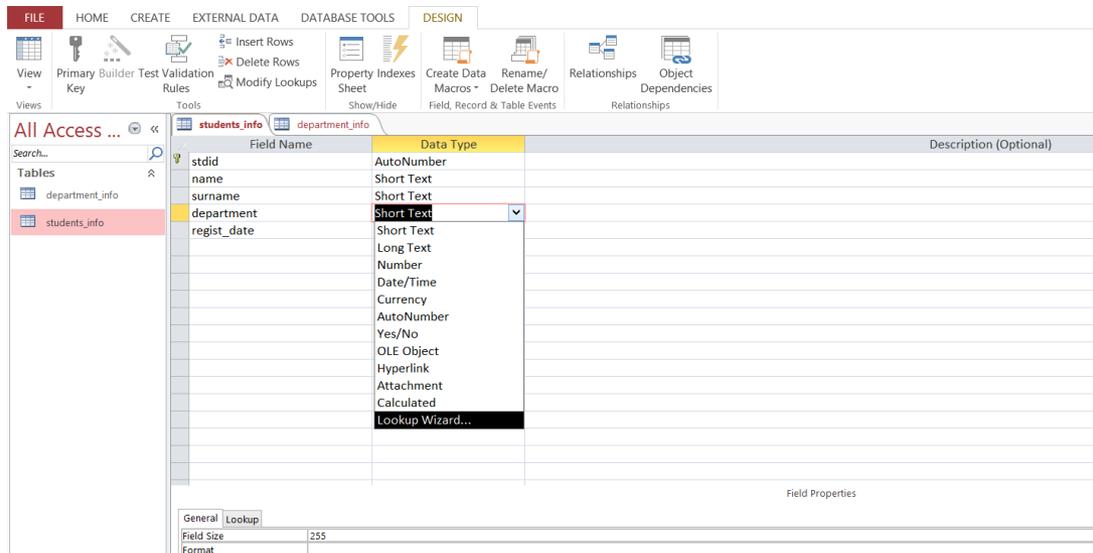
- ▶ In the department column which is in student_info table, to select data from department_info table select student_info table first and click design view.
- ▶ Then, select the Field Name that should be edited.

The screenshot shows the Microsoft Access interface in Design View for the 'students_info' table. The 'department' field is selected, and its dropdown menu is open, showing 'Computer' as the selected value. The ribbon includes various tools like Filter, Sort & Filter, Records, Find, and Text Formatting. The table data is as follows:

stdid	name	surname	department	regist_date	Click to Add
1	Pinar	KUMYALILI	Information Tex	11.9.2013	
2	Cihan	UNAL	Information Tex	11.9.2014	
3	Ahsen	KAYA	Math		
4	Murat	SAHIN	Computer		
*	(New)				

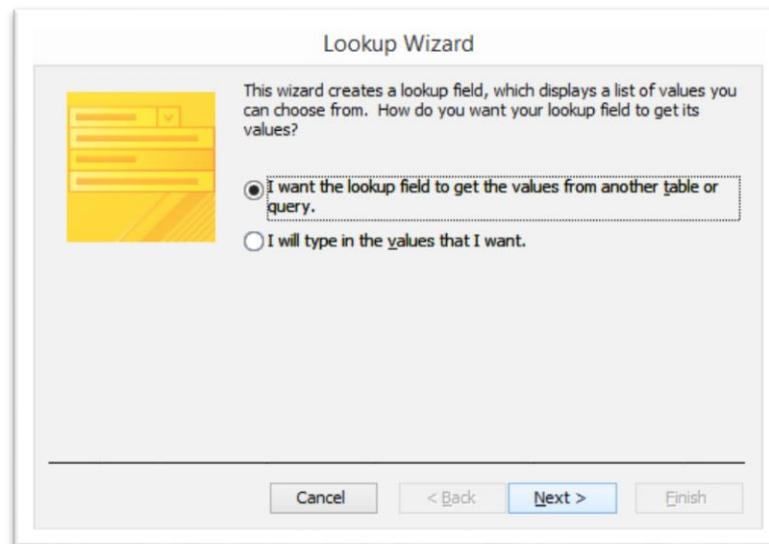
Relational Database

- ▶ The Lookup Wizard should be selected from the Data Type drop-down list.



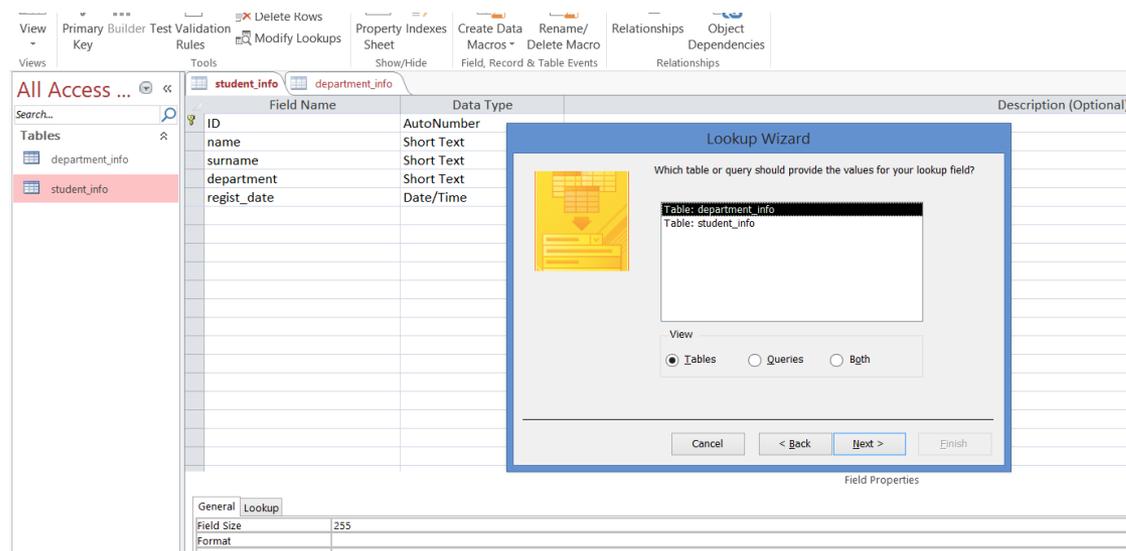
Relational Database

- ▶ From the next page the default value is " I want to lookup field to get the values from another table or query " select, and then click on the Next button.



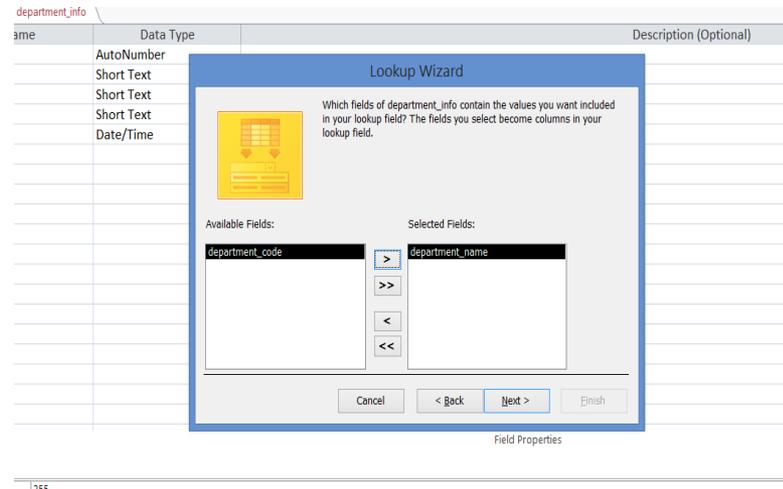
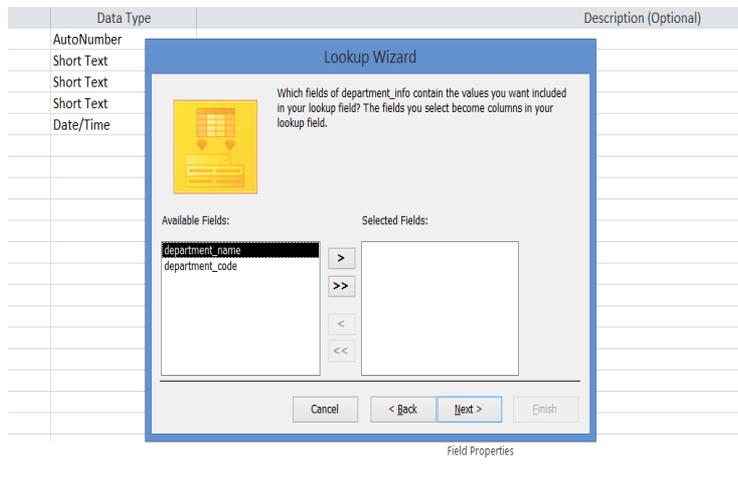
Relational Database

- ▶ The next page should select the table from which the data will be pulled, and then click the Next button.
- ▶ Your table must be department_info



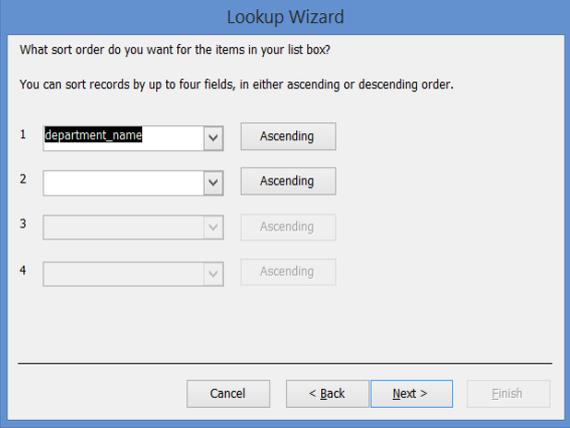
Relational Database

- ▶ In the third step, department_name column should be selected, and then the Next button must be clicked.



Relational Database

- ▶ In the fourth step, column order should be select.
- ▶ The column name must be selected from the drop-down list, the Ascending or Descending alignment method must be applied, and then the Next button must be clicked.



The screenshot shows a 'Lookup Wizard' dialog box with the following content:

What sort order do you want for the items in your list box?

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

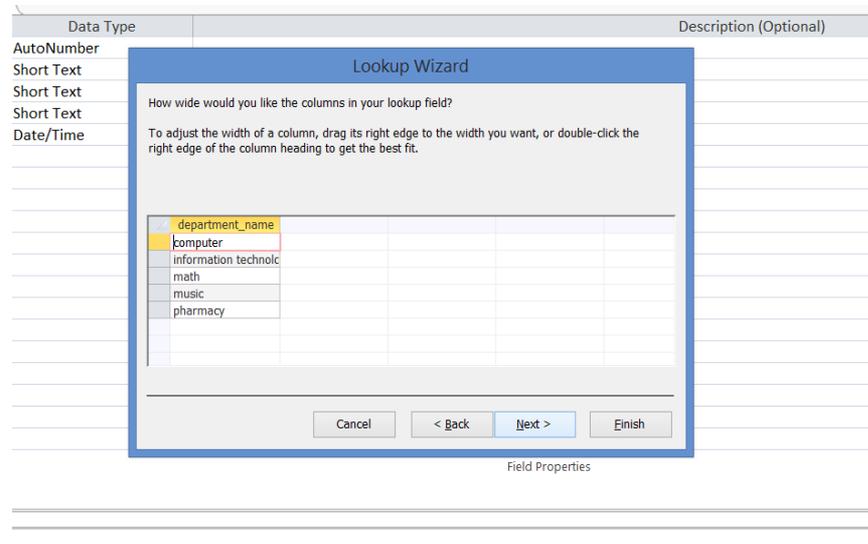
Field Number	Field Name	Sort Order
1	department_name	Ascending
2		Ascending
3		Ascending
4		Ascending

At the bottom of the dialog box, there are four buttons: 'Cancel', '< Back', 'Next >', and 'Finish'. The 'Next >' button is highlighted.

Field Properties

Relational Database

- In the fifth step, the current list will be displayed.
- The Next button should be clicked.



Relational Database

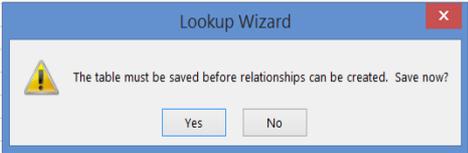
Then click the Finish button and save the relationship between two tables.

Field Name	Data Type	Description (Optional)
	AutoNumber	
	Short Text	
me	Short Text	
partment	Short Text	
_date	Date/Time	

Field Name	Data Type	Description (Optional)
Lookup		
	255	
sk		

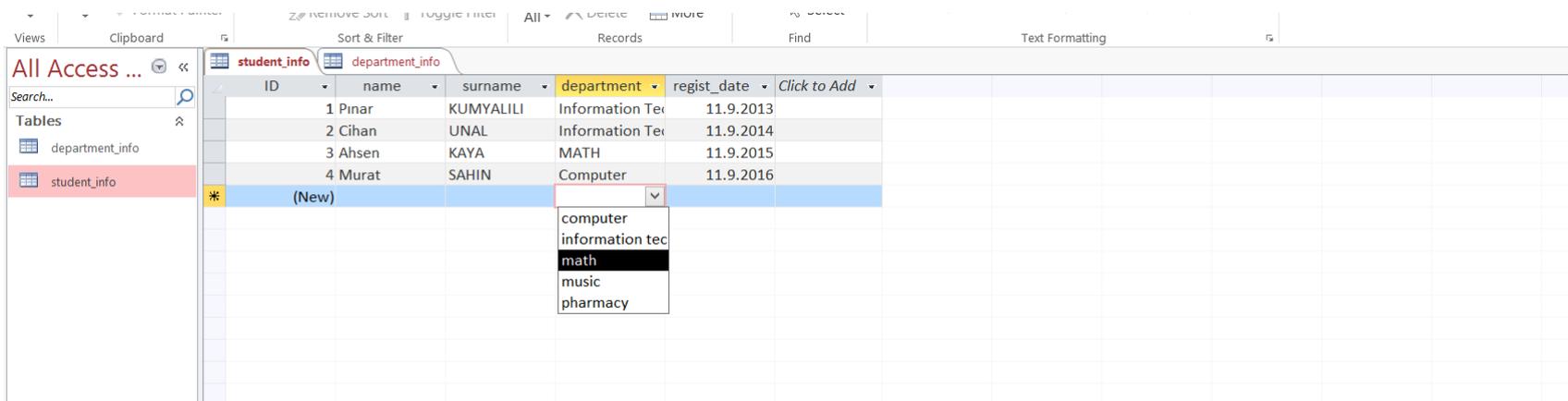


Field Properties



Relational Database

- ▶ When a new record is added on the Datasheet View screen, the department column information can be selected from the drop down list.



The screenshot shows the Microsoft Access Datasheet View for a table named 'student_info'. The table has the following columns: ID, name, surname, department, and regist_date. The 'department' column is highlighted in yellow. A dropdown menu is open for the 'department' column of the new record, showing the following options: computer, information tec, math, music, and pharmacy. The 'math' option is currently selected.

ID	name	surname	department	regist_date	Click to Add
1	Pinar	KUMYALILI	Information Tec	11.9.2013	
2	Cihan	UNAL	Information Tec	11.9.2014	
3	Ahsen	KAYA	MATH	11.9.2015	
4	Murat	SAHIN	Computer	11.9.2016	
*	(New)		computer		

LECTURE 9
DATABASE PROGRAMS
END OF SUBJECT