Databases under Access

Introduction

In the modern world, data has become a crucial asset for every organization and economic activity. Managing this data efficiently is essential for making informed decisions and achieving strategic goals. This course introduces students of Economic Sciences to the fundamental concepts and techniques of Database Management Systems (DBMS). Through theoretical lessons and practical applications using Microsoft Access, students will learn how to design, organize, and manage databases that support economic analysis, business operations, and financial decision-making. By the end of the course, students will be able to understand how databases are used to store, retrieve, and analyze economic data, and how effective database design contributes to improving organizational performance and information management.

INTRODUCTION TO DATABASES

- **A database is a structured set or collection of data.**
- **There are several types of databases (DBs) that differ in the way data is structured.**
- **BD Relational, object ,hierarchical, network, functional, deductive, etc.**
- **95% of databases are relational.**
- **Oracle, a database software publisher, is the second largest company after Microsoft.**

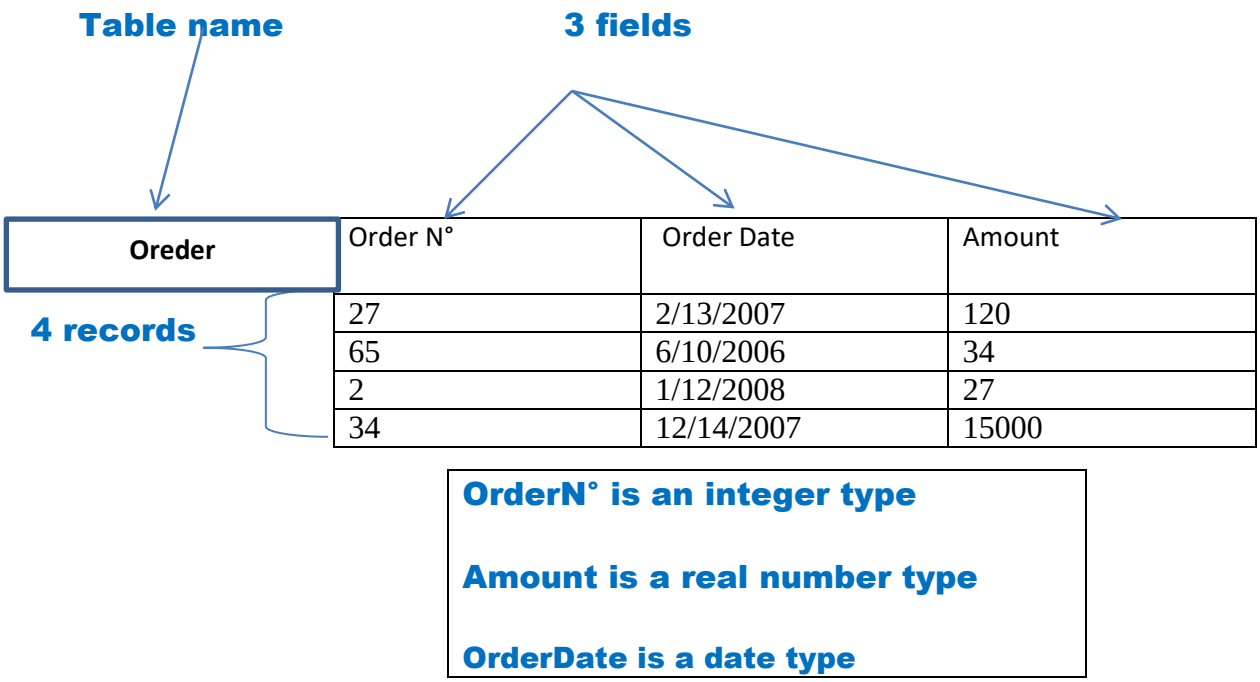
Structure of a relational database

- **A relational database consists of a set of tables (or relations).**
- **A table consists of:**

  ✓ **Rows called records (or tuples)**
  ✓ **Columns, each representing a field (or attribute).**

- **Each table has a name.**
- **Each field has a name and a type :Text, numeric, date, etc.**

Table example



Some constraints

- **Two tables in the same database cannot have the same name.**
- **Two fields in the same table cannot have the same name.**
- **The same field can be present in several tables.**

Example database

BOOK

N°Book	Book Title
10	Currency
25	Finance

AUTHOR

N° Author	Author Name
1	Dupont
2	Durand
3	Martin

BOOK AUTHOR

Book Number	N° Author
10	1
25	1
25	3

DBMS

- **Software that manages databases is called a "Database Management System."**
- **Access is a relational DBMS.**
- **MySQL, SQL Server, Postgres, Oracle, DB2, etc.**
- **A DBMS allows you to:**
- **Create a database**
- **Modify the structure of tables**
- **A DBMS allows you to:**

  ✓ **Create a database**

  ✓ **Modify the structure of tables**

  ✓ **Query the database**

  ✓ **Modify the database**

Creating a database

1. Launch Access.

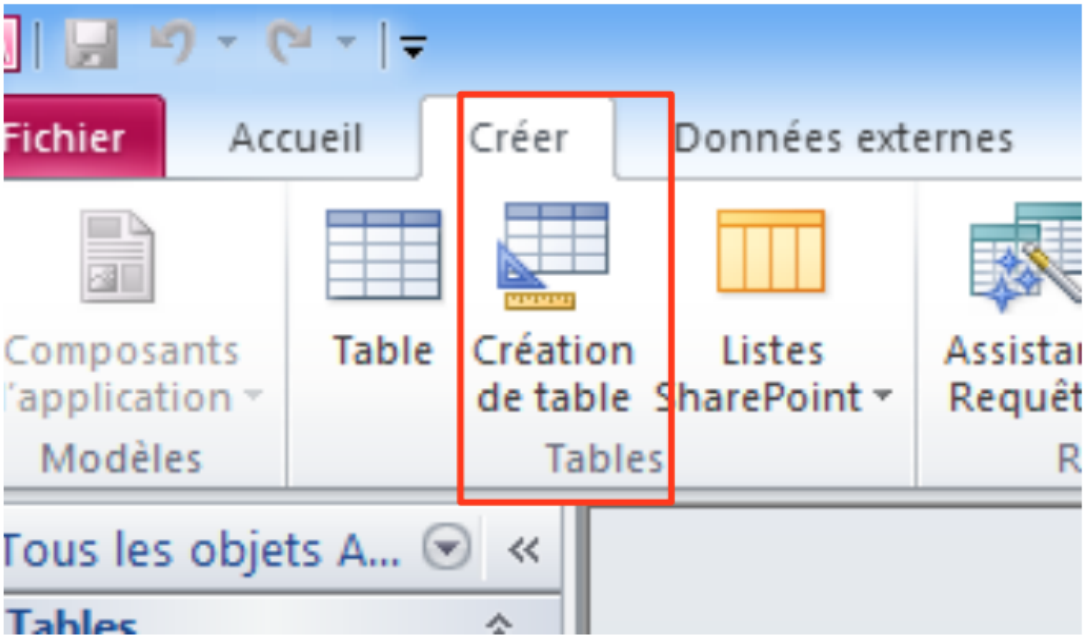
2. Request the creation of a new database.

3. Give your database a name.

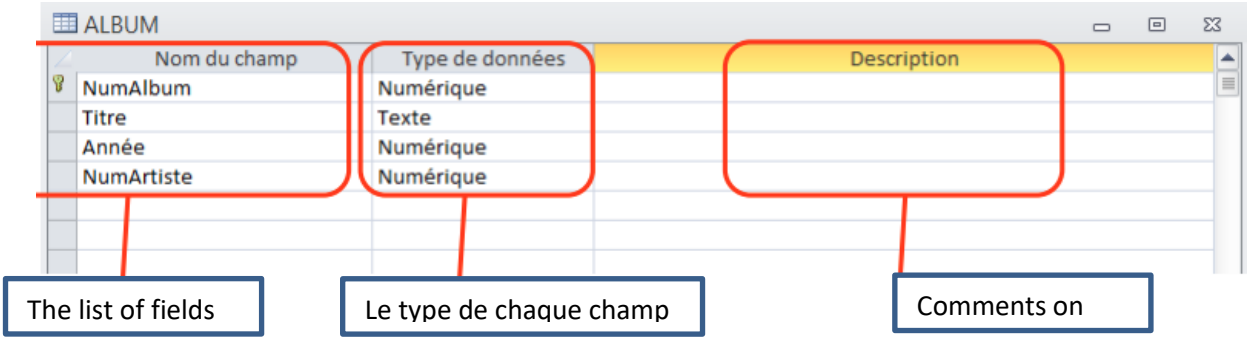
4. That's it, your database has been created, but for now it does not contain any information.

5. Note that Access will have created a file of considerable size!

Creating a table



Creating a table



Creating a table

Once you have finished typing all the fields that make up the table,

Close the creation window.

Access will then ask for the name of the table,

Access will also ask you to specify the primary key. We will come back to this concept later,

That's it, our "Album" table has been created,

To display its contents, simply double-click on it,

You can then enter, delete, or modify records

Field types

 AutoNumber: number incremented each time a new record is inserted.

 Numeric: The user must enter the value. By default, this is an integer, but you can specify whether it is a real number.

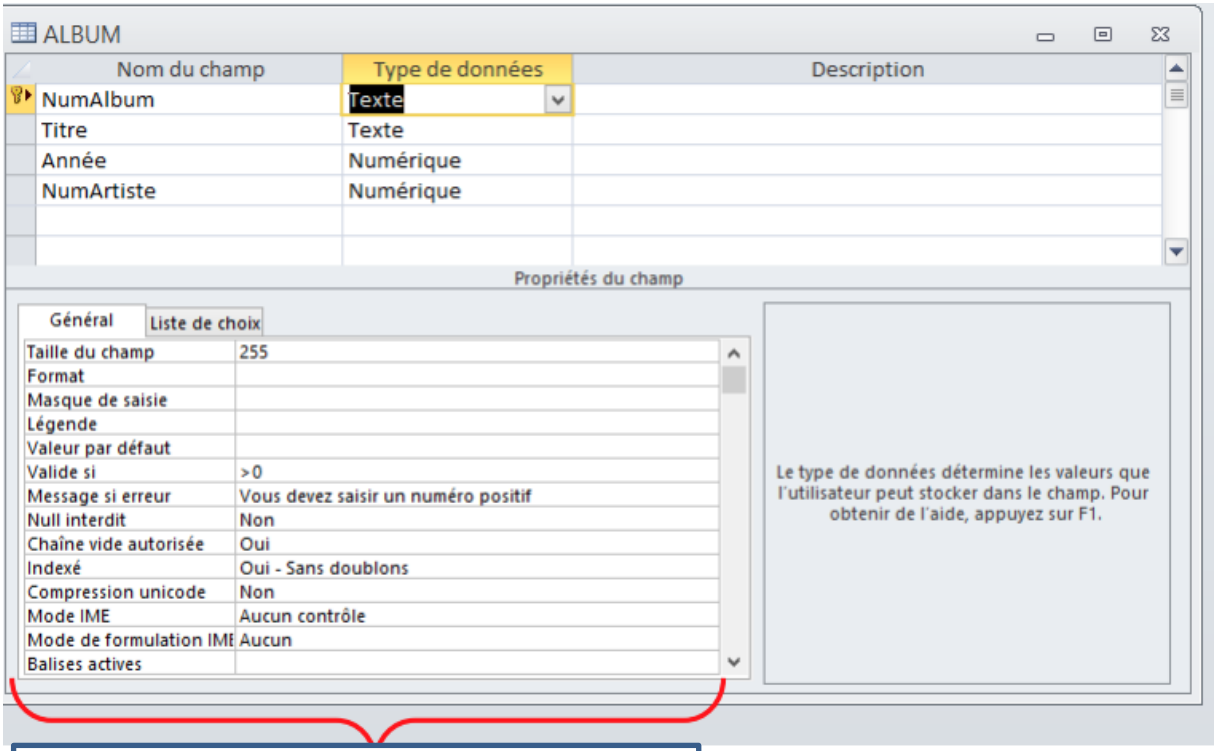
 Text: This is a string of characters. Its size can be specified.

 Yes/No: This corresponds to fields that can only take one of two values, YES or NO.

 Date/Time: Field types that indicate a notion of time. Several formats are available.

Other types that are rarely used

Field properties



Properties that can be specified for a field

Concept of a primary key

□ A primary key in a table is

- **A field or set of fields**

□ That identifies each row in the table

- **No two records can have the same value for the key**

□ For example: in the Album table,

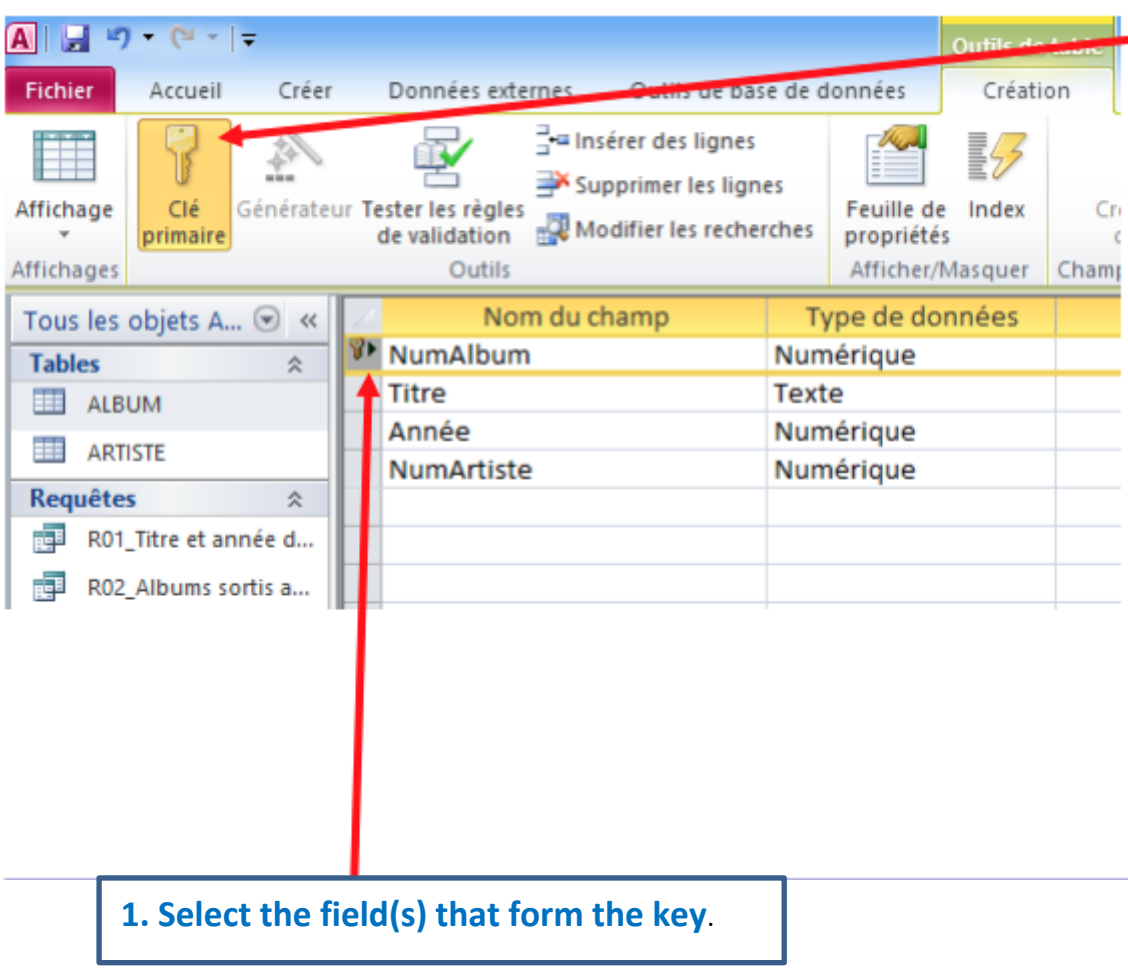
- **the NumAlbum field is a primary key because no two albums can have the same number.**
- **The Year field is not a primary key because two albums can have the same release year.**

Consequences of declaring a primary key

 The system (Access) will refuse to insert a new record if it violates the uniqueness of the primary key value.

 If there is already a record with the same primary key value, the system will refuse to modify the primary key if the new value already exists.

Declaring a primary key



Concept of foreign key

A field (or set of fields) is a foreign key in a table if it references a primary key in another table.

For example:

- **the ArtistID (Num Artiste) field is a primary key in the Artist table,**
- **so this field is a foreign key in the Album table.**

In this case, we refer to referential integrity.

Consequences of declaring a foreign key

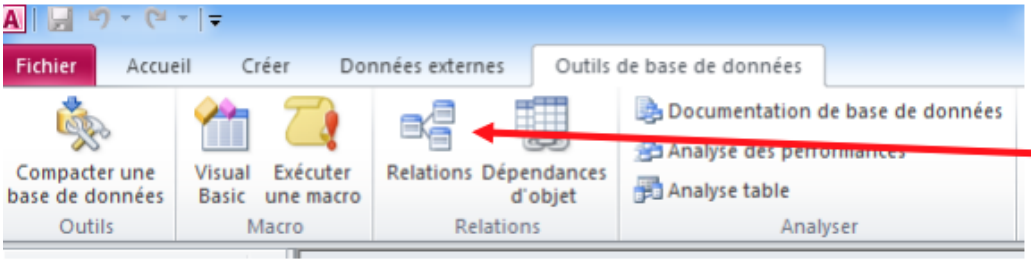
□ The system will refuse to insert an album if its ArtistID does not exist in the Artist table.

□ The system will refuse to delete an artist if there are recordings associated with them in the Album table.

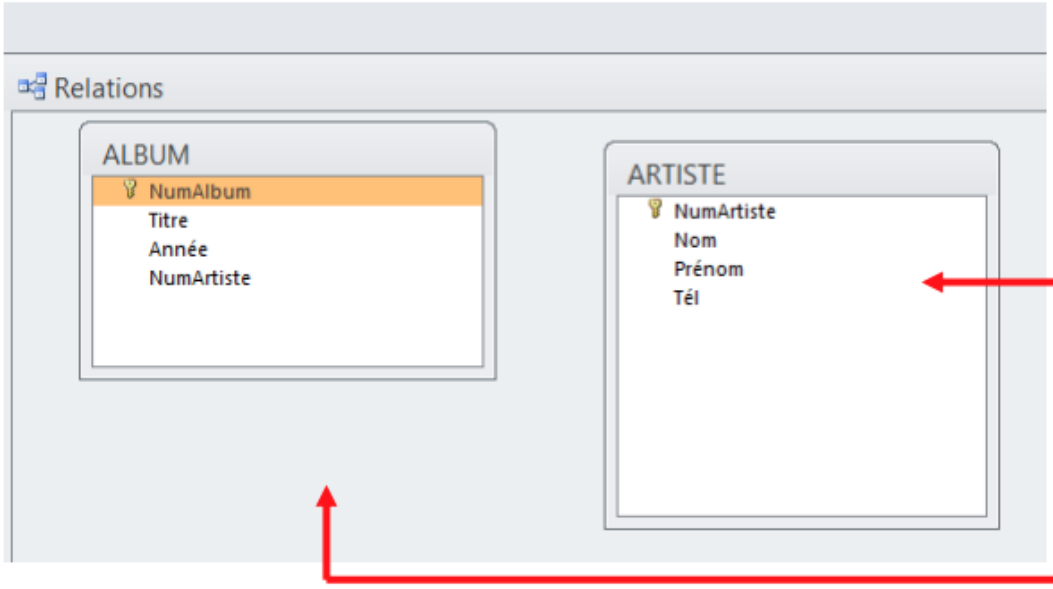
□ The system will refuse to modify a NumArtiste in Album if the new value is not present in Artist.

□ The system will refuse to modify a NumArtiste in Artist if there are already albums associated with the old value.

Creating foreign keys (1)



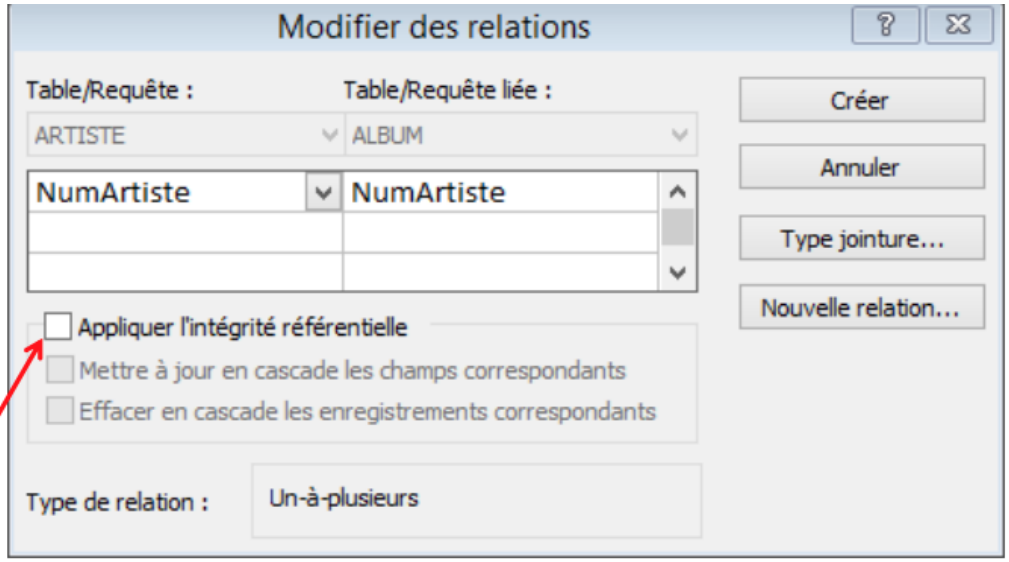
1. Select the field(s) that form the



2. Display both

Artist and Album tables

Creating foreign keys (2)



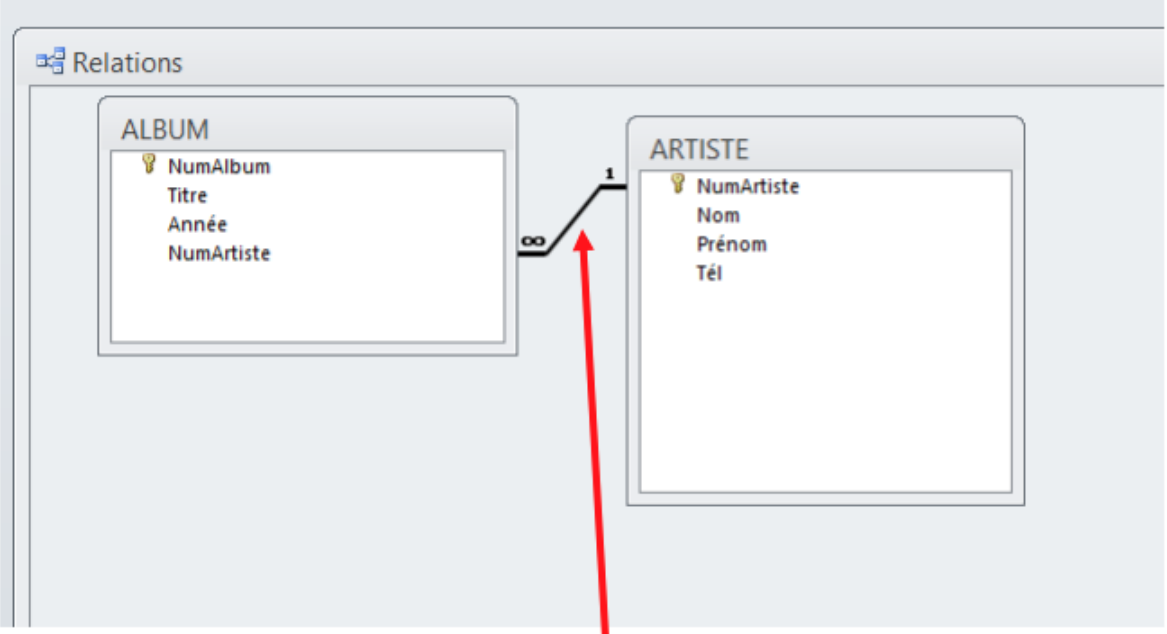
Check this

By moving NumArtist

from Artist to NumArtist

from Album, you get this window..

Creating foreign keys (3)



This relationship means that an artist can be associated with multiple albums, and an album is associated with only one artist.