



UNIVERSITÀ  
DEGLI STUDI  
DI BERGAMO

Dipartimento  
di Ingegneria Gestionale,  
dell'Informazione e della Produzione

# 22059 – APPLIED TOPICS IN MANAGEMENT ENGINEERING

**Excel, Access and Matlab**

Prof. Giuseppe Pellegrini  
Prof. Renato Redondi

# AGENDA

## Lecture IX

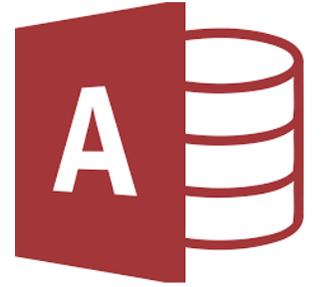
- QUERIES
  - Crosstab queries
    - How to create a Crosstab query
  - Action queries
    - Update queries
      - How to create an Update query
    - Delete queries
      - How to create a Delete query
    - Make Table queries
      - How to create a Make Table query
    - Append queries
      - How to create an Append query
- FURTHER MATERIAL



# QUERIES

## Crosstab queries

- A crosstab query calculates a sum, average, count, or other aggregate function on records, and then groups the results by two types of information: one down the left side of the datasheet and the other across the top.
- It is a special type of query that displays its results in a grid similar to an Excel worksheet.
- A crosstab query usually includes data from more than one table and always includes three types of data:
  - Data used as row headings
  - Data used as column headings
  - Values that you want to sum, count etc.



## QUERIES

### How to create a Crosstab query

- The easiest way to create a crosstab query is to use the Crosstab Query Wizard.
- On Create Tab, in “Query” group, click on Query Design.
- The *New query* window will appear.
- Select “Crosstab query design”.
- Then, click on OK.

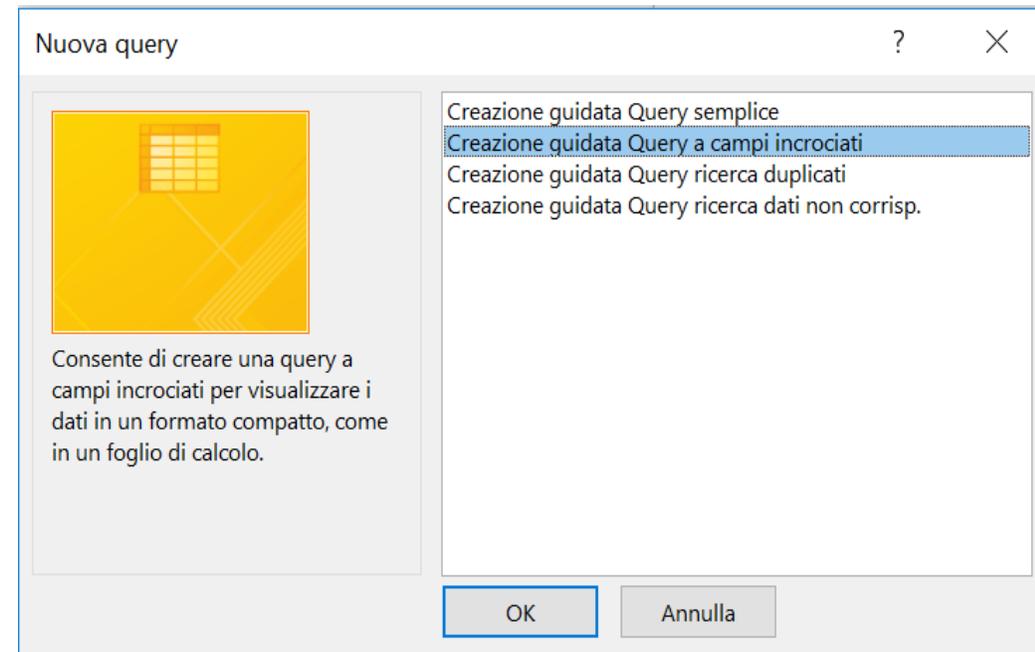
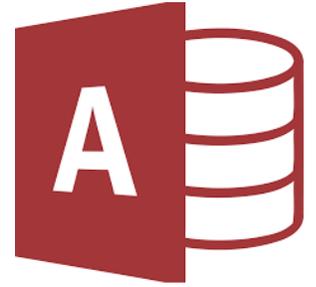
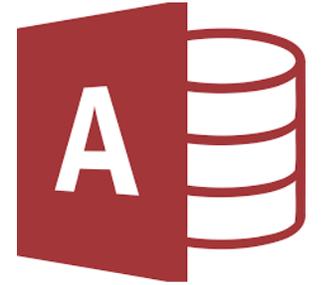


Fig.1: Crosstab query Design

## QUERIES

### How to create a Crosstab query

- The *Crosstab Query Wizard* will appear.
- Select the Table you want. Then, Next.



### Example:

- *Count the number of students by last name and department*

Creazione guidata Query a campi incrociati

Quale tabella o query contiene i campi da utilizzare nella query a campi incrociati?

Per includere campi appartenenti a più tabelle, creare una query contenente tutti i campi necessari ed usarla per creare la query a campi incrociati.

Visualizza

Tabelle  Query  Entrambe

Esempio

	Intestazione1	Intestazione2	Intestazione3
TOTALE			

Tabella: Campi incrociati  
Tabella: Database studenti  
Tabella: Fascia reddito  
Tabella: Rata per Fascia  
Tabella: Studenti selezionati

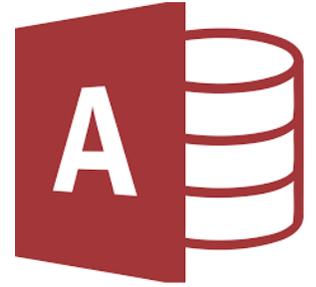
Annulla < Indietro **Avanti >** Fine

Fig.2: Crosstab Query Wizard

# QUERIES

## How to create a Crosstab query

- Choose the field you want to use as row headings. Then, Next.
- Choose the field you want to use as column headings. Then, Next.



Creazione guidata Query a campi incrociati

Da quale campo si desidera trarre i valori da usare come intestazioni di righe?  
È possibile selezionare al massimo tre campi.  
Selezionare i campi nell'ordine in cui si desidera ordinare le informazioni. Ad esempio, si possono ordinare e raggruppare i valori per paese e poi per area geografica.

Campi disponibili:  
MATRICOLA  
NOME  
DIPARTIMENTO

Campi selezionati:  
COGNOME

Esempio

COGNOME	DIPARTIMEN	DIPARTIMEN	DIPARTIMEN
COGNOME1	TOTALE		
COGNOME2			
COGNOME3			
COGNOME4			

Buttons: Annulla, < Indietro, Avanti >, Fine

Fig.3: Selection of row headings

Creazione guidata Query a campi incrociati

Scegliere il campo da cui trarre i valori da usare come intestazioni di colonne.  
Selezionare, ad esempio, Nome dipendente per avere il nome di ciascun dipendente come intestazione di colonna.

MATRICOLA  
NOME  
DIPARTIMENTO

Esempio

COGNOME	DIPARTIMEN	DIPARTIMEN	DIPARTIMEN
COGNOME1	TOTALE		
COGNOME2			
COGNOME3			
COGNOME4			

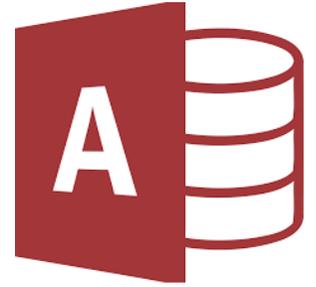
Buttons: Annulla, < Indietro, Avanti >, Fine

Fig.4: Selection of column headings

## QUERIES

### How to create a Crosstab query

- Choose the type of action you want to calculate for each row and column intersection. Then, Next.
- Click on Finish.



Creazione guidata Query a campi incrociati

Quale valore deve essere calcolato per ogni intersezione di riga e colonna?

Ad esempio, si può calcolare l'importo totale degli ordini per ciascun dipendente (colonna) per paese e area geografica (riga).

Effettuare il riepilogo di ciascuna riga?

Includi somme di righe

Campi:

MATRICOLA  
NOME

Funzioni:

Conteggio  
DevSt  
Max  
Media  
Min  
Primo  
Somma  
Ultimo  
Var

Esempio

COGNOME	DIPARTIMEN	DIPARTIMEN	DIPARTIMEN
COGNOME1	Conteggio(MATRICOLA)		
COGNOME2			
COGNOME3			
COGNOME4			

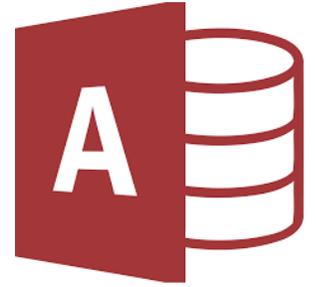
Annulla < Indietro Avanti > Fine

Fig.5: Select the type of action

## QUERIES

### How to create a Crosstab query

- Now, in Design Tab, click on Run.
- The result of the query will appear.



COGNOME	Totale di MA	ECONOMIA	GIURISPRUD	INGEGNERIA	LETTERE	LINGUE
AMATO	6	1	1	3		1
BARBIERI	4	1		2		1
BARONE	7	1	3	1		2
BASILE	6	4	1		1	
BATTAGLIA	2			1	1	
BELLINI	5		2	1	2	
BENEDETTI	8	2	1	3	2	
BERNARDI	8	4	3	1		
BIANCHI	7	2	3		1	1
BIANCO	9	3	2	1	1	2
BRUNO	4		2	1		1

Fig.6: Result of the query

**NB.** A crosstab query can contain empty intersections because the tables used do not always contain values for every possible data point.

## QUERIES

### Action queries

- An action query changes the data in its dataset.
- Once you have made the change, it is very difficult to go back. If you want to edit your action, you usually have to restore the data from a backup copy.
- There are four types of action queries:
  1. Update query → Changes a set of records according to criteria entered.
  2. Delete query → Removes rows that meet the criteria entered.
  3. Make table query → Creates a new table with records copied from an existing table.
  4. Append query → Adds the records at the end of the existing table.

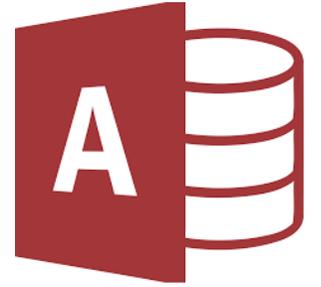


**NB.** Make table query is the only one that does not make changes to the data in the tables.

## QUERIES

### Update queries

- An update query changes a set of records that meet specified criteria.
- Use an update query when you need to add, change, or delete the data in one or more existing records.
- Usually, this kind of query is used when you have to edit several rows in the dataset. This because once you have change something in the dataset is very difficult to go back.



## QUERIES

### How to create an Update query

Example:

*Edit the last name of all students who meet the criterion ROSSI in ROSSO.*

- First of all, you have to create or open a select query.
- On the Design Tab, click Update in the *Query Type* group.

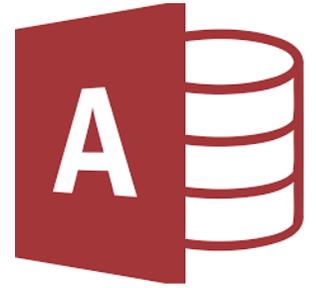
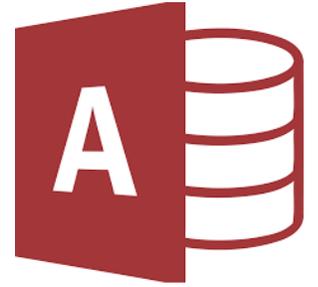


Fig.7: Update in *Query Type* group

## QUERIES

### How to create an Update query

- The Query Builder will appear.
- In the row Criteria and under Last name column, enter the old last name that you want to change, namely “ROSSI”.
- In the row Update to and under Last name column, enter the new last name you want. So, type “ROSSO”.



Campo:	[MATRICOLA]	[COGNOME]	[NOME]	[DIPARTIMENTO]
Tabella:	Database studenti	Database studenti	Database studenti	Database studenti
Aggiorna a:		"ROSSO"		
Criteri:		"ROSSI"		
Oppure:				

Fig.8: Query Builder

## QUERIES

### How to create an Update query

- Now, click on Run.
- A warning window will appear.

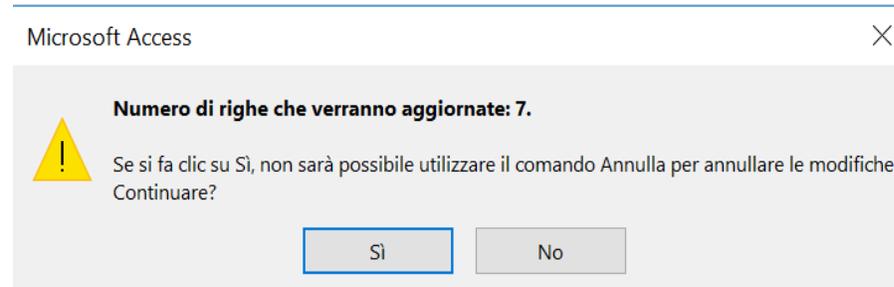


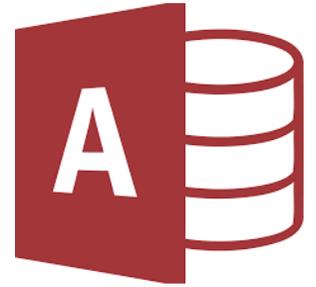
Fig.9: Warning window

[if you have checked the number of rows matching the criterion first, the warning window should confirm that you are performing a correct operation]

- Click on yes.

MATRICOLA	COGNOME	NOME	DIPARTIMEN
2034543	ROSSI	ANNA ROSA	INGEGNERIA
2034569	ROSSI	TAMARA	ECONOMIA
2034598	ROSSI	PATRIZIA	INGEGNERIA
2034710	ROSSI	ANTONELLA	LINGUE
2034794	ROSSI	FERNANDO	LINGUE
2034821	ROSSI	ALDA	INGEGNERIA
2034994	ROSSI	DANIEL	LINGUE

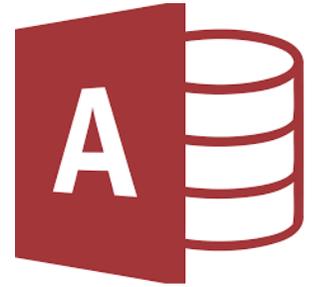
Fig.10: Database rows to edit



## QUERIES

### How to create an Update query

- The dataset has been updated.
- To check the change you can run a select query with the criterion “ROSSO”.



MATRICOLA	COGNOME	NOME	DIPARTIMEN
2034543	ROSSO	ANNA ROSA	INGEGNERIA
2034569	ROSSO	TAMARA	ECONOMIA
2034598	ROSSO	PATRIZIA	INGEGNERIA
2034710	ROSSO	ANTONELLA	LINGUE
2034794	ROSSO	FERNANDO	LINGUE
2034821	ROSSO	ALDA	INGEGNERIA
2034994	ROSSO	DANIEL	LINGUE

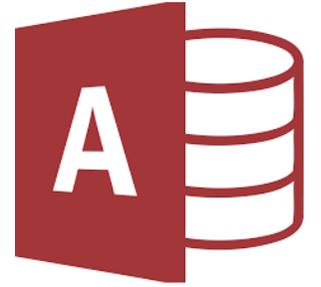
Fig.11: Updated records

- It should be noted that there is correspondence with the rows that were to be changed.

## QUERIES

### Delete queries

- A delete query removes from one or more tables the rows that meet the criteria entered.
- Usually, delete queries are used only when you need to change or remove large amounts of data quickly.
- To remove small quantities of data, it is recommended to do it manually.



## QUERIES

### How to create a Delete query

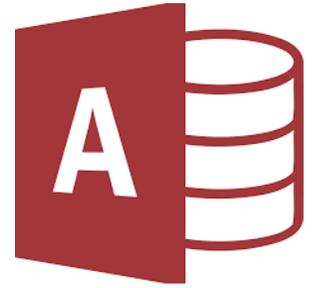
Example:

*Delete all engineering students.*

- First of all, you have to create or open a select query.
- On the Design Tab, click on Delete in the *Query Type* group.



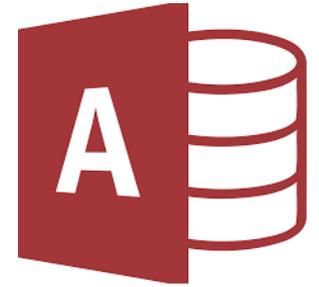
Fig.12:Delete in Query Type group



## QUERIES

### How to create an Delete query

- The Query Builder will appear.
- In the row Criteria and under Department column, enter “ENGINEERING”.



Campo:	[MATRICOLA]	[COGNOME]	[NOME]	[DIPARTIMENTO]
Tabella:	Database studenti	Database studenti	Database studenti	Database studenti
Elimina:	Dove	Dove	Dove	Dove
Criteri:				"INGEGNERIA"
Oppure:				

Fig.13: Query Builder

## QUERIES

### How to create an Delete query

- Now, click on Run.
- A warning window will appear.

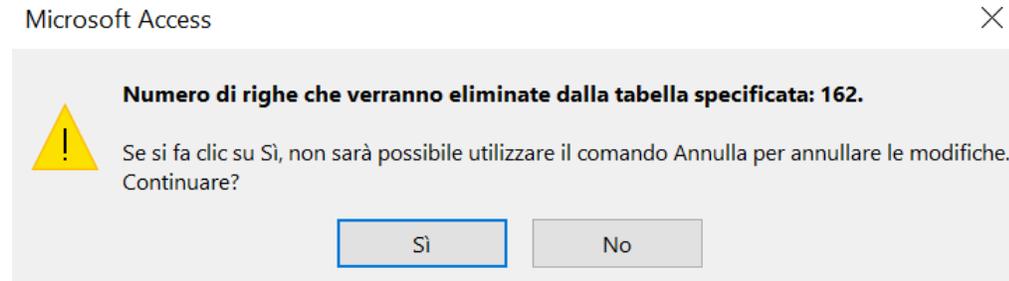
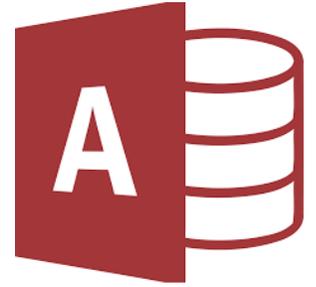


Fig.14: Warning window

- Click on yes.

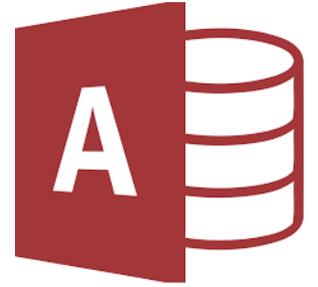
MATRICOLA	COGNOME	NOME	DIPARTIMENTC
2034530	FONTANA	RAFFAELE	LETTERE
2034531	MARINI	SAMUELE	INGEGNERIA
2034532	PARISI	ROBERTA	GIURISPRUDENZA
2034533	SERRA	LORETTA	GIURISPRUDENZA
2034534	RUSSO	ITALO	LETTERE
2034535	LONGO	FLAVIO	INGEGNERIA
2034536	MANCINI	MARIA GABRIE	INGEGNERIA
2034537	RUSSO	ELISABETTA	INGEGNERIA
2034538	LEONE	IRENE	INGEGNERIA
2034539	PALMIERI	FEDERICA	GIURISPRUDENZA
2034540	BARONE	SANDY	GIURISPRUDENZA

Fig.15: Some engineering students in the dataset

## QUERIES

### How to create an Delete query

- The dataset has been updated.
- To check the change you can run a select query with the criterion “ENGINEERING”.



MATRICOLA	COGNOME	NOME	DIPARTIMENTO
2034530	FONTANA	RAFFAELE	LETTERE
#Eliminato	#Eliminato	#Eliminato	#Eliminato
2034532	PARISI	ROBERTA	GIURISPRUDENZA
2034533	SERRA	LORETTA	GIURISPRUDENZA
2034534	RUSSO	ITALO	LETTERE
#Eliminato	#Eliminato	#Eliminato	#Eliminato
#Eliminato	#Eliminato	#Eliminato	#Eliminato
#Eliminato	#Eliminato	#Eliminato	#Eliminato
#Eliminato	#Eliminato	#Eliminato	#Eliminato
2034539	PALMIERI	FEDERICA	GIURISPRUDENZA
2034540	BARONE	SANDY	GIURISPRUDENZA

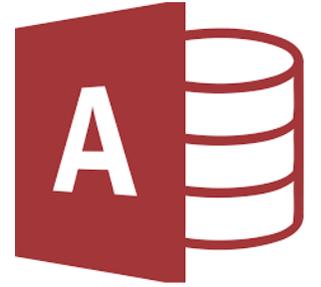
Fig.16: Deleted records

- It should be noted that there is correspondence with the rows that were to be changed.

## QUERIES

### Make Table queries

- A make table query creates a new table with records copied from an existing table.
- You may use a make table query when you want to create a new table based on query criterion or criteria from an existing table.
- If you run a make table query with no criterion or criteria, Access will make a duplicate of the table with the title you will provide. This may be an easy way to create the backup of a table before running an action query that edit the dataset.



## QUERIES

### How to create a Make Table query

Example:

*Make a table containing engineering students.*

- First of all, you have to create or open a select query.
- On the Design Tab, click on Make Table in the *Query Type* group.

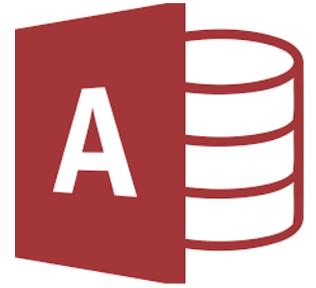


Fig.17: Make Table in *Query Type* group

## QUERIES

### How to create a Make Table query

- The Create Table window will appear.
- Enter the name you want to give to the table.
- Then, select OK.

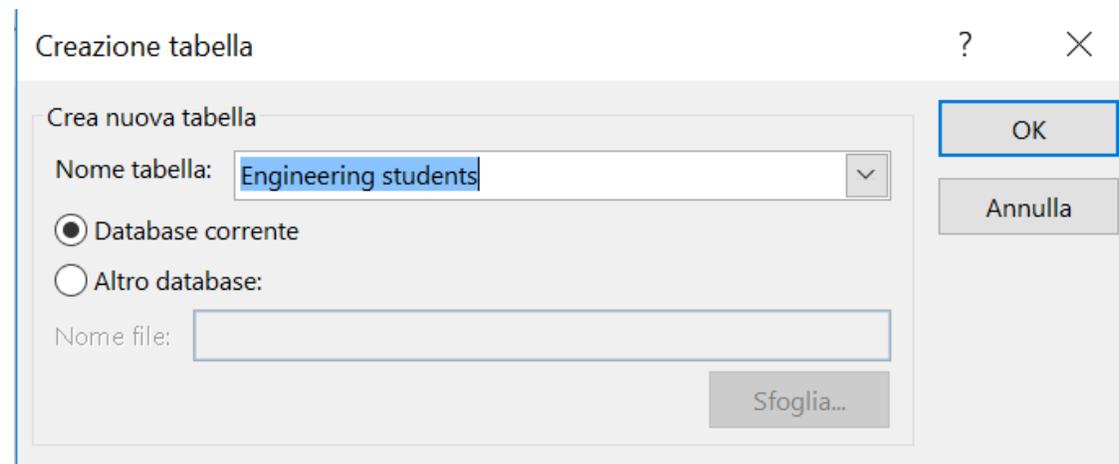
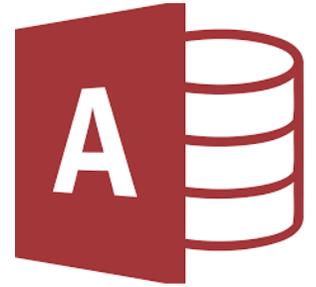
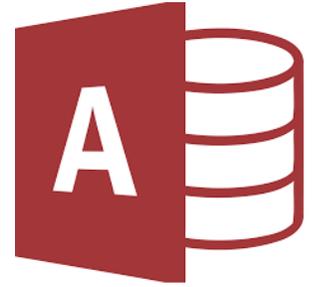


Fig.18: Create Table window

## QUERIES

### How to create a Make Table query

- The Query Builder will appear.
- In the Criteria row under Department column, type “ENGINEERING”.



Campo:	[MATRICOLA]	[COGNOME]	[NOME]	[DIPARTIMENTO]
Tabella:	DB STUDENTI INIZIALE	DB STUDENTI INIZIALE	DB STUDENTI INIZIALE	DB STUDENTI INIZIALE
Ordinamento:				
Mostra:	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Criteri:				"INGEGNERIA"
Oppure:				

Fig.19: Query Builder

## QUERIES

### How to create a Make Table query

- Now, click on Run.
- A warning window will appear.

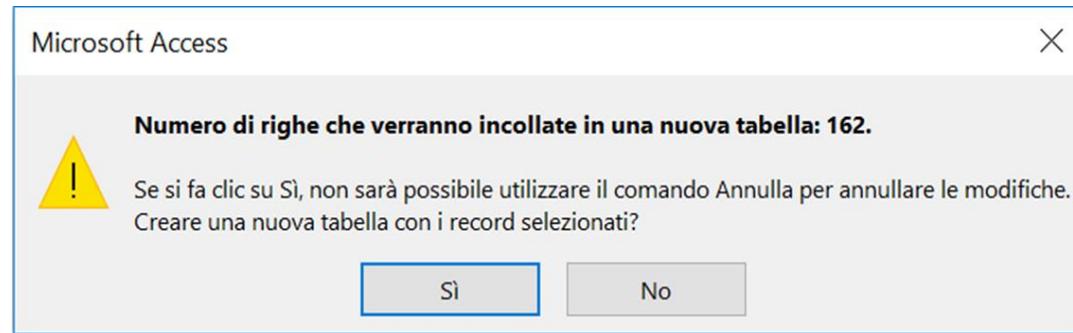
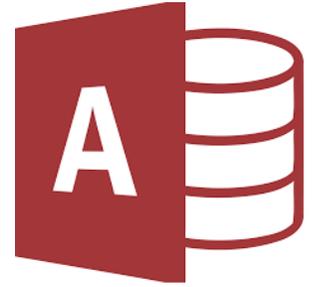


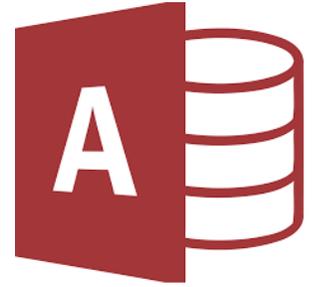
Fig.20: Warning window

- Click on yes.

## QUERIES

### How to create a Make Table query

- The Table has been created.
- It is composed by 162 rows, corresponding to 162 students.
- To show the Table, you have to go to All Access Objects and select the title you have entered in the previous step.



MATRICOLA	COGNOME	NOME	DIPARTIMEN
2034529	RIVA	ION	INGEGNERIA
2034531	MARINI	SAMUELE	INGEGNERIA
2034535	LONGO	FLAVIO	INGEGNERIA
2034536	MANCINI	MARIA GABRIE	INGEGNERIA
2034537	RUSSO	ELISABETTA	INGEGNERIA
2034538	LEONE	IRENE	INGEGNERIA
2034543	ROSSI	ANNA ROSA	INGEGNERIA
2034544	ESPOSITO	OLIMPIA	INGEGNERIA
2034547	CARBONE	BENEDETTA	INGEGNERIA
2034551	VALENTINI	CLARA	INGEGNERIA
2034553	RUGGIERO	GRAZIELLA	INGEGNERIA
2034554	DI STEFANO	SAMANTHA	INGEGNERIA

2034559	BARBIERI	THOMAS	INGEGNERIA
2034563	DE LUCA	VINCENZA	INGEGNERIA
2034565	ESPOSITO	VINCENZA	INGEGNERIA
2034568	PIRAS	CARLOTTA	INGEGNERIA
2034574	DE ANGELIS	ORESTE	INGEGNERIA
2034577	GRASSO	MARISA	INGEGNERIA
2034582	TESTA	GIADA	INGEGNERIA
2034583	ESPOSITO	EMILIANO	INGEGNERIA
2034587	CARBONE	ROMANA	INGEGNERIA
2034590	PALUMBO	SILVIA	INGEGNERIA
2034592	MESSINA	BEATRICE	INGEGNERIA

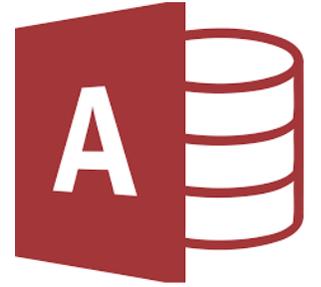
Record: 1 di 162

Fig.21: Table of all engineering students

## QUERIES

### Append queries

- An append query adds a set of records from one or more source tables (or queries) to one or more destination tables.
- Usually, the source and destination tables reside in the same database, but not necessarily.
- You cannot use this kind of query to change the data in individual fields in existing records (To do this, see the sub-chapter *How to create an Update query*).
- To add rows of data that might meet or not some criteria, you can only use append queries.



## QUERIES

### How to create an Append query

Example:

*You want to append to the engineering students' table the economics students' table.*

- First of all, you have to create or open a select query.
- On the Design Tab, click on Append in the *Query Type* group.

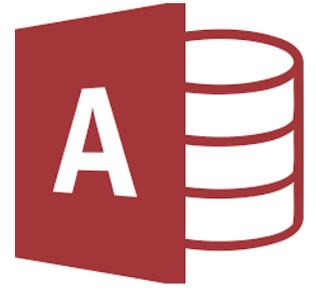


Fig.22: Append in Query Type group

## QUERIES

### How to create an Append query

- The Append window will appear.
- Enter the name of the table to which you want to append the table containing the economics students .
- Then, select OK.

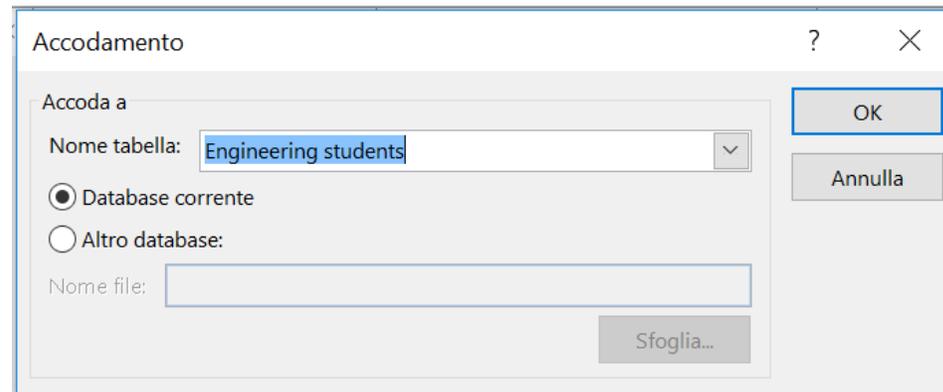
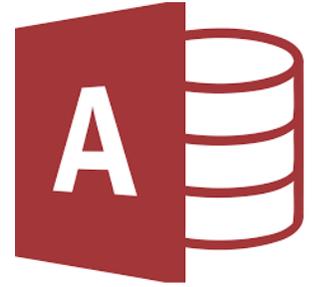
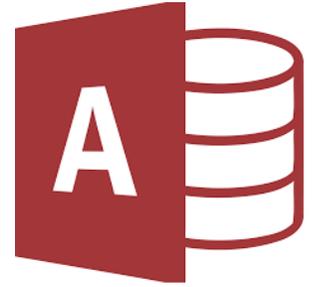


Fig.23: Append window

## QUERIES

### How to create an Append query

- The Query Builder will appear.
- Since the column headings are the same in both the tables, it can be used a single column with the \*.



Campo:	Economics students.*
Tabella:	Economics students
Ordinamento:	
Accoda a:	Engineering students.*
Criteri:	
Oppure:	

Fig.24: Query Builder

## QUERIES

### How to create an Append query

- Now, click on Run.
- A warning window will appear.

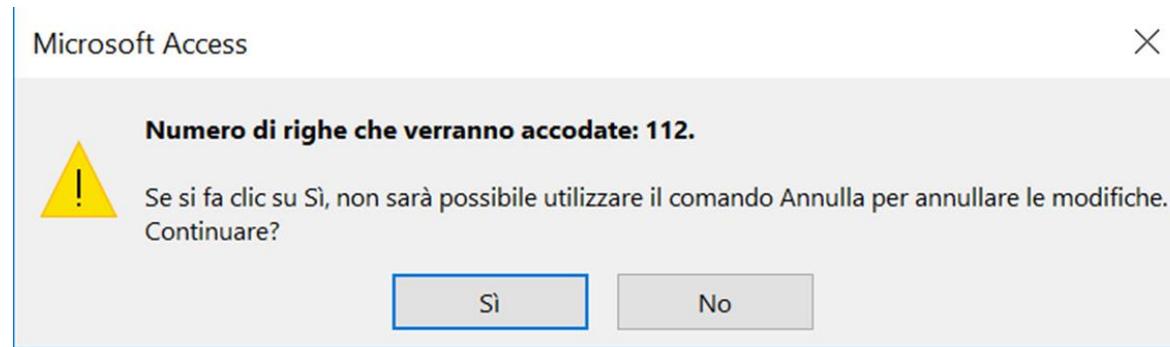
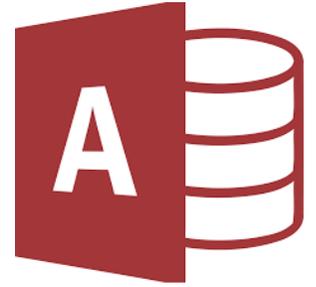


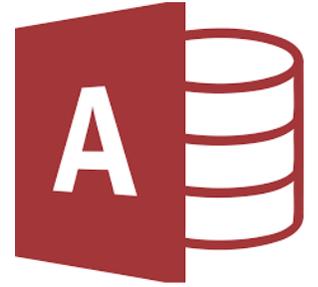
Fig.25: Warning window

- Click on yes.

## QUERIES

### How to create an Append query

- The query has been run.
- The Engineering student table, now consists of 274 files, corresponding to the sum of 162 engineering students and 112 economics students.



MATRICOLA	COGNOME	NOME	DIPARTIMEN
2035046	GALLO	DINO	INGEGNERIA
2035052	SILVESTRI	LUCIANA	INGEGNERIA
2035053	GALLO	ELIANA	INGEGNERIA
2035056	MARTINI	MARISA	INGEGNERIA
2034514	FERRARO	ALBERTO	ECONOMIA
2034516	GALLI	MANLIO	ECONOMIA
2034517	LEONE	DORIANA	ECONOMIA
2034519	FERRARA	DANIELE	ECONOMIA

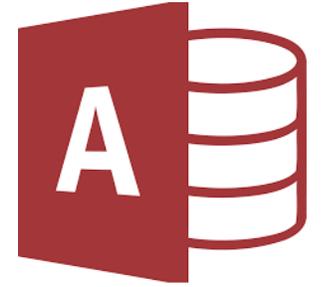
Record: 1 di 274

Economics students append  
to engineering students

Fig.26: List of engineering and economics students

# FURTHER MATERIAL

To review and deepen the topics of this lecture



1. <https://www.youtube.com/watch?v=udNPGRIAVwl>
2. [https://www.youtube.com/watch?v=ZcWprq\\_hgOc](https://www.youtube.com/watch?v=ZcWprq_hgOc)
3. <https://www.youtube.com/watch?v=nTR0LD8Xjxo>
4. [https://www.youtube.com/watch?v=F\\_nHDAyVgVo](https://www.youtube.com/watch?v=F_nHDAyVgVo)
5. [https://www.youtube.com/watch?v=nx\\_-z-uuw5Y](https://www.youtube.com/watch?v=nx_-z-uuw5Y)
6. Alexander, M., & Kusleika, R. (2018). Access 2019 Bible. John Wiley & Sons.