



**Joint and Open REsearch Programmes:
features and potentialities of the JOREP database**

IRCrES-CNR, Rome – November 27-28, 2014

**PRESENTATION AND APPLICATION OF
QUERYING TECHNIQUES TO JOREP DATASET**

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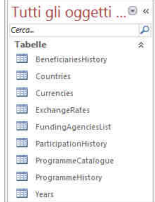
RISIS
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JOREP and MS Access

- JOREP data are implemented in **MS Access 2013**.
- Access environment:
 - complex data
 - several sets of information from different archives
 - custom views of data.
- You are displaying a **demo version of JOREP dataset**, created to introduce you for potential future uses of the dataset.



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Objects in MS access



- A dataset primary purpose is **to store data**.
- According to the need of the user, MS Access allows 'playing' with data through different '**objects**':
 - TABLES -> to ORGANIZE and STORE Data (back-end)
 - FORMS -> to ENTER Data (back-end)
 - **QUERIES -> to VIEW and ANALYZE Data (front-end)**
- As a first step, we can define queries as "objects" (similar in structure to the tables) providing **flexible** ways for any database **manipulation operation** (latin word: *quaerere*).

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Why creating Access query?




- Queries enable user to **extract data**.
- You can create a query when you need **ONLY** a **specific portion** of the data form tables (or existing queries).
 - For example, you may **only need to see joint R&D programmes which France participates to**. The response would be to display only the records whose state field matches with French participation.
- Multiple tables or queries can be used.
- Restrictions can be used
 - e.g. Comparison operators

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Creating a query in JOREP

- By using the **Query Wizard**, you can create only very simple queries (*quick-and-dirty way*).
- We'll create all our queries using the **Design View**. Once designed, the results of a query can be displayed in Datasheet View
- What you can do with Access queries in JOREP
 - Choose tables (e.g. *ProgrammeCatalogue, ParticipationHistory*)
 - Choose fields of your interest (e.g. *Countries, NABS, Amount*)
 - Provide criteria (e.g. *only particular NABS*)
 - Sort records (e.g. *by country*)
 - Perform calculations (e.g. *sum amounts of investments*)...

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The Query Design view window

Field: This is where field names are entered or added.

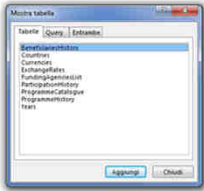
Table: This row shows the table the field is from. This is useful in queries with multiple tables.



Sort: This row enables sorting instructions for the query.



Show: This row determines whether to display the field in the returned recordset.

Criteria: This row consists of the criteria that filter the returned records.

Or: This row is the first of a number of rows to which you can add multiple query criteria.



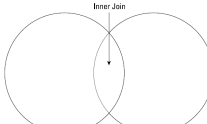








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Creating Queries using Multiple Tables

- Access makes it easy to **join two or more tables**.
- The first step is adding the tables to your query, using the **Show Table window**. If you're creating a new query in Design view, the Show Table window appears right away!
- Once you have your **related tables** in the query design window, you're ready to choose the fields you want. You can **pick fields from multiple tables**.
- In JOREP all the 1:M relationship are built with INNER JOINS by default.

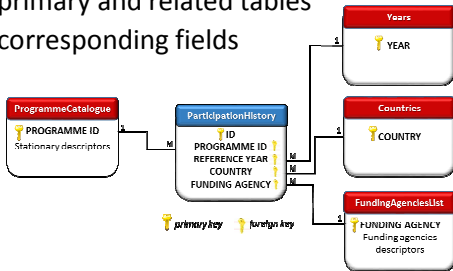







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Before creating a query


- **Review each table!**
 - Identify necessary information such as data type (short text; numeric), and so on.
 - Possibly figure it out manually
- **Review relationships!**
 - Identify primary and related tables
 - Identify corresponding fields










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More about a query

- Do not include any **unnecessary tables or queries** in Design View of the query (probably you will have to deal with unexpected problems!)
- Always use a **primary table** 

ProgrammeCatalogue	FundingAgenciesList	Countries	Years
 PROGRAMME ID	 FUNDING AGENCY	 COUNTRY	 YEAR





- Restrictions **MUST** be used.
- You can use... other queries in order to create a new query

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Focus on the select queries


- A **select query** is the most common type of query.
- It retrieves data from one or more tables and displays the results in a datasheet
- You can choose **what 'fields' to view, sort records by one or more fields; limit which records you see (classic selection criteria); combine data from multiple tables;** and so on...
- You can also use a select query to group records and calculate sums, counts, averages, and other types of totals.







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A last advice before starting

- The secret to a good query is getting **the information you want, and nothing more.**
- To tell Access what records it should get (and which ones it should ignore), you need a **filter expression!**
- A little of data syntax
 - **Fields of tables:** square brackets
 - **Strings:** enclosed in double quotes
 - **Date:** enclosed #








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Types of operators

- You can use the **relational operators:**
 - < less than
 - <= less than or equal to
 - = equal to
 - <> Not equal to
 - > Greater
 - >= Greater than or equal to
- **Logical operators:**
 - And, Or, Not
- The **logic functions:**
 - IIF
- **Other functions:**
 - IsNull; Like

There are seven basic mathematical operators:


+	Addition
-	Subtraction
*	Multiplication
/	Division
\	Integer division
^	Exponentiation






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Creating Queries using Multiple Tables (step-by-step)

1. Choose *Create* → *Queries* → *Query Design*
2. Select the table that has the data you want, and then click *Add* (or just double-click the table)
3. Select the fields you want to include in your query.
4. Arrange the fields from left to right in the order you want them to appear in the query results.
5. Choose a sort order
6. Set your filtering criteria
7. Choose *Query Tools* | *Design* → *Results* → *Run*
8. Save the query



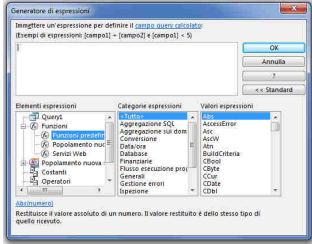



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Query 'functions'

- A function is a built-in algorithm that takes some data that you supply, performs a calculation, and then returns a result.
- The difference between functions and the mathematical operators is the fact that **functions can perform far more complex operations.**
- Functions: name followed by () / Use of "Build" function





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Ready?

Now we can start with...
...some **research topics**

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RESEARCH TOPIC / A

Joint programming landscape evolution

- How relevant are joint programming in the European Research Area? Did investment in joint programmes change over the years?
- What is the importance of European and National funding in joint programming?
- Which are the main authorities behind their establishment?

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Generating query A.1

- I know that JOREP dataset contains data on national investments in Joint R&D programmes from 11 sample countries. I need to know how much each country invested for each year (from 2000 on) along the life of each programme. I would like to know the data in Euro.

ProgrammeCatalogue

- ProgrammeID
- StartYear
- EstablishingAutho
- RemarksEstablishir

ParticipationHistory

- ID
- ProgrammeID
- ReferenceYear
- ParticipatingCo
- FirstYearNation

Years

- Years

Currencies

- Currency

ExchangeRates

- ID
- Year
- Currency
- Amount

ProgrammeID	ParticipatingCountry	Amount	Currency	ReferenceYear	Amount	amount_euro: [ParticipationHistory].[Amount]*[ExchangeRates].[Amount]
ProgrammeCatalogue	ParticipationHistory	ParticipationHistory	Currencies	ParticipationHistory	ExchangeRates	
Raggruppamento	Raggruppamento	Raggruppamento	Raggruppamento	Raggruppamento	Raggruppamento	Raggruppamento
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Generating query A.2

- Well, now I want to know the total amount invested for all the programmes. I think data could be biased by the presence of ESA programme (with/without ESA).

qryAIESAexc_amo...

- ProgrammeID
- StartYear
- ParticipatingCo
- ParticipationHi:
- Currency

ProgrammeCatalogue

- ProgrammeID
- StartYear
- EstablishingAutho
- RemarksEstablishir

ProgrammeHistory

- ID
- ProgrammeID
- ReferenceYear
- NameProgEng
- ProgrammeDuri:

ProgrammeID

ProgrammeCatalogue

Raggruppamento

<> "PEU041"

ProgrammeID	NameProgEng	EstablishingAuthc	amount_euro
ProgrammeCatalogue	ProgrammeHistory	ProgrammeCatalogue	qryAIESAexc_amount
Raggruppamento	Raggruppamento	Raggruppamento	Somma
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Generating query A.3


- I guess that funding volume increases over years. Is it true?

qryA1ESAinc_amount_eur...

- ProgrammeID
- ParticipatingCountry
- ParticipationHistory.Amount
- Currency
- ReferenceYear
- ExchangeRates.Amount
- amount_euro

ReferenceYear	amount_euro
qryA1ESAinc_amount	qryA1ESAinc_amount
Raggruppamento	Somma
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>





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Generating Query A.4

- It would be interesting to know investments in joint R&D Programmes in a specific year only...

ProgrammeCatalogue

- ProgrammeID
- StartYear
- EstablishingAuthor
- RemarksEstablishir


ProgrammeHistory


- ID
- ProgrammeID
- ReferenceYear
- NameProgEng
- ProgrammeDur

qryA1ESAinc_amou...

- ProgrammeID
- ParticipatingCo
- ParticipationHi
- Currency
- ReferenceYear

ProgrammeID	NameProgEng	ReferenceYear	amount_euro
ProgrammeCatalogue	ProgrammeHistory	qryA1ESAinc_amount	qryA1ESAinc_amount
Raggruppamento	Raggruppamento	Raggruppamento	Somma
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2009	<input checked="" type="checkbox"/>






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Generating Query A.5

- What is the main authority establishing joint R&D programmes? What is the distribution of amount of investments by authority?

```
qryA2ESAexc_sub1_ammoun...
*
ProgrammeID
NameProgEng
EstablishingAuthority
SommaDiamount_euro
```

EstablishingAuthc	ProgrammeID	SommaDiamount_eur
qryA2ESAexc_sub1_an	qryA2ESAexc_sub1_an	qryA2ESAexc_sub1_an
Raggruppamento	Conteggio	Somma
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>



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RESEARCH TOPIC / B

Patterns of National participations in joint programming

- Are there any differences by country in the participation to joint programming?
- Can we identify different patterns of integration?
- How do countries participate to the same programmes?



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Generating Query B.1

- I would like to know how much invested each sample country for each joint R&D programme contained in JOREP. I want to match this information with data on categories of the programme.

ProgrammeCatalogue

- ProgrammeID
- StartYear
- EstablishingAutho
- RemarksEstablishir

ProgrammeHistory

- ID
- ProgrammeID
- ReferenceYear
- NameProgEng
- ProgrammeDuri

qryAIESAinc_amo...

- ProgrammeID
- ParticipatingCo
- ParticipationHi
- Currency
- ReferenceYear

ProgrammeID	ParticipatingCountry	amount_euro	ERACategory
ProgrammeCatalo	qryAIESAinc_amount	qryAIESAinc_amount	ProgrammeHistory
Raggruppamento	Raggruppamento	Somma	Raggruppamento
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Generating Query B.1.1

- For each country, I am interested in counting all the participation to the programmes, how did it invest, the minimum and maximum for the expense and the average of investment

qryB1_national_parti...

- ProgrammeID
- ParticipatingCount
- SommaDiamount_e
- ERACategory

ParticipatingCoun	ProgrammeID	SommaDiamount_eur	SommaDiamount_eur	SommaDiamount_eur	SommaDiamount_eur
qryB1_national_partic	qryB1_national_partic	qryB1_national_partic	qryB1_national_partic	qryB1_national_partic	qryB1_national_partic
Raggruppamento	Conteggio	Somma	Min	Max	Media
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<< European level					

Generating Query B.2

- I would like to know how much it was invested in the different typologies of joint R&D programmes.

ProgrammeCatalogue

- ProgrammeID
- StartYear
- EstablishingAuthor
- RemarksEstablishing

ProgrammeHistory

- ID
- ProgrammeID
- ReferenceYear
- NameProgEng
- ProgrammeDuration

qryB1_national_parti...

- ProgrammeID
- ParticipatingCount
- SommaDiamount_eur
- ERACategory

ProgrammeID	NameProgEng	ParticipatingCountry	ERACategory	ProgrammeTypology	FundingModel	SommaDiamount_eur
ProgrammeCatalogue	ProgrammeHistory	qryB1_national_partic	ProgrammeHistory	ProgrammeHistory	ProgrammeHistory	qryB1_national_partic
Raggruppamento	Raggruppamento	Raggruppamento	Raggruppamento	Raggruppamento	Raggruppamento	Raggruppamento
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Generating Query B.3/B.4

- I am interested in counting how many countries from the sample participate to the joint R&D programmes and how much is their total investment.
- I want to know how much was invested by countries in programmes by typology of programme

qryB2_nat_participat...

- ProgrammeID
- NameProgEng
- ParticipatingCo
- ERACategory
- ProgrammeTypo

ProgrammeID	NameProgEng	ParticipatingCountry	ProgrammeTypology	SommaDiamount_eur
qryB2_nat_participati	qryB2_nat_participati	qryB2_nat_participati	qryB2_nat_participati	qryB2_nat_participati
Raggruppamento	Raggruppamento	Conteggio	Raggruppamento	Somma
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

qryB3_national_parti...

- ProgrammeID
- NameProgEng
- ConteggioDiPartic
- ProgrammeTypolo
- SommaDiSommaDi

ProgrammeTypolo	ProgrammeID	SommaDiSommaDiam
qryB3_national_partic	qryB3_national_partic	qryB3_national_partic
Raggruppamento	Conteggio	Somma
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Generating Query B.5

- I am interested in studying partnerships in bilateral programmes contained in JOREP. How can I extract the data I need?

ProgrammeHistory

- ID
- ProgrammeID
- ReferenceYear
- NameProgEng
- ProgrammeDuration
- RemarksProgrammeDuration
- ProjectDuration

ProgrammeID	NameProgEng	ERACategory	PartnerCountries
ProgrammeHistory	ProgrammeHistory	ProgrammeHistory	ProgrammeHistory
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<> European-level pr	

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Generating Query B.6

- I want to exploit JOREP dataset because I am interested to know what were the contractors countries of the ERA-Net (FP6 only).

ProgrammeCatalogue

- ProgrammeID
- StartYear
- EstablishingAutho
- RemarksEstablishir

ProgrammeHistory

- ID
- ProgrammeID
- ReferenceYear
- NameProgEng
- ProgrammeDuri

ProgrammeID	NameProgEng	ProgrammeTypology	ERACategory	PartnerCountries	StartYear	Espr1: If([StartYear] <= 2007; 'FP6'; 'FP7')
ProgrammeCatalo	ProgrammeHistory	ProgrammeHistory	ProgrammeHistory	ProgrammeHistory	ProgrammeCatalogue	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Not Like '1'	European-level prog			*FP6*

The IIF function evaluates a specific condition and returns a result based on a false or true determination

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RESEARCH TOPIC / C

Joint programming, scientific domains and political objectives

- Is there a concentration of joint programming on specific scientific areas?

ProgrammeCatalogue




- ProgrammeID
- StartYear
- EstablishingAutho
- Remarks:Establishir

1

∞

ProgrammeHistory

- ID
- ProgrammeID
- ReferenceYear
- NameProgEng
- ProgrammeDurc

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Query C.1/C.2




- How much is the total investment in joint R&D programmes by NABS?

SUM BY PROGRAMME

ProgrammeID	NABSResearchTopics	amount_euro
ProgrammeCatalogue	ProgrammeHistory	qryA1ESAinc_amount
Raggruppamento	Raggruppamento	Somma
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

COUNT + SUM BY NABS

NABSResearchTop	ProgrammeID	SommaDiamount_eur
ProgrammeHistory	ProgrammeCatalogue	qryD1_progNabs_ESA
Raggruppamento	Conteggio	Somma
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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Wrap up

- JOREP queries returns dynamic set of records not stored within the dataset unless you have directed Access to build a record from those records.
- When you save a query, only the structure of the query is saved, not the returned records.
- Through creating a query you can sort data, set criteria to limit the results, using operators and expressions.

