A Query Rosetta Stone: Natural Language, Microsoft Access QBE, SQL, and Relational Algebra

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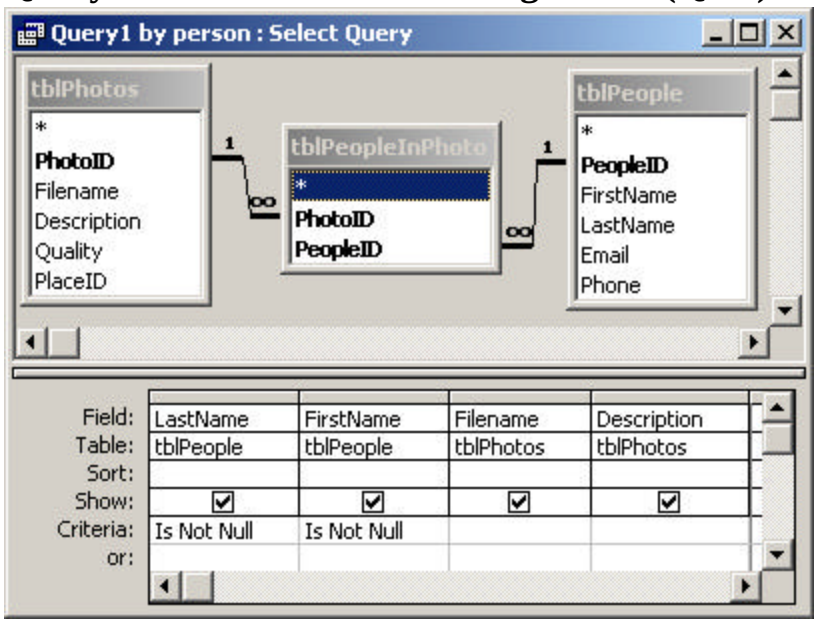
Query in Natural Language

One person can be in one or many photos and one photo can contain zero, one, or many people. List all the people who are in photos along with the filename and the description of the photo(s) they are in. People and photos may be listed multiple times, but a person will never be in the same photo twice (assuming the photos have not been doctored).

Query in Microsoft Access Design View (QBE)



Query in SQL generated by Access

```
SELECT [tblPeople].[LastName], [tblPeople].[FirstName],
[tblPhotos].[Filename], [tblPhotos].[Description]
FROM (tblPeople INNER JOIN tblPeopleInPhoto ON
[tblPeople].[PeopleID] = [tblPeopleInPhoto].[PeopleID]) INNER JOIN
tblPhotos ON [tblPeopleInPhoto].[PhotoID] = [tblPhotos].[PhotoID]
WHERE ((([tblPeople].[LastName]) Is Not Null) And
(([tblPeople].[FirstName]) Is Not Null));
```

Query in SQL cleaned up for readability

```
SELECT  tblPeople.LastName, tblPeople.FirstName, tblPhotos.Filename, tblPhotos.Description
FROM    (tblPeople INNER JOIN tblPeopleInPhoto ON tblPeople.PeopleID = tblPeopleInPhoto.PeopleID)
        tblPhotos INNER JOIN ON tblPhotos.PhotoID = tblPeopleInPhoto.PhotoID
WHERE   (tblPeople.LastName Is Not Null) AND (tblPeople.FirstName Is Not Null);
```

Query in Relational Algebra (color-coded to match the SQL)

R1 ← tblPeople **equijoin**$_{\text{PeopleID=PeopleID}}$ tblPeopleInPhoto — *join tblPeople and tblPeopleInPhoto*

R2 ← R1 **equijoin**$_{\text{PhotoID=PhotoID}}$ tblPhotos — *join the result of the first join, R1, with tblPhotos*

R3 ← σ LastName != Null (R2) — *select only those R2 records where LastName is not null*

R4 ← σ FirstName != Null (R2) — *select only those R2 records where FirstName is not null*

R5 ← R3 Ç R4 — *intersect (AND) R3 and R4*

Result ← π LastName, FirstName, Filename, Description (R5) — *project 4 fields (columns) in the final Result*