Homework Assignment 4: Relational Algebra Queries

Please submit via Canvas.

Translate each of the English-language information requests below into a relational algebra query. You do not need to provide SQL or the actual output tables, though you may find it useful to compute results as you formulate relational algebra expressions. Base your answers on the following relations (see sample data on the next page):

BANDS(Id, Name, FormedIn, Country)

MUSICIANS(MId, Name, BandId, FromYear, ToYear)

ALBUMS(AId, Title, BandId, Year)

You may abbreviate relation names using just the first letter of each (B, M, A)

Exercises

1. Find all musicians who played with their band in year 1970. Output the names of the musicians.

2. Find all musicians who played with their band in year 1970. Output the names of the musicians and the name of the band they played in.

3. Find all musicians who played in the band 'King Crimson' in the year 1974. Output the names of the musicians.

4. Find all musicians who played in their band in the band's year of formation. Output the names of the musicians and the names of the bands.

5. Find all musicians who played in the band 'Pink Floyd' in the year 1971. Output the names of the musicians.

6. Find the band in which 'Michael Karoli' played. Report the name of the band.

7. Find all musicians who participated in recording of the album 'Meddle'. Output the names of the musicians.

8. Find all bands that recorded two albums in the same year. For each band, output its name, titles of both albums and the year of their release. Expected result:

Band Name	Album 1	Album 2	Year
...	...	...	...

9. Find all bands in which 'Irmin Schmidt' DID NOT play. Output the names of the bands.

10. Find all 'Pink Floyd' band members who did NOT participate in the recording of the album 'Meddle'. (note: a musician did not participate in a recording of an album if s/he did not play in the band that year).

11. For each band, find the band ID, the name of the band, and the total number of albums listed in the database for the band.

12. Find the name(s) of the band(s) who released the greatest number of albums between 1970 and 1979 (inclusive)

BANDS:

Id	Name	Formed_in	Country
1	Pink Floyd	1965	UK
2	King Crimson	1969	UK
3	Can	1968	Germany
4	Doors	1967	USA
5	Velvet Underground	1967	USA
6	Gong	1969	France
7	Yes	1968	UK

ALBUMS:

AId	Title	BandId	Year
1	Meddle	1	1970
2	Animals	1	1977
3	Red	2	1974
4	Landed	3	1975
5	Soundtracks	3	1970
6	Beat	2	1982
7	The Doors	4	1967
8	Strange Days	4	1967
9	Loaded	5	1970
10	You	6	1974
11	Shamal	6	1976
12	Fragile	7	1971
13	Close to the Edge	7	1972

MUSICIANS:

MId	Name	BandId	FromYear	ToYear
1	Roger Waters	1	1966	1983
2	Syd Barrett	1	1966	1968
3	Robert Fripp	2	1969	2002
4	Adrian Belew	2	1981	2002
5	Irmin Schmidt	3	1968	1978
6	Michael Karoli	3	1968	1978
7	Jim Morrison	4	1967	1971
8	Lou Reed	5	1967	1973
9	Daevid Allen	6	1969	1974
10	Pierre Moerlen	6	1975	1978
11	Jon Anderson	7	1968	1981
12	Bill Bruford	7	1968	1972
13	Bill Bruford	2	1972	2010

Notes: (a) BandID is a foreign key referencing bands in both relations where this attribute appears. (b) Consider all attributes indicating years to be integers with appropriate comparison operators applicable. (c) Assume that if a musician is listed as being in the band during a year in which an album was recorded, the musician participated in the album's recording.