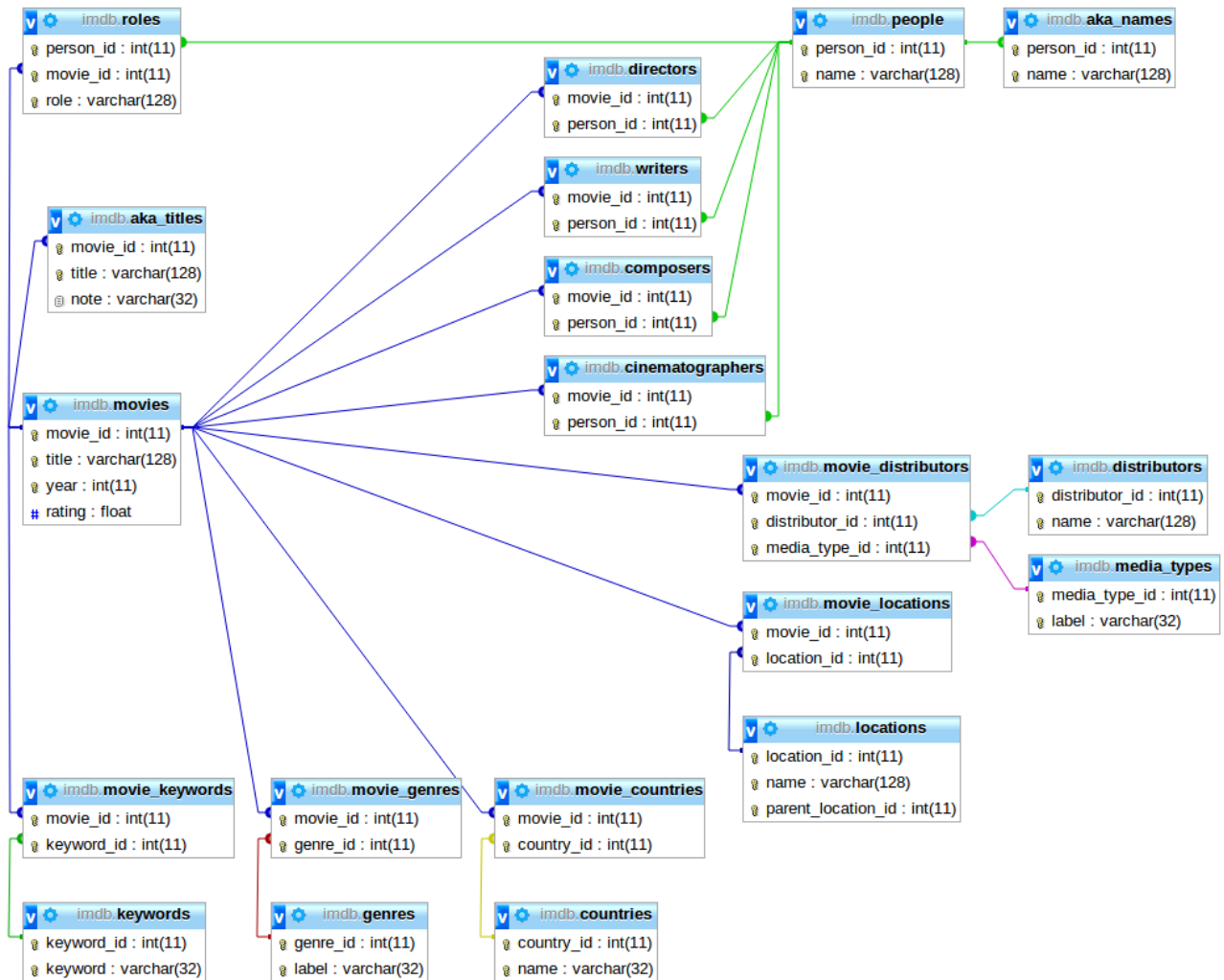


# Relational Algebra: Outer Joins

## Database Schema



## Problems

1. Find ALL movies released in 2011 and their aka titles.
2. Find ALL movies released in 1976 OR 1977 and their composer's name.
3. Find ALL movies released in 1976 OR 1977, their composer's name and the composer's aka names.

Answers:

1.

```
      ρ aka=a.title
      |
      π m.title, a.title
      |
      σ m.year = 2011
      |
      ⋈L
      m.movie_id = a.movie_id
      /      \
  movies m      aka_titles s
```

```
SELECT m.title, a.title as aka
FROM movies m
LEFT JOIN aka_titles a ON m.movie_id = a.movie_id
WHERE year = 2011;
```

title	aka
Harry Potter and the Deathly Hallows: Part 2	NULL
Intouchables	Quasi amici
Intouchables	The Intouchables
Intouchables	Untouchable
Intouchables	Ziemlich beste Freunde
Jodaeiye Nader az Simin	A Separation
Jodaeiye Nader az Simin	Nader and Simin, a Separation
Jodaeiye Nader az Simin	Nader und Simin - eine Trennung
Jodaeiye Nader az Simin	Una separazione
Jodaeiye Nader az Simin	Yodeling Is No Sin
The Artist	NULL
Warrior	NULL

2.

```

      π m.title, p.name
      |
σ m.year = 1976 OR m.year = 1977
      |
      ⋈L
      c.person_id = p.person_id
      /          \
      ⋈L          people p
m.movie_id = c.movie_id
  /          \
movies m      composers c
```

```
SELECT m.title, p.name
FROM movies m
LEFT JOIN composers c ON m.movie_id = c.movie_id
LEFT JOIN people p ON c.person_id = p.person_id
WHERE m.year = 1976 OR m.year = 1977;
```

title	name
Annie Hall	NULL
Network	Lawrence, Elliot (I)
Rocky	Conti, Bill
Star Wars	Williams, John (I)
Taxi Driver	Herrmann, Bernard (I)

3.

```

      ρ aka=a.name
      |
      π m.title, p.name, a.name
      |
      σ m.year = 1976 OR m.year = 1977
      |
      ⋈L
      p.person_id = a.person_id
      /          \
      ⋈L          aka_names a
      c.person_id = p.person_id
      /          \
      ⋈L          people p
      m.movie_id = c.movie_id
      /          \
      movies m      composers c
```

```
SELECT m.title, p.name, a.name as aka
FROM movies m
LEFT JOIN composers c ON m.movie_id = c.movie_id
LEFT JOIN people p ON c.person_id = p.person_id
LEFT JOIN aka_names a ON c.person_id = a.person_id
WHERE m.year = 1976 OR m.year = 1977;
```

title	name	aka
Annie Hall	NULL	NULL
Network	Lawrence, Elliot (I)	NULL
Rocky	Conti, Bill	Gray, Helen
Star Wars	Williams, John (I)	Williams Jr., John
Star Wars	Williams, John (I)	Williams Jr., John T.
Star Wars	Williams, John (I)	Williams, John T.
Star Wars	Williams, John (I)	Williams, Johnny
Taxi Driver	Herrmann, Bernard (I)	Herrmann, Bernard
Taxi Driver	Herrmann, Bernard (I)	Herrmann, Mr. Bernard