Trabalho prático de Bases de Dados

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1.

superchaves na tabela economy -> {Country}, {Country, GDP}, {Country, Agriculter}, {Country, Industry}, {Country, Inflaction}, {Country, Unemployment}, {Country, GDP, Agriculter}, {Country, GDP, Industry}, {Country, GDP, Inflaction} , {Country, GDP, Unemployment}, {Country, Agriculter, Industry}, {Country, Agriculter, Inflaction}, {Country, Agriculter, Unemployment}, {Country, Industry, Inflation}, {Country, Industry, Unemployment}, {Country, Inflaction, Unemployment}, {Country, GDP, Agriculter, Industry}, {Country, GDP, Agriculter, Inflaction}, {Country, GDP, Agriculter, Unemployment}, {Country, GDP, Industry, Inflaction}, {Country, GDP, Industry, Unemployment}, {Country, GDP, Inflaction, Unemployment}, {Country, GDP, Agriculter, Industry, Inflaction}, {Country, GDP, Agriculture, Industry, Unemployment}, {Country, GDP, Agriculter, Inflaction, Unemployment}, {Country, GDP, Industry, Inflaction, Unemployment}, {Country, Agriculter, Industry, Inflaction, Unemployment}, {Country, GDP, Agriculter, Industry, Inflaction, Unemployment}

chaves candidatas na tabela economy -> {Country}

chaves estrangeiras na tabela economy -> {Country}

superchaves na tabela organization -> {Name}, {Name, Abbreviation}, {Name, City}, {Name, Country}, {Name, Province}, {Name, Abbreviation, City}, {Name, Abbreviation, Country}, {Name, Abbreviation, Province}, {Name, City, Country}, {Name, City, Province}, {Name, Country, Province}, {Name, Abbreviation, City, Country}, {Name, Abbreviation, City, Province}, {Name, Abbreviation, Country, Province}, {Name, City, Country, Province}, {Name, Abbreviation, City, Country, Province}

chaves candidatas na tabela organization -> {Abbreviation}

chaves estrangeiras na tabela organization -> {Country}

superchaves na tabela isMember -> {Organization}, {Organization, Country}, {Organization, Type}, {Organization, Country, Type}

chaves candidatas na tabela isMember -> {Organization }

chaves estrangeiras na tabela isMember -> {Country}

2.a)

superchaves na tabela membro -> {Email}, {Nome, Email}, {Email, Ano}, {Nome, Email, Ano}

chaves candidatas na tabela membro -> {Email}

chaves estrangeiras na tabela membro -> {}

superchaves na tabela gostaDe -> {Nome}, {Country}, {Nome, Country}

chaves candidatas na tabela gostaDe -> {Nome, Country}

chaves estrangeiras na tabela gostaDe -> {Country}

2.b)

```
1.  CREATE TABLE membro(
2.    nome varchar(20),
3.    email VARchar(50),
4.    ano integer,
5.    PRIMARY KEY (nome, email));
6.
7.
8.  CREATE TABLE gostaDe (
9.    nome varchar(20),
10.   country varchar(4),
11.   PRIMARY KEY (nome, country)),
12.   FOREIGN KEY (country) REFERENCES country(code));
```

2.c)

```
1.  INSERT INTO membro VALUES('Liliana Ferro', 'lilianaferro@gmail.com', '1970');
2.  INSERT INTO membro VALUES('Ruben Fontes', 'rubenfontes@gmail.com', '1980');
3.  INSERT INTO membro VALUES('Lyana Lalanda', 'lyanalalanda@gmail.com', '1960');
4.  INSERT INTO membro VALUES('Salvador Valido', 'salvadorvalido@gmail.com', '1950');
5.  INSERT INTO membro VALUES('Fábio Patrício', 'fabiopatricio@gmail.com', '1954');
6.  INSERT INTO membro VALUES('Mathias Águeda', 'mathiasagueda@gmail.com', '1974');
7.  INSERT INTO membro VALUES('Marisol Teves', 'marisolteves@gmail.com', '1998');
8.  INSERT INTO membro VALUES('Débora Pederneiras', 'deborapederneiras@gmail.com',
    '1985');
9.  INSERT INTO membro VALUES('Eunice Bogado', 'eunicebogado@gmail.com', '1990');
10. INSERT INTO membro VALUES('Katerina Mota', 'katerinemota@gmail.com', '1995');
11. INSERT INTO membro VALUES('Mercês Guimarães', 'mercesguimaraes@gmail.com', '1991');
12. INSERT INTO membro VALUES('Maurício Veríssimo', 'mauricioverissimo@gmail.com',
    '1993');
13. INSERT INTO membro VALUES('Anaisa Palhares', 'anaisapalhares@gmai.com', '1987');
14. INSERT INTO membro VALUES('Nicole Malho', 'nicolemalho@gmail.com', '1973');
15. INSERT INTO membro VALUES('Ludmila Monsanto', 'ludmilamonsanto@gmail.com', '1964');
```

```
1.  INSERT INTO gostaDe (nome, country)
2.  SELECT membros.nm, country.code
3.  FROM (SELECT membro.nome as nm FROM membro limit 5 offset 0) as membros, encompasses,
    country WHERE encompasses.continent='Europe' and encompasses.country=country.code;
4.
5.  INSERT INTO gostaDe (nome, country)
6.  SELECT membros.nm, country.code
7.  FROM (SELECT membro.nome as nm FROM membro limit 5 offset 5) as membros, ismember,
    country WHERE ismember.organization='EU' and ismember.country=country.code;
8.
9.  INSERT INTO gostaDe (nome, country)
10. SELECT membros.nm, country.code
11. FROM (SELECT membro.nome as nm FROM membro limit 5 offset 10) as membros, language,
    country WHERE language.name='Portuguese' and language.country=country.code;
```

3.a)

$$\Pi_{name}\sigma_{organization='EU' \wedge country.code=ismember.country}(country\ X\ ismember)$$

```
1.  SELECT name
2.  FROM country, ismember
3.  WHERE organization='EU' and country.code=ismember.country
```

3.b)

$$r \rightarrow organization = 'EU' \wedge country.code = ismember.country \wedge encompasses.country = ismember.country \wedge encompasses.continent = 'Europe'$$

$$\Pi_{name}\sigma_{r}(country\ X\ ismember\ X\ encompasses)$$

```
1.  SELECT distinct name
2.  FROM country, ismember, encompasses
3.  WHERE organization!='EU' and country.code=ismember.country and
    encompasses.country=ismember.country and encompasses.continent='Europe'
```

3.c)

$$r \rightarrow organization = 'EU' \wedge country.code = ismember.country \wedge economy.country = ismember.country$$

$$\Pi_{gdp}\sigma_{r}(country\ X\ ismember\ X\ economy)$$

```
1.  SELECT gdp
2.  FROM country, ismember, economy
3.  WHERE organization='EU' and country.code=ismember.country and
    economy.country=ismember.country
```

3.d)

$s \rightarrow$

$\sigma_{encompasses.continent \quad 'Europe' \wedge economy.country=encompasses.country}(economy\ X\ encompasses)$

$\Pi_{country.name}\ \sigma_{economy.country=count \quad .code}\ (economy\ X\ country \bowtie \mathcal{G}_{\min(gdp)\ as\ n}(s))$

```
1. SELECT country.name
2. FROM (SELECT min(gdp) as n FROM economy, encompasses WHERE
   encompasses.continent='Europe' and economy.country=encompasses.country) as r,
   economy, country
3. WHERE r.n=gdp and economy.country=country.code
```

3.e)

$$organization.name\mathcal{G}_{count(ismember.country)\ as\ n}(ismember\ X\ organization)$$

```
1. SELECT organization.name, count(ismember.country)
2. FROM ismember, organization
3. WHERE ismember.organization=organization.abbreviation
4. group by organization.name
```

3.f)

$$country.name\mathcal{G}_{count(ismember.country)\ as\ n}(ismember\ X\ country)$$

```
1. SELECT country.name, count(ismember.country)
2. FROM ismember, country
3. WHERE ismember.country=country.code
4. group by country.name
```

3.g)

$$r \rightarrow ismember\ X\ country$$

$$s \rightarrow \sigma_{ismember.country=count \quad .code}(r)$$

$$t \rightarrow country.name\ \mathcal{G}_{count(ismember.country)\ as\ n}(s)$$

$$\Pi_{name}(\mathcal{G}_{\max(n)\ as\ n}(t) \bowtie t)$$

```
1. with count_cnts(name, n) as (SELECT country.name, count(ismember.country) as n
2. FROM ismember, country
3. WHERE ismember.country=country.code
4. group by country.name)
5. SELECT name
6. FROM (SELECT max(n) as n FROM count_cnts) as r, count_cnts
7. WHERE r.n= count_cnts.n
```

3.h)

$$r \rightarrow ismember\ X\ organization$$

$$s \rightarrow \sigma_{ismember.organization=organiza \quad .abbreviation}(r)$$

$$t \rightarrow organization.name\ \mathcal{G}_{count(ismember.country)\ as\ n}(s)$$

$$\Pi_{name}(\mathcal{G}_{\min(n)\ as\ n}(t) \bowtie t)$$

```
1.  with count_orgs(name, n) as (SELECT organization.name, count(ismember.country) as n
2.  FROM ismember, organization
3.  WHERE ismember.organization=organization.abbreviation
4.  group by organization.name)
5.  SELECT name
6.  FROM (SELECT min(n) as n FROM count_orgs) as r, count_orgs
7.  WHERE r.n= count_orgs.n
```

3.i)

$$\Pi_{country.name}\ \sigma_{economy.country=coun \quad .code}\ (economy\ X\ country \bowtie \mathcal{G}_{\max(gdp)\ as\ n}(economy))$$

```
1.  SELECT country.name
2.  FROM (SELECT max(gdp) as n FROM economy) as r, economy, country
3.  WHERE r.n=gdp and economy.country=country.code
```

3.j)

$$\Pi_{name}\ \sigma_{ismember.country=count \quad .code}\ (ismember\ X\ country \bowtie \Pi_{organization}\sigma_{country='MA'}(ismember))$$

```
1.  SELECT distinct name
2.  FROM (SELECT organization as org FROM ismember WHERE country='MA') as n, ismember,
    country
3.  WHERE ismember.country=country.code and ismember.organization=n.org
```

3.k)

$$r \rightarrow \Pi_{organization}\ \sigma_{ismember.country='B'}\ (ismember)$$

$$\mathrm{s} \rightarrow \Pi_{organization}\ \sigma_{ismember.country='L'}\ (ismember)$$

$$\mathrm{t} \rightarrow \Pi_{name}\ \sigma_{ismember.country='NL'}\ (ismember)$$

$$r\ \cap s\ \cap t$$

```
1.  SELECT organization
2.  FROM ismember
3.  WHERE ismember.country='B'
4.  INTERSECT
5.  SELECT organization
6.  FROM ismember
7.  WHERE ismember.country='L'
8.  INTERSECT
9.  SELECT organization
10. FROM ismember
11. WHERE ismember.country='NL';
```