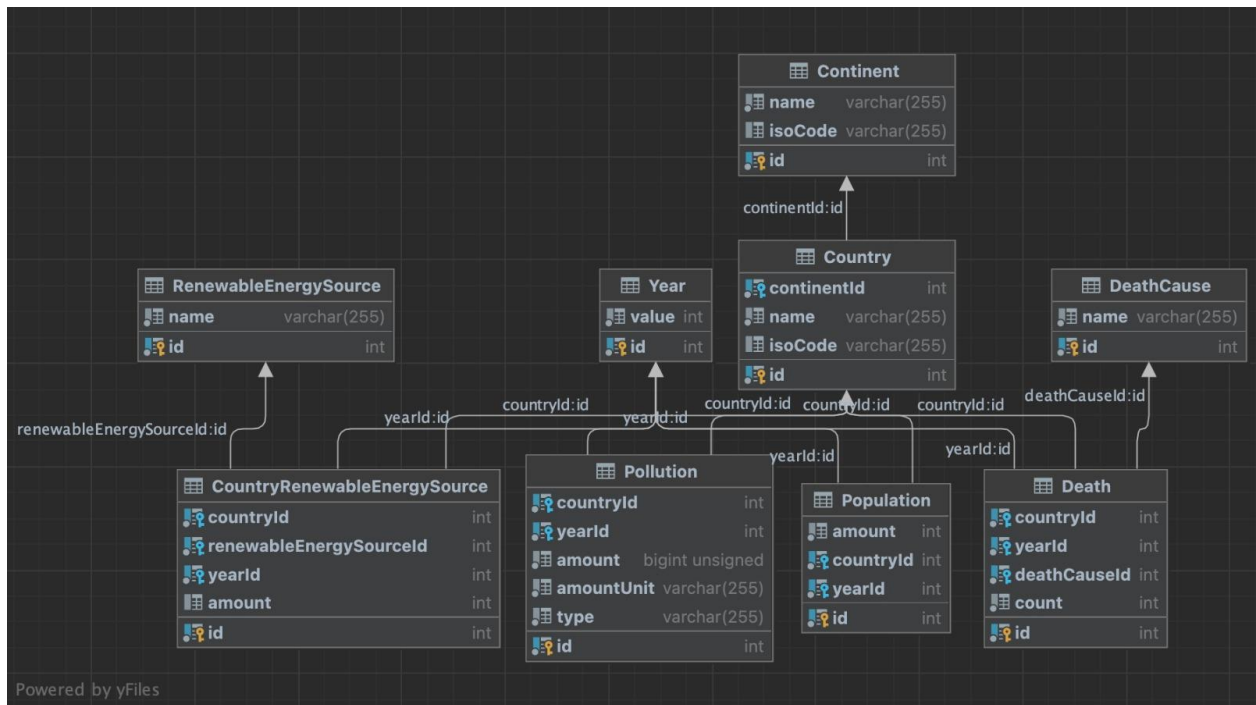


CS 306 DATABASE SYSTEMS – PROJECT STEP 2
COUNTRIES, POLLUTIONS AND SOLUTIONS
GROUP 22

- Ahmet Alperen Güngör – 28847
- Anıl Arslan – 29468
- Batuhan İşildak - 29181
- Dediş Atakan Öz – 29414
- Eren Altın – 28986

GITHUB REPOSITORY: https://github.com/batuhanisildak-malwation/CS306_Group22



Link to the relational model: [LINK](#)

Some changes are made in the CSV files:

- All semicolons are changed to commas in order to import them in proper format. Additionally, first line that includes column names are cleared since DataGrip was used to import data to the database.
- **Death:** Raw and unedited data are divided into causes and parsed into the proper format. Python and Pandas frameworks are used for this operation.
- **Pollution:** In countryId there were matching issues due to wrong parsing. They are changed accordingly wrt our country table.
- **Population:** Some empty rows are cleared. In addition, some unmatched countryIds are fixed.

All the entity sets are converted into tables with the same names. In addition, since it is a many-to-many relationship, “uses” relation between “Country”, “Year” and “RenewableEnergySources” is converted into a table with the name “CountryRenewableEnergySource”.

Below are the MySQL codes that we used to create tables:

- **Continent Entity:**
create table Continent (
 id int auto_increment primary key,
 name varchar(255) not null,
 isoCode varchar(255) null,
 constraint id unique (id)
);
- **Country Entity:**
create table Country (
 id int auto_increment primary key,
 continentId int not null,
 name varchar(255) not null,
 isoCode varchar(255) null,
 constraint Country_ibfk_1 foreign key (continentId) references Continent (id)
);
create index continentId on Country (continentId);
- **Death Entity:**
create table Death (
 id int auto_increment primary key,
 countryId int not null,
 yearId int not null,
 deathCauseId int not null,
 count int not null,
 constraint Death_ibfk_1 foreign key (yearId) references Year (id),
 constraint Death_ibfk_2 foreign key (countryId) references Country (id),
 constraint Death_ibfk_3 foreign key (deathCauseId) references DeathCause (id)
);
create index countryId on Death (countryId);
create index deathCauseId on Death (deathCauseId);
create index yearId on Death (yearId);
- **DeathCause Entity:**
create table DeathCause (
 id int auto_increment primary key,

```
name varchar(255) not null  
);
```

- **Pollution Entity:**

```
create table Pollution (  
    id int auto_increment primary key,  
    countryId int not null,  
    yearId int not null,  
    amount bigint unsigned not null,  
    amountUnit varchar(255) not null,  
    type varchar(255) not null,  
    constraint Pollution_ibfk_1 foreign key (yearId) references Year (id),  
    constraint Pollution_ibfk_2 foreign key (countryId) references Country (id)  
);
```

```
create index countryId on Pollution (countryId);
```

```
create index yearId on Pollution (yearId);
```

- **Population Entity:**

```
create table Population (  
    id int auto_increment primary key,  
    amount int not null,  
    countryId int not null,  
    yearId int not null,  
    constraint Population_ibfk_1 foreign key (yearId) references Year (id),  
    constraint Population_ibfk_2 foreign key (countryId) references Country (id)  
);
```

```
create index countryId on Population (countryId);
```

```
create index yearId on Population (yearId);
```

- **Renewable Energy Sources Entity:**

```
create table RenewableEnergySource (  
    id int auto_increment primary key,  
    name varchar(255) not null  
);
```

- **Year Entity:**

```
create table Year (  
    id int auto_increment primary key,  
    value int not null  
);
```

- **“uses” relation between country, year and renewable energy:**

```
create table CountryRenewableEnergySource (  
    id int auto_increment primary key,  
    countryId int not null,  
    yearId int not null,  
    amount bigint unsigned not null,  
    amountUnit varchar(255) not null,  
    type varchar(255) not null,  
    constraint CountryRenewableEnergySource_ibfk_1 foreign key (countryId) references Country (id),  
    constraint CountryRenewableEnergySource_ibfk_2 foreign key (yearId) references Year (id)  
);
```

```
id int auto_increment primary key,  
countryId int not null,  
renewableEnergySourceId int not null,  
yearId int not null,  
amount int default 0 null,  
constraint CountryRenewableEnergySource_ibfk_1 foreign key  
(renewableEnergySourceId) references RenewableEnergySource (id),  
constraint CountryRenewableEnergySource_ibfk_2 foreign key (countryId) references  
Country (id),  
constraint CountryRenewableEnergySource_ibfk_3 foreign key (yearId) references  
Year (id)  
);  
create index countryId on CountryRenewableEnergySource (countryId);  
create index renewableEnergySourceId on CountryRenewableEnergySource  
(renewableEnergySourceId);  
create index yearId on CountryRenewableEnergySource (yearId);
```