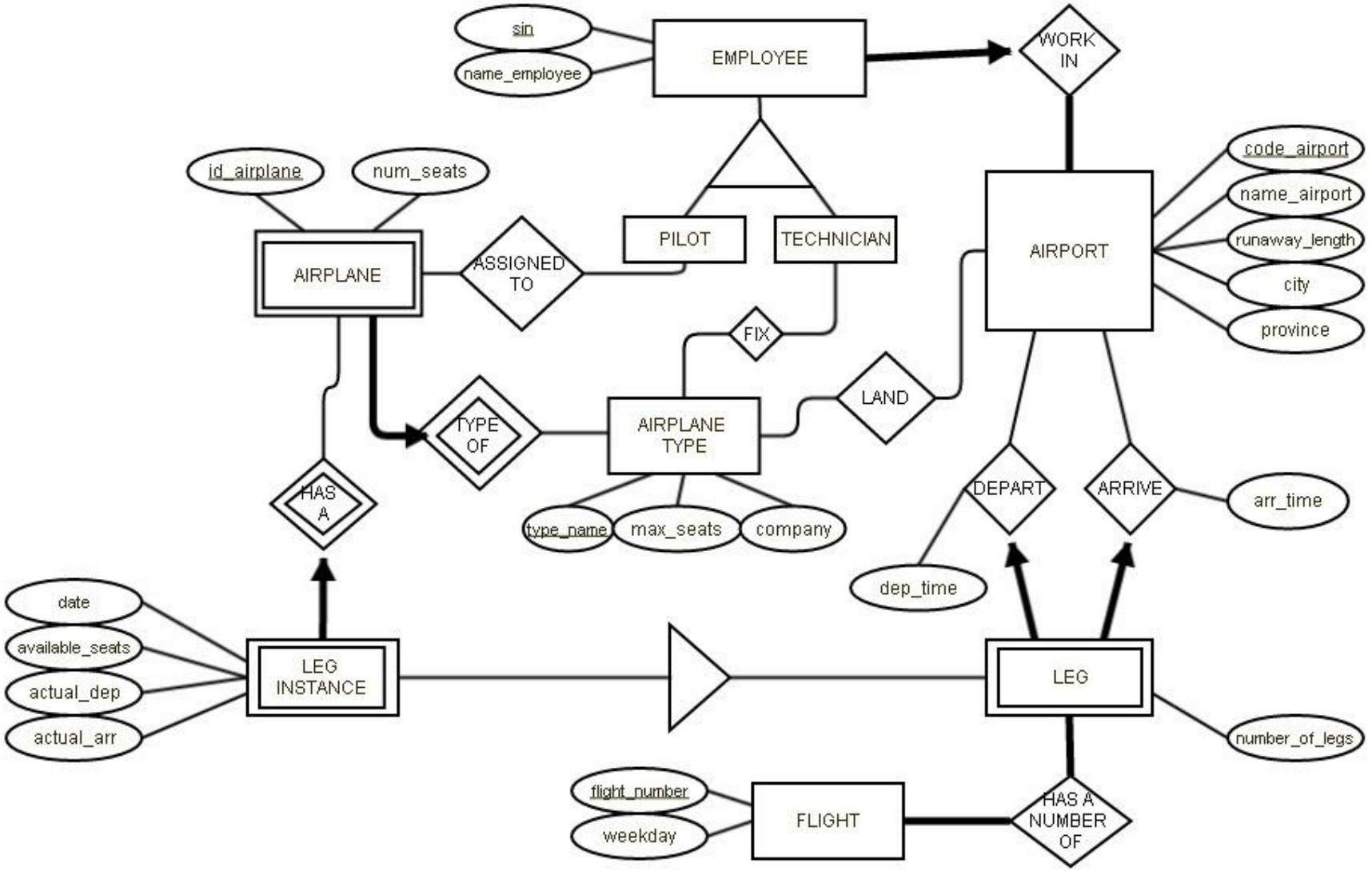
Entity-Relationship Diagram



Relational Schema

AIRPORT(code_airport, name, runaway_length, city, province)

AIRPLANE(id_airplane, num_seats, type_name: unique)
type_name is FK to table AIRPLANE TYPE

AIRPLANE TYPE(type_name, max_seats, company)

EMPLOYEE(sin, name_employee, code_airport:unique)
code_airport is a FK to table AIRPORT

PILOT(sin, id_airplane)
sin is FK to table EMPLOYEE
id_airplane is FK to table AIRPLANE

TECHNICIAN(type_name, sin)
type_name is FK to table AIRPLANE_TYPE
sin is FK to table EMPLOYEE

FLIGHT(flight_number, weekday)

LEG(number_of_legs, dep_time, arr_time, arr_code,dep_ code, flight_number)
dep_code is FK to table AIRPORT
arr_code is FK to table AIRPORT
flight_number is FK to table FLIGHT

LEG INSTANCE(date, available_seats, actual_dep, actual_arr, id_airplane, arr_code,dep_ code, flight_number)
id_airplane is a FK to table AIRPLANE
dep_code is FK to table AIRPORT
arr_code is FK to table AIRPORT
flight_number is FK to table FLIGHT

LAND(type_name, code_airport)
type_name is FK to table AIRPLANE TYPE,
code_airport is FK to table AIRPORT

Statements

```
CREATE TABLE Airport (
        code_airport INTEGER,
        name_airport VARCHAR(20),
        runaway_length INTEGER,
        city VARCHAR(20),
        province VARCHAR(20),
        PRIMARY KEY (code_airport))

CREATE TABLE AirplaneType (
        type_name VARCHAR(20),
        max_seats INTEGER,
        company VARCHAR(20),
        PRIMARY KEY (type_name))

CREATE TABLE Airplane (
        id_airplane INTEGER,
        num_seats INTEGER,
        type_name VARCHAR(20),
        PRIMARY KEY (id_ariplane),
        FOREIGN KEY(type_name)
        REFERENCES AirplaneType(type_name))

CREATE TABLE Employee (
        sin INTEGER,
        name_employee VARCHAR(20),
        code_airport INTEGER,
        PRIMARY KEY (sin),
        FOREIGN KEY(code_airport)
        REFERENCES Airport(code_airport))

CREATE TABLE Flight (
        flight_number INTEGER,
        weekday VARCHAR(20)
        PRIMARY KEY (flight_number))

CREATE TABLE Pilot (
        id_airplane INTEGER,
        sin INTEGER,
        PRIMARY KEY (id_airplane, sin),
        FOREIGN KEY(id_airplane)
        REFERENCES Airplane(id_airplane),
        FOREIGN KEY(sin)
        REFERENCES Employee(sin))

CREATE TABLE Technician (
        type_name VARCHAR(20),
        sin INTEGER,
        PRIMARY KEY (type_name, sin),
        FOREIGN KEY(type_name)
        REFERENCES AirplaneType(type_name),
        FOREIGN KEY(sin) REFERENCES Employee(sin))


CREATE TABLE Leg (
        number_of_legs INTEGER,
        dep_time TIME,
        arr_time TIME,
        arr_code INTEGER,
        dep_code INTEGER,
        flight_number INTEGER,
        PRIMARY KEY (arr_code,dep_ code, flight_number),
        FOREIGN KEY(dep_code)
        REFERNCES Airport(code_airport),
        FOREIGN KEY(arr_code)
        REFERENCES Airport(code_airport),
        FOREIGN KEY(flight_number)
        REFERENCES Flight(flight_number))
```

```
CREATE TABLE LegInstance (
        date DATE,
        available_seats INTEGER,
        actual_dep TIME,
        actual_arr TIME,
        id_airplane INTEGER,
        arr_code INTEGER,
        dep_code INTEGER,
        flight_number INTEGER,
        PRIMARY KEY (id_airplane, arr_code, dep_ code, flight_number),
        FOREIGN KEY(id_airplane) REFERENCES Airplane(id_airplane),
        FOREIGN KEY(dep_code) REFERENCES Airport(code_airport),
        FOREIGN KEY(arr_code) REFERENCES Airport(code_airport),
        FOREIGN KEY(flight_number) REFERENCES Flight(flight_number))


CREATE TABLE Land (
        type_name VARCHAR(20),
        code INTEGER,
        PRIMARY KEY (type_name, code),
        FOREIGN KEY(type_name)  REFERENCES AirplaneType(type_name),
        FOREIGN KEY(code) REFERENCES Airport(code))
```

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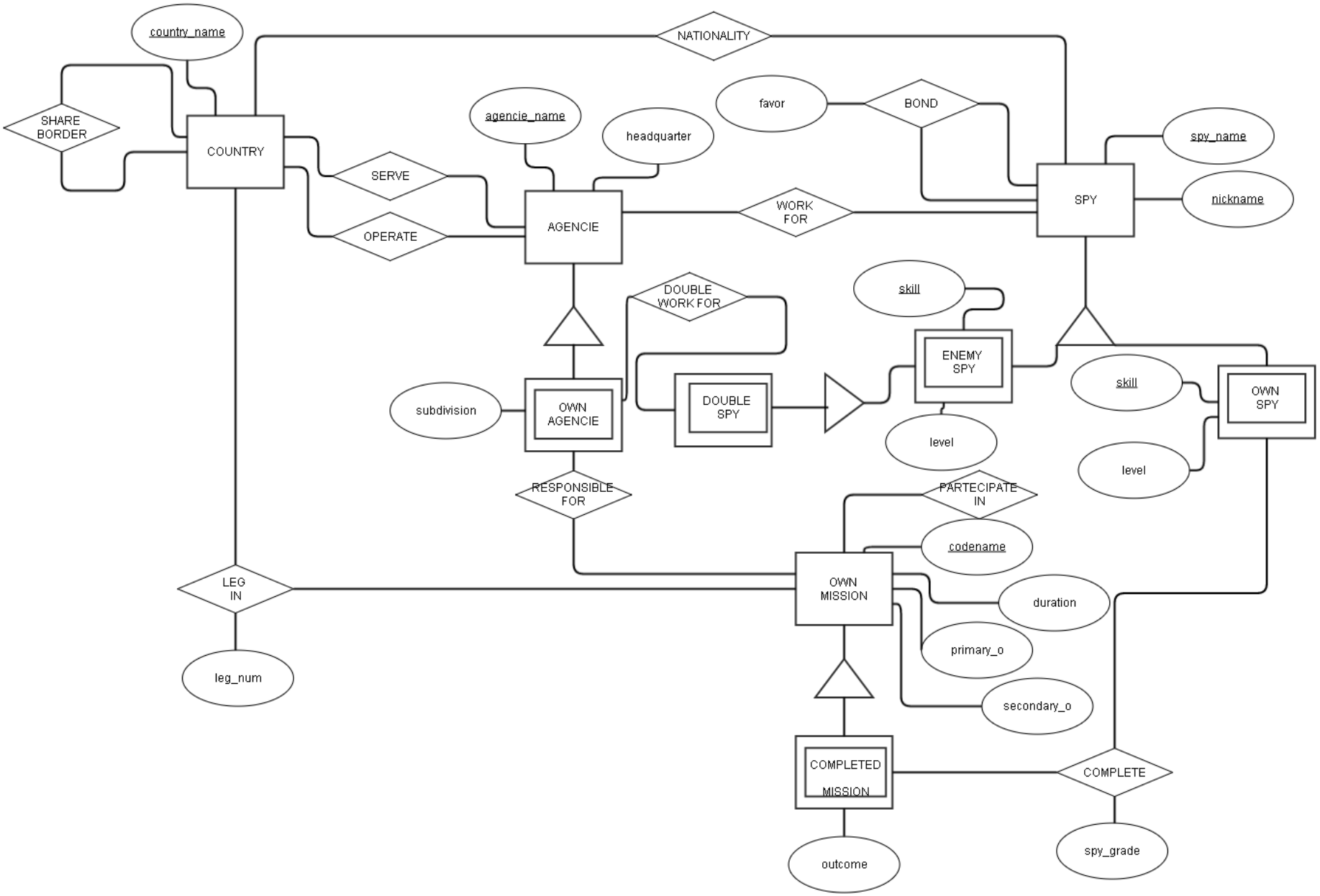

Relational Schema

Agency (agency_name, headquarter)

Own Agency (agency_name, subdivision)
agency_name is a foreign key to table Agency

Country (country_name, served_agency: UNIQUE)
served_agency is a foreign key to table Agency

Operative Agency (country_name, operative_agency)
country_name is a foreign key to table Country
operative_agency is a foreign key to table Agency

Share Border (country_name, border_country)
country_name is a foreign key to table Country
border_country is a foreign key to table Country

Spy (spy_name, nickname, agency_name, country_name)
agency_name is a foreign key to table Agency
country_name is a foreign key to table Country

Bond(spy_name1, spy_name2, favor)
spy_name1 is a foreign key to table Spy
spy_name2 is a foreign key to table Spy

Own Spy (spy_name, skill: not NULL, level: not NULL)
spy_name is a foreign key to table Spy

Enemy Spy (spy_name, skill, level)
spy_name is a foreign key to table Spy

Double Spy (spy_name, agency_name)
spy_name is a foreign key to table Enemy Spy
agency_name is a foreign key to table Own Agency

Mission (codename, duration, primary_t:not NULL, secondary_t, subdivision)
subdivision is a foreign key to table Own Agency

Partecipate In (codename, spy_name)
spy_name is a foreign key to table Own Spy
codename is a foreign key to table Mission

Completed Mission (codename, spy_name, outcome, spy_grade)
codename is a foreign key to table Partecipate In
spy_name is a foreign key to table Partecipate In

Leg (codename, country_name, leg_num)
codename is a foreign key to table Mission
country_name is a foreign key to table Country

Statements

```
CREATE TABLE Agency (
agency_name VARCHAR(20),
headquarter VARCHAR(20),
PRIMARY KEY (agency_name, headquarter),
)

CREATE TABLE Own Agency (
agency_name VARCHAR(20),
subdivision VARCHAR(20),
PRIMARY KEY (agency_name, subdivision),
FOREIGN KEY (agency_name)
REFERENCES Agency(agency_name)
 )

CREATE TABLE Country (
country_name VARCHAR(20),
served_agency VARCHAR(20) UNIQUE,
PRIMARY KEY (country_name),
FOREIGN KEY (served_agency)
REFERENCES Agency(agency_name)
 )

CREATE TABLE Operative Agency (
country_name VARCHAR(20),
operative_agency VARCHAR(20),
PRIMARY KEY (country_name, operative_agency),
FOREIGN KEY (country_name)
REFERENCES Country(country_name),
FOREIGN KEY (operative_agency)
REFERENCES Agency(agency_name)
)

CREATE TABLE Share Border (
country_name VARCHAR(20),
border_country VARCHAR(20),
PRIMARY KEY (country_name, border_country),
FOREIGN KEY (country_name)
REFERENCES Country(country_name),
FOREIGN KEY (border_country)
REFERENCES Country(country_name)
)

CREATE TABLE Spy (
spy_name VARCHAR(20),
nickname VARCHAR(20),
agency_name VARCHAR(20),
country_name VARCHAR(20),
PRIMARY KEY (spy_name, nickname),
FOREIGN KEY (agency_name)
REFERENCES Agency(agency_name),
FOREIGN KEY (country_name)
REFERENCES Country(country_name)
)

CREATE TABLE Bond (
spy_name1 VARCHAR(20),
spy_name2 VARCHAR(20),
favor VARCHAR(50),
PRIMARY KEY (spy_name1, spy_name2, favor),
FOREIGN KEY (spy name1)
REFERENCES Spy(spy_name),
FOREIGN KEY (spy name2)
REFERENCES Spy(spy_name)
)
```

```
CREATE TABLE Own Spy (
spy_name VARCHAR(20),
skill VARCHAR(20) NOT NULL,
level INTEGER NOT NULL,
PRIMARY KEY (spy_name, skill),
FOREIGN KEY (spy name)
REFERENCES Spy(spy_name)
)

CREATE TABLE Enemy Spy (
spy_name VARCHAR(20),
skill VARCHAR(20),
level INTEGER,
PRIMARY KEY (spy_name, skill),
FOREIGN KEY (spy name)
REFERENCES Spy(spy_name)
)

CREATE TABLE Double Spy (
spy_name VARCHAR(20),
agency_name VARCHAR(20),
PRIMARY KEY (spy_name, agency_name),
FOREIGN KEY (spy name)
REFERENCES Enemy Spy(spy_name),
FOREIGN KEY (agency_name)
REFERENCES Own Agency(agency_name)
)
```

```
CREATE TABLE Mission (
codename VARCHAR(20),
duration INTEGER,
primary_t VARCHAR(20) NOT NULL,
secondary_t VARCHAR(20),
subdivision VARCHAR(20),
PRIMARY KEY (codename),
FOREIGN KEY (subdivision)
REFERENCES Own Agency(subdivision)
)

CREATE TABLE Partecipate In (
codename VARCHAR(20),
spy_name VARCHAR(20),
PRIMARY KEY (codename, spy_name),
FOREIGN KEY (codename)
REFERENCES Mission(codename),
FOREIGN KEY (spy name)
REFERENCES Own Spy(spy_name)
)

CREATE TABLE Completed Mission (
 codename VARCHAR(20),
spy_name VARCHAR(20),
outcome VARCHAR(250),
spy_grade INTEGER,
PRIMARY KEY (codename, spy_name),
FOREIGN KEY (codename)
REFERENCES Partecipate In(codename),
FOREIGN KEY (spy_name)
REFERENCES Partecipate In(spy_name)
)
```

```
CREATE TABLE Leg ( codename VARCHAR(20),
country_name VARCHAR(20),
leg_num INTEGER,
PRIMARY KEY (codename, country_name, leg_num),
FOREIGN KEY (codename)
REFERENCES Mission(codename),
FOREIGN KEY (country_name)
REFERENCES Country(country_name)
)
```