Technical University of Košice

Faculty of Electrical Engineering and Informatics

Submission 1 – Airport

Database Systems – Wednesday 10:50

Entity-Relationship model, Relational model

SQL DDL script to create a database

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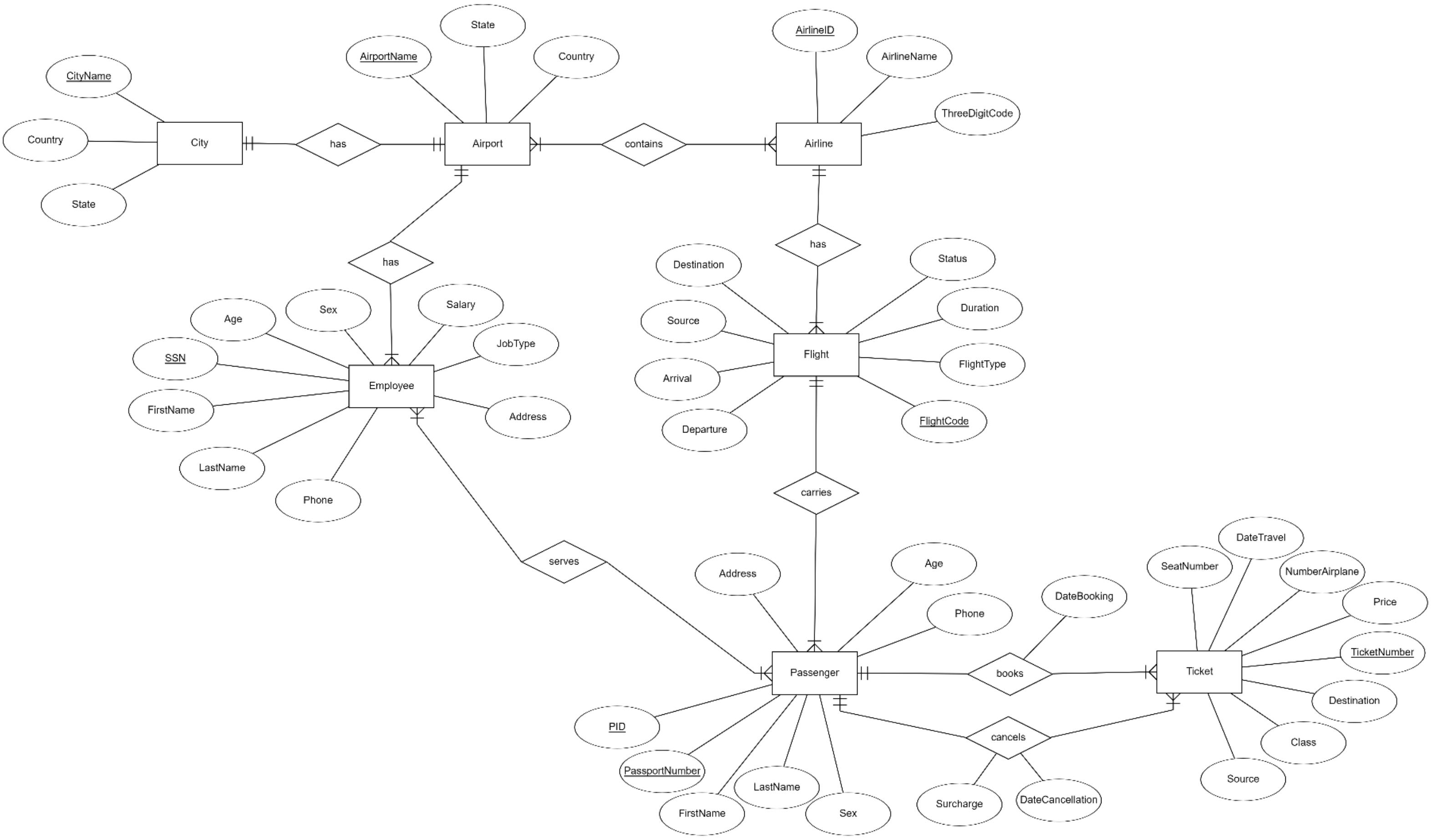

Figure 1: Airport Entity-Relationship (ER) diagram

Entities:

- City

*CityName	Country	State

- Airport

*AirportName	Country	State

- Airline

*AirlineID	AirlineName	ThreeDigitCode

- Flight

*FlightCode	Destination	Source	Arrival	Departure	Status	Duration	FlightType

- Passenger

*PassportNumber	*PID	FirstName	LastName	Sex	Age	Address	Phone

- Ticket

*TicketNumber	SeatNumber	DateTravel	NumberAirplane	Price	Destination	Class	Source

- Employee

*SSN	FirstName	LastName	JobType	Sex	Age	Address	Phone	Salary

1.1 ER diagram contains following relationships:

Entity 1	Name of the Relationship	Entity 2	Cardinality
City	has	Airport	1 : 1
Airport	contains	Airline	m : n
Airport	has	Employee	1 : n
Airline	has	Airplane	1 : n
Airplane	carries	Passengers	1 : n
Employee	serves	Passengers	m : n
Passenger	books	Ticket	1 : n
Passenger	cancels	Ticket	1 : n

Type of the binary relationship	Relationships in the system
one-to-one	A city has only one airport.
one-to-many	1. An airline has multiple airplanes. 2. An airplane carries many passengers. 3. A passenger can book one or more tickets. 4. A passenger can cancel one or more tickets.
many-to-many	All International airlines operating through various countries across the world have their offices located in all major cities and airports they cover. Hence, an airport may have many airline offices.

2. Relational Model (RM)

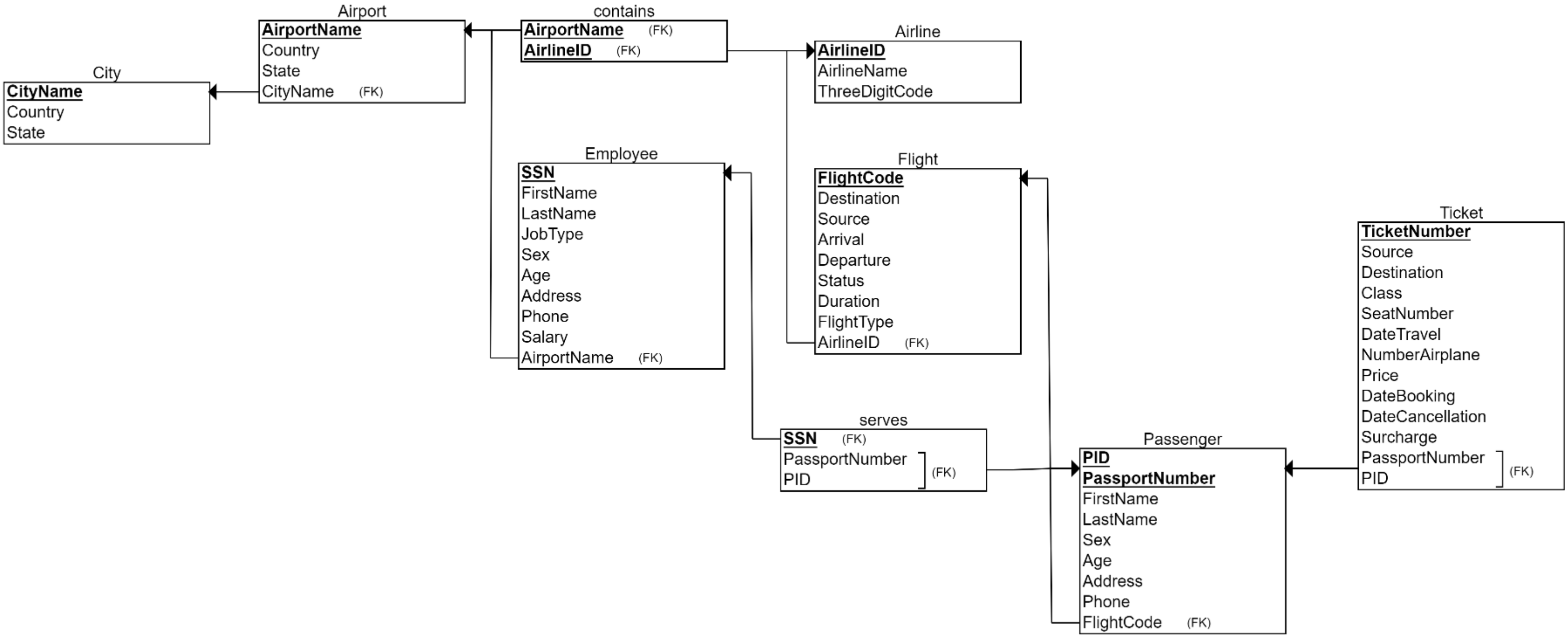

Figure 2. Airport Relational diagram

Tables of Relational Model (RM)
City (*CityName, Country, State) Airport (*AirportName, Country, State, CityName (FK)) Airline (*AirlineID, AirlineName, ThreeDigitCode) Flight (*FlightCode, Destination, Source, Arrival, Departure, Status, Duration, FlightType, AirlineID (FK)) Passenger (*PassportNumber, *PID, FirstName, LastName, Sex, Age, Address, Phone, FlightCode (FK)) Ticket (*TicketNumber, Source, Destination, Class, SeatNumber, DateTravel, NumberAirplane, Price, DateBooking, DateCancellation, Surcharge, PassportNumber (FK), PID (FK)) Employee (*SSN, FirstName, LastName, JobType, Sex, Age, Address, Phone, Salary, AirportName (FK)) serves (*SSN, *PassportNumber (FK), *PID (FK)) contains (*AirportName (FK), *AirlineID (FK))

3. SQL DDL script

--Delete databases if they exist—

```
drop table if exists ticket;
drop table if exists contain;
drop table if exists serves;
drop table if exists passenger;
drop table if exists flight;
drop table if exists airline;
drop table if exists employee;
drop table if exists airport;
drop table if exists city;
```

-- Code for creating a City Base –

```
create table city
(
    cityname varchar(15) not null
        primary key,
    country  varchar(30) not null,
    state    varchar(15)
);
```

-- Code for creating an Airport Base –

```
create table airport
(
    airportname varchar(100) not null
        primary key,
    country     varchar(30)  not null,
    state       varchar(15),
    cityname    varchar(15)
        references city
            on delete cascade
);
```

-- Code for creating an Airline Base –

```
create table airline
(
    airlineid      varchar(3) not null
        primary key,
    airlinename    varchar(50),
    threedigitcode varchar(3)
);
```

-- Code for creating a Flight Base –

```
create table flight
(
    flightcode  varchar(10) not null
        primary key,
    destination varchar(3),
    source      varchar(3),
    arrival     varchar(10),
    departure   varchar(10),
    status      varchar(10),
    duration    varchar(30),
    flighttype  varchar(10),
    airlineid   varchar(3)
        references airline
            on delete cascade
);
```

-- Code for creating a Passenger Base–

```
create table passenger
(
    pid             integer     not null,
    passportnumber varchar(10) not null,
    firstname      varchar(20) not null,
    lastname       varchar(20) not null,
    sex            varchar(1),
    age            integer
        constraint passenger_age_check
            check (age > 0),
    address        varchar(100),
    phone          integer,
    airplanecode   varchar(10)
        references flight
            on delete cascade,
    primary key (passportnumber, pid)
);
```

-- Code for creating a Ticket Base –

```
create table ticket
(
    ticketnumber     integer     not null
        primary key,
    source           varchar(3)  not null,
    destination      varchar(3)  not null,
    class            varchar(15) not null,
    seatnumber       varchar(5)  not null,
    datetravel       date        not null,
    numberairplane   varchar(10) not null,
    price            integer,
    datebooking      date,
    datecancellation date,
    surcharge        integer,
    passportnumber   varchar(10),
    pid              integer,
    foreign key (passportnumber, pid) references passenger
        on delete cascade
);
```

-- Code for creating a Contains Base–

```
create table contain
(
    airportname varchar(100) not null
        references airport
            on delete cascade,
    airlineid   varchar(3)   not null
        references airline
            on delete cascade,
    primary key (airportname, airlineid)
);
```

-- Code for creating an Employee Base–

```
create table employee
(
    ssn         integer     not null
        primary key,
    firstname   varchar(20) not null,
    lastname    varchar(20) not null,
    jobtype     varchar(30) not null,
    sex         varchar(1),
    age         integer
        constraint employee_age_check
            check (age > 0),
    address     varchar(100),
    phone       integer,
    salary      integer,
    airportname varchar(100)
        references airport
            on delete cascade
);
```

-- Code for creating a Serves Base –

```
create table serves
(
    ssn            integer     not null
        references employee
            on delete cascade,
    pid            integer     not null,
    passportnumber varchar(10) not null,
    primary key (ssn, pid, passportnumber),
    foreign key (passportnumber, pid) references passenger
        on delete cascade
);
```