Database Management System – 22 (SQL - CREATE, DROP, ALTER)

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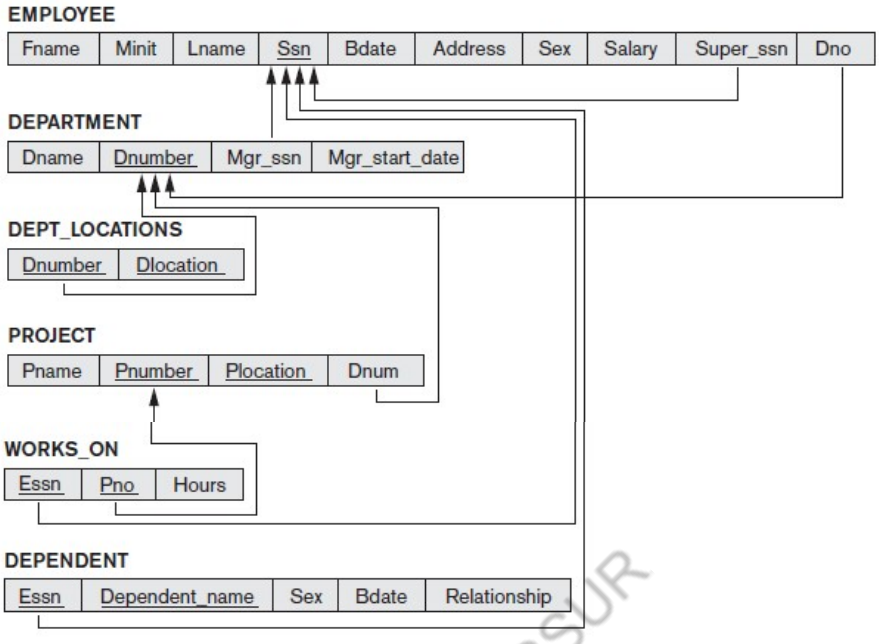
Outline

- CREATE
- ALTER
- DROP
- Constraints
- Specifying Key and Referential Integrity Constraints
- Exercise - 5



CREATE, ALTER,DROP

- CREATE TABLE
- ALTER TABLE
- DROP TABLE

Attribute Data Types

- **Numeric** data type
  - INTEGER or INT, and SMALLINT
  - FLOAT or REAL, and DOUBLE PRECISION
  - Formatted numbers can be declared by using DECIMAL(i, j)—or DEC(i, j) or NUMERIC(i, j)
- **Character-string** data types
  - fixed length—CHAR(n) or CHARACTER(n)
  - Varying length - VARCHAR(n) or CHAR VARYING(n) or CHARACTER VARYING(n)

Attribute Data Types

- **Bit-string** data types
  - **fixed length n—BIT(n)—or varying length—** BIT VARYING(n)
  - B‘10101’.5
  - variable-length bitstring data type called BINARY LARGE OBJECT or BLOB is also available to specify columns that have large binary values, such as images.
  - BLOB(30G) specifies a maximum length of 30 gigabits
- **Boolean** data type
  - TRUE or FALSE or UNKNOWN

Attribute Data Types

- **DATE** data type has ten positions, and its components are YEAR, MONTH, and DAY in the form YYYY-MM-DD
- **TIME** data type has at least eight positions, with the components HOUR, MINUTE, and SECOND in the form HH:MM:SS
- **TIME WITH TIME ZONE** data type includes an additional six positions for specifying the displacement from the standard universal time zone
- **Timestamp** data type (TIMESTAMP) includes the DATE and TIME fields, plus a minimum of six positions for decimal fractions of seconds and an optional WITH TIME ZONE qualifier
  - TIMESTAMP '2014-09-27 09:12:47.648302'

Domains in SQL

- **CREATE DOMAIN** SSN_TYPE **AS CHAR(9)**;

Constraints

- **CREATE TABLE** EMPLOYEE(… ,
  Dno **INT NOT NULL DEFAULT** 1,....
- Dnumber INT **NOT NULL CHECK** (Dnumber > 0 **AND** Dnumber < 21);
- **CREATE DOMAIN** D_NUM **AS** INTEGER
  CHECK (D_NUM > 0 **AND** D_NUM < 21);

Specifying Key and Referential Integrity Constraints

- Dnumber INT **PRIMARY KEY**;
- Candidate keys
  Dname VARCHAR(15) **UNIQUE**
- **FOREIGN KEY**
- Referential triggered action
  - SET NULL, CASCADE, and SET DEFAULT
  - option must be qualified with either ON DELETE or ON UPDATE

Examples of Referential triggered action

```
CREATE TABLE EMPLOYEE
    ( ... ,
      Dno          INT          NOT NULL       DEFAULT 1,
    CONSTRAINT EMPPK
      PRIMARY KEY (Ssn),
    CONSTRAINT EMPSUPERFK
      FOREIGN KEY (Super_ssn) REFERENCES EMPLOYEE(Ssn)
                  ON DELETE SET NULL          ON UPDATE CASCADE,
    CONSTRAINT EMPDEPTFK
      FOREIGN KEY(Dno) REFERENCES DEPARTMENT(Dnumber)
                  ON DELETE SET DEFAULT     ON UPDATE CASCADE);

                                CREATE TABLE DEPARTMENT
                                    ( ... ,
                                      Mgr_ssn CHAR(9)          NOT NULL       DEFAULT '888665555',
                                      ... ,
                                    CONSTRAINT DEPTPK
                                      PRIMARY KEY(Dnumber),
                                    CONSTRAINT DEPTSK
                                      UNIQUE (Dname),
                                    CONSTRAINT DEPTMGRFK
                                      FOREIGN KEY (Mgr_ssn) REFERENCES EMPLOYEE(Ssn)
                                                  ON DELETE SET DEFAULT     ON UPDATE CASCADE);

CREATE TABLE DEPT_LOCATIONS
    ( ... ,
    PRIMARY KEY (Dnumber, Dlocation),
    FOREIGN KEY (Dnumber) REFERENCES DEPARTMENT(Dnumber)
                ON DELETE CASCADE          ON UPDATE CASCADE);
```


Specifying Constraints on Tuples Using CHECK

- **CHECK** (Dept_create_date <= Mgr_start_date);

Airline Reservation System

AIRPORT

Airport_code	Name	City	State

FLIGHT

Flight_number	Airline	Weekdays

FLIGHT_LEG

Flight_number	Leg_number	Departure_airport_code	Scheduled_departure_time
		Arrival_airport_code	Scheduled_arrival_time

LEG_INSTANCE

Flight_number	Leg_number	Date	Number_of_available_seats	Airplane_id
Departure_airport_code	Departure_time	Arrival_airport_code	Arrival_time	

Airline Reservation System

FARE

Flight_number	Fare_code	Amount	Restrictions

AIRPLANE_TYPE

Airplane_type_name	Max_seats	Company

CAN_LAND

Airplane_type_name	Airport_code

AIRPLANE

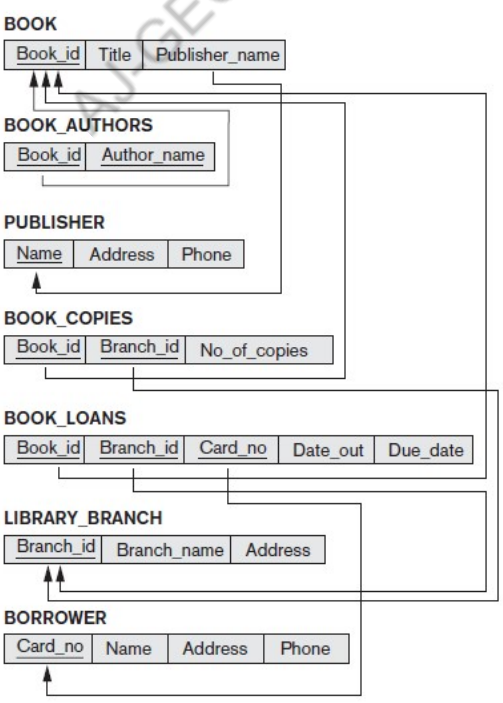
Airplane_id	Total_number_of_seats	Airplane_type

SEAT_RESERVATION

Flight_number	Leg_number	Date	Seat_number	Customer_name	Customer_phone

Exercise - 5

1. Consider the airline database shown. What are the referential integrity constraints that should hold on the schema? Write appropriate SQL DDL statements to define the database.



Exercise – 5 contd...

2. Consider the LIBRARY relational database schema shown. Choose the appropriate action (reject, cascade, set to NULL, set to default) for each referential integrity constraint, both for the deletion of a referenced tuple and for the update of a primary key attribute value in a referenced tuple. Justify your choices.
3. Write appropriate SQL DDL statements for declaring the LIBRARY relational database schema. Specify the keys and referential triggered actions.

Reference

- Elmasri R. and S. Navathe, Database Systems: Models, Languages, Design and Application Programming, Pearson Education 6th edition and 7th edition

Thank you