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Homework 2

3.2   There are 22 distinct tuples.

3.4   A candidate key is a set of fields that uniquely identifies a tuple.
There can be multiple candidate keys, but a primary key is a
singular, optimized key selected from candidate keys, that can
uniquely idetify a tuple. In others words, a primary key is the
most simplified or basic candidate key.
Meanwhile, a superkey is a set of fields that contains a key; it
is superfluous in its fields.

3.5   ① !candidatekey

age is an inappropriate candidate key; the same goes for name as
there are duplicate entries.

② candidatekey

either SID or login would make appropriate candidate keys as they
can uniquely identify tuples.

3.6   A foreign key constraint is an integrity constraint involving two relations
that must be specified if a DBMS is to make sure that when one
relation is modified, the other relation is checked, if not modified,
to keep data consistent. Without them, there will be discrepencies
within the database. Referential integrity ensures that the relationship
between relations remains consistent throughout modifecations.

3.7   ① foreign key(cid) references ~~enrolled~~ courses
foreign key (sid) reference students
foreign key (fid) reference faculty
foreign key (cid) reference meets_in
foreign key (rno) reference Rooms
② cid reference teaches

3.12
```
CREATE TABLE Professors ( ssn        char(9),
                          cid        char(8),
                          FOREIGN KEY (cid) reference Courses
                          PRIMARY KEY (ssn));
CREATE TABLE Courses ( cid         char(8),
                       Semester    varchar(20),
                       PRIMARY KEY (cid));
CREATE TABLE Teaches ( ssn         char(9),
                       cid         char(8),
                       PRIMARY KEY (ssn, cid),
                       FOREIGN KEY (ssn) reference Professors,
                       FOREIGN KEY (cid) reference Courses);
```

Cannot capture "exactly one" participation constraint if DB
allows duplicates. Conidtion 6 cannot be captured as that is outside
of SQL's capabilities.

3.15
```
CREATE TABLE Musicians ( ssn        char(9),
                         name       char(15),
                         PRIMARY KEY (ssn));
CREATE TABLE Instrument (instid     char(10),
                         key        char(5),
                         PRIMARY KEY (instid));
CREATE TABLE Play
CREATE TABLE Plays ( ssn            char(9),
                     instid         char(10),
                     PRIMARY KEY (ssn, instid),
                     FOREIGN KEY (ssn) reference Musicians,
                     FOREIGN KEY (instid) reference Instrument);
CREATE TABLE Song ( songid         varchar(10),
                    title          varchar(20),
                    author         char(15),
                    PRIMARY KEY (songid),
                    FOREIGN KEY (author) reference Musicians);
```

```
CREATE TABLE Appears ( songid varchar (10),
                       title     varchar(20),
                       author char (15),
                       albumid integer, NOT NULL,
                       PRIMARY KEY (songid),
                       foreign KEY (albumId) reference alb Producer);
CREATE TABLE albProducer ( ssn      char(9) not NULL,
                       albumid  integer,
                       copyright date,
                       title      varchar(20),
                       format    varchar (5),
                       PRIMARY KEY (albumid)
                       FOREIGN KEY (ssn) reference Musicians);
CREATE TABLE Perform ( songid  varchar (10),
                       ssn      char(9),
                       PRIMARY KEY (ssn, songid),
                       FOREIGN KEY (songid) references Songs
                       FOREIGN KEY (ssn) reference Musicians);
CREATE TABLE Phone Home ( phone    char (10),
                       addr      varchar (30),
                       PRIMARY KEY (phone),
                       FOREIGN KEY (addr) reference Place);
CREATE TABLE Place ( addr   char(30));
CREATE TABLE Lives ( SSN   char (9),
                       phone  char(10),
                       addr   char(30),
                       PRIMARY KEY (ssn, addr),
                       FOREIGN KEY (phone, addr), reference phoneHome,
                       FOREIGN KEY (ssn) reference Musicians);
```

```
CREATE TABLE   Employees ( ssn      varchar(9),
                           union    varchar(10),
                           PRIMARY KEY(ssn));
```

3.16
```
CREATE TABLE Airplane (regnumber    integer),
                       PRIMARY KEY (regnumber);
CREATE TABLE Models ( modno         varchar(9),
                      capacity      integer,
                      weight        integer,
                      PRIMARY KEY (modno));
CREATE TABLE Type ( regnumber    integer,
                    modno        integer,
                    PRIMARY KEY (modno, regnumber),
                    FOREIGN KEY (modno) reference Models,
                    FOREIGN KEY (regnumber) reference Airplane);
CREATE TABLE TECHNICIAN_EMP ( ssn    varchar(9), ref Employees
                              union  varchar(10),
                              name   char(15),
                              addr   char varchar(20),
                              phone  varchar(10),
           FOREIGN KEY(ssn)
           reference Employees PRIMARY KEY(ssn));
CREATE TABLE TRAFFIC_EMP( ssn       varchar(9) ref Employees
                          union     varchar(10),
                          exam      date,
                          PRIMARY KEY (ssn),
                          FOREIGN KEY (ssn) reference Employees);
CREATE TABLE TEST( testno      integer,
                   name        varchar(15),
                   maxscore    integer,
                   PRIMARY KEY (testno));
CREATE TABLE testinfo ( testno   integer,
                        ssn      varchar(9),
                        regno    integer,
                        datet    date,
                        nohour   integer,
                        score    integer,
                        PRIMARY KEY (testno, regno, ssn),
                        FOREIGN KEY (testno) reference Test,
                        FOREIGN KEY (regno) reference Airplane)
                        FOREIGN KEY (ssn) reference Employees));
```