CS1555 Recitation 3

Objective: To practice the relational model and SQL DDL

Consider the following relation schemas and states:

STUDENT ( sid, name, class, major)

STUDENT\_DIR ( sid, address, phone)

COURSE\_TAKEN ( course\_no, term, sid, grade)

COURSE ( course\_no, name, level)

1. What are the arities and cardinalities of the relations?

**STUDENT**

|  |  |  |  |
| --- | --- | --- | --- |
| sid | name | class | major  Arity =  Cardinality = |
| 123 | John | 3 | CS |
| 124 | Mary | 3 | CS |
| 126 | Sam | 2 | CS |
| 129 | Julie | 2 | Math |

**STUDENT \_DIR**

Arity =

Cardinality =

|  |  |  |
| --- | --- | --- |
| sid | address | phone |
| 123 | 333 Library St | 555-535-5263 |
| 124 | 219 Library St | 555-963-9635 |
| 129 | 555 Library St | 555-123-4567 |

**COURSE**

|  |  |  |
| --- | --- | --- |
| course\_no | name | course\_level |
| CS1520 | Web Programming | UGrad  Arity =  Cardinality = |
| CS1555 | Database Management Systems | UGrad |
| CS1550 | Operating Systems | UGrad |
| CS 1655 | Secure Data Management and Web Applications | Ugrad |
| CS2550 | Database Management Systems | Grad |

**COURSE\_TAKEN**

|  |  |  |  |
| --- | --- | --- | --- |
| course\_no | term | sid | grade  Arity =  Cardinality = |
| CS1520 | Fall 19 | 123 | 3.75 |
| CS1520 | Fall 19 | 124 | 4 |
| CS1520 | Fall 19 | 126 | 3 |
| CS1555 | Fall 19 | 123 | 4 |
| CS1555 | Fall 19 | 124 | NULL |
| CS1550 | Spring 20 | 123 | NULL |
| CS1550 | Spring 20 | 124 | NULL |
| CS1550 | Spring 20 | 126 | NULL |
| CS1550 | Spring 20 | 129 | NULL |
| CS2550 | Spring 20 | 124 | NULL |
| CS1520 | Spring 20 | 126 | NULL |

2. Find the primary key of each relation, assuming that a student is allowed to take each course only once.

3. Now given that a student may re-take a course if she or he fails to obtain a proper grade for that course, what is the primary key of the Course-taken relation?

4. Find the foreign key(s) of each relation, if any. Where does each foreign key reference to?

5. Use CREATE TABLE statement to create tables for each of the relations above. You need to define the primary keys, foreign keys and any other constraints.

6. What will happen if the first two CREATE TABLE statements are switched. Will the statements run smoothly without a problem?

7. Would the following actions be valid given the current data? If not, why?

* Add a tuple <CS1550, Fall 19, 130, NULL> to COURSE\_TAKEN
* Delete the tuple <CS1520, Fall 19, 126, NULL> from COURSE\_TAKEN
* Delete the tuple <123, John, 3, CS> from STUDENT
* Delete the tuple <123, John, 3, CS> from STUDENT, with foreign keys referring to ***sid*** in the Student table are declared with the “ON DELETE CASCADE” option
* Delete the tuple <123, 333 Library St, 555-535-5263> from STUDENT\_DIR
* In the table COURSE, update the ***name*** of the course CS1520 to Java Programming
* In the table COURSE, update the ***course\_no*** of the course CS1520 to CS7896
* In the table COURSE, update the ***course\_no*** of the course CS1520 to CS7896, with foreign keys referring to ***course\_no*** in COURSE table are declared with the “ON UPDATE CASCADE” option