

## Assignment for Database Integrity

### Objectives

- Understand database integrity concepts.
- Be able to create database tables with foreign key constraints.

### Key Ideas

- Integrity
- Foreign key constraints.

### Problems

1. **Problem 1:** Follow the instructions given below to add foreign key constraints to the supplier-part-project database. Use this reference page for the syntax on MySQL database.
  - Use `mysqldump` command to back up your entire supplier-part-project database into a script file. The syntax of the command is given below. Note that the command should be run from a command-line window or shell, a console window without logging into MySQL database.

```
mysqldump -u username DATABASE -p > spj_backup.sql
```

For example (Type the command in single line)

```
mysqldump -u jdoe JDOE -p > spj_backup.sql
```
  - If you want to back up specific tables, use a command like the following example which backs up tables s, p, j, and spj to file named spj backup.sql

```
mysqldump -u jdoe -p JDOE s p j spj > spj_backup.sql
```
  - More detailed instructions on backups are given in a separate web page on the course website.
  - Add foreign key referential constraints (ON DELETE CASCADE) to table spj in the backup script file.
  - Run the modified script to re-create tables using the following command:

```
mysql DATABASE -u username -p < spj_backup.sql
```
  - Log in MySQL database and test the foreign key constraints by executing the following SQL queries in the order and describe what happens and why.

- (a) insert into spj values ('S8', 'P1', 'J2', 600);
- (b) insert into s values ('S8', 'McFadden', 40, 'Fort Worth');
- (c) select \* from s;
- (d) insert into spj values ('S8', 'P1', 'J2', 600);
- (e) select \* from spj;
- (f) delete from s where s num = 'S8';
- (g) select \* from s
- (h) select \* from spj;

2. **Problem 2:**

Using the sample suppliers-parts-projects data values (you can also find them on the inside back cover), say what the effect of each of the following operations is:

- (a) UPDATE project J7, setting CITY to New York.
- (b) DELETE supplier S3 from table S, if the applicable referential action for table SPJ is CASCADE DELETE.
- (c) DELETE all shipments for project J4 from table SPJ, if the applicable referential action for table SPJ is CASCADE DELETE.
- (d) UPDATE shipment S1-P1-J1 from table SPJ, setting S# to S2.
- (e) UPDATE shipment S5-P5-J5 from table SPJ, setting J# to J8.
- (f) INSERT shipment S5-P8-J7 into table SPJ.

3. **Problem 3:** An education database contains information about an in-house company education training program. For each training course, the database contains details of all prerequisite courses and all offerings for that course. For each offering, it contains details of all teachers and all student enrollments for that offering. The database also contains information about employees. The relevant tables are as follows:

```

COURSE {COURSE#, TITLE}
PREREQ {SUP_COURSE#, SUB_COURSE# }
OFFERING {COURSE#, OFF#, OFFDATE, LOCATION}
TEACHER {OFF#, EMP# }
ENROLLMENT {OFF#, EMP#, GRADE}
EMPLOYEE {EMP#, ENAME, JOB}

```

The meaning of the PREREQ table is that the superior course (SUP\_COURSE) has the subordinate course (SUB\_COURSE) as an immediate prerequisite; the others should be self-explanatory. Draw a referential diagram for this database. Also give the corresponding database definition (that is, write appropriate definitions for the tables including foreign key constraints).

4. **Problem 4:** This textbook by C. J. Date has discussed foreign key delete and update rules, but it did not mention any foreign key "insert" rules. Explain the reasons.