

COMS 4111 - Homework 3

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DDL Changes

The inheritance hierarchy between the 3 entities is **complete specialization**.

- **department** attribute is added to the Person table
- Specialized attributes of Student are (**year**)
- Specialized attributes of Faculty are (**pay_grade, title**)
- The attribute **school** has been abstrated out as a separate table, so as to implement the relationship - **school contains department**. An additional attribute **sname** has been added to the **department** table
- Attribute **enrollment_limit** has been added to implement **maximum enrollment** constraint on **sections**
- An additional table **section_taught_by** has been created to store the instructors for the courses.
- **Views** - StudentAll, FacultyAll, CoursesTaken, CoursesTaught

Triggers

- **course_participant_BEFORE_INSERT** trigger ensures a student has completed pre-requisite courses before enrolling for a course and ensures that the section, student is trying to enrol for, has vacant seats

```
mysql> SELECT prereq_id FROM course_prereqs WHERE course_id = 'ANTHBC4664';
+-----+
| prereq_id |
+-----+
| ANTHBC6633 |
| ANTHC1571 |
| ANTHF4356 |
+-----+
3 rows in set (0.00 sec)

mysql> SELECT * FROM course_participant;
Empty set (0.00 sec)

mysql> SELECT * FROM sections WHERE call_no = '00002';
+-----+-----+-----+-----+-----+-----+-----+
| call_no | course_id | section_no | year | semester | enrollment_limit | section_key |
+-----+-----+-----+-----+-----+-----+-----+
| 00002 | ANTHBC4664 | 1 | 2010 | Fall | 2 | 2010FallANTHBC46641 |
+-----+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql> INSERT INTO course_participant VALUES('ABAD-1','00002');
ERROR 1644 (03000): Pre-Reqs not satisfied: ANTHBC6633,ANTHC1571,ANTHF4356
```

Figure 1: Failure to enrol when prerequisites haven't been completed

```
mysql> SELECT enrollment_limit FROM sections where call_no = '00043';
+-----+
| enrollment_limit |
+-----+
| 2 |
+-----+
1 row in set (0.00 sec)

mysql> select * from course_participant;
Empty set (0.00 sec)

mysql> INSERT INTO course_participant VALUES('ABAD-1','00043');
Query OK, 1 row affected (0.07 sec)

mysql> INSERT INTO course_participant VALUES('AIAN-1','00043');
Query OK, 1 row affected (0.07 sec)

mysql> INSERT INTO course_participant VALUES('AKAN-1','00043');
ERROR 1644 (04000): Section is full
```

Figure 2: Maximum enrollment constraint

- `section_taught_by BEFORE INSERT` ensures that a faculty can't instruct for more than 3 courses per semester

```
mysql> select * from section_taught_by;
Empty set (0.00 sec)

mysql> INSERT INTO section_taught_by VALUES('ALAS-1','00011');
Query OK, 1 row affected (0.10 sec)

mysql> INSERT INTO section_taught_by VALUES('ALAS-1','00012');
Query OK, 1 row affected (0.06 sec)

mysql> INSERT INTO section_taught_by VALUES('ALAS-1','00013');
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO section_taught_by VALUES('ALAS-1','00014');
ERROR 1643 (02000): A faculty is not allowed to instruct for more than 3 sections
```

Figure 3: Faculty can't instruct for more than 3 sections

Stored Procedures

- Stored procedures - `insertStudent`, `updateStudent`, `deleteStudent` are used for manipulating `Student` table

```
mysql> SELECT * FROM StudentAll where UNI = 'SARI-1';
Empty set (0.00 sec)

mysql> CALL insertStudent('Sanchez','Rick','rick@rickandmorty.com','Computer Science',2077);
Query OK, 1 row affected (0.10 sec)

mysql> SELECT * FROM StudentAll where UNI = 'SARI-1';
+-----+-----+-----+-----+-----+-----+
| UNI   | last_name | first_name | email                  | department | year |
+-----+-----+-----+-----+-----+-----+
| SARI-1 | Sanchez   | Rick       | rick@rickandmorty.com | Computer Science | 2077 |
+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql> CALL updateStudent('SARI-1','Sanchez','Rick','ricksanchez@rickandmorty.com','Computer Science',2088);
Query OK, 1 row affected (0.09 sec)

mysql> SELECT * FROM StudentAll where UNI = 'SARI-1';
+-----+-----+-----+-----+-----+-----+
| UNI   | last_name | first_name | email                  | department | year |
+-----+-----+-----+-----+-----+-----+
| SARI-1 | Sanchez   | Rick       | ricksanchez@rickandmorty.com | Computer Science | 2088 |
+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql> CALL deleteStudent('SARI-1');
Query OK, 1 row affected (0.10 sec)

mysql> SELECT * FROM StudentAll where UNI = 'SARI-1';
Empty set (0.00 sec)
```

Figure 4: `insertStudent`, `updateStudent`, `deleteStudent`

- Stored procedures - **insertFaculty**, **updateFaculty**, **deleteFaculty** are used for manipulating **Faculty** table

```
mysql> SELECT * FROM FacultyAll WHERE UNI = 'SMWO-1';
Empty set (0.00 sec)

mysql> CALL insertFaculty('Smith','Morty','morty@rickandmorty.com','Computer Science',8,'Senior Professor');
Query OK, 1 row affected (0.11 sec)

mysql> SELECT * FROM FacultyAll WHERE UNI = 'SMWO-1';
+-----+-----+-----+-----+-----+-----+-----+
| UNI | last_name | first_name | email | department | pay_grade | title |
+-----+-----+-----+-----+-----+-----+-----+
| SMWO-1 | Smith | Morty | morty@rickandmorty.com | Computer Science | 8 | Senior Professor |
+-----+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql> CALL updateFaculty('SMWO-1','Smith','Morty','mortysmith@rickandmorty.com','Computer Science',9,'Senior Professor');
Query OK, 1 row affected (0.09 sec)

mysql> SELECT * FROM FacultyAll WHERE UNI = 'SMWO-1';
+-----+-----+-----+-----+-----+-----+-----+
| UNI | last_name | first_name | email | department | pay_grade | title |
+-----+-----+-----+-----+-----+-----+-----+
| SMWO-1 | Smith | Morty | mortysmith@rickandmorty.com | Computer Science | 9 | Senior Professor |
+-----+-----+-----+-----+-----+-----+-----+
1 row in set (0.00 sec)

mysql> CALL deleteFaculty('SMWO-1');
Query OK, 1 row affected (0.09 sec)

mysql> SELECT * FROM FacultyAll WHERE UNI = 'SMWO-1';
Empty set (0.00 sec)
```

Figure 5: insertFaculty, updateFaculty, deleteFaculty

Functions

- **generate_uni_for_person** - used to generate UNI for a person given last name and first name