COMP 3311: Database Management Systems

Lab 5 Exercise: Simple SQL DDL, DML and Constraint Statements

WHAT TO DO

1. **Download** the zipped folder Lab5Exercise.zip from the ***Simple SQL DDL, DML and Constraint Statements*** entry of the Lab Schedule course webpage and **unzip** it. The folder contains three script files Lab5DB.sql, Lab5AddConstraints.sql and Lab5TestConstraints.sql.

2. **Place** your InsertMyself.sql script file <u>inside</u> the Lab5Exercise folder and **modify** it to also insert into the EnrollsIn table, five tuples with the following values. ← NEW!

studentId	courseId	grade
<your student id>	COMP3311	97.6
<your student id>	COMP4021	88.3
<your student id>	ELEC3100	95.1
<your student id>	HUMA1020	89.4
<your student id>	MATH2421	92.5

3. **Execute** the Lab5DB.sql script file in SQL Developer.

4. **Edit** the Lab5AddConstraints.sql script file by editing the alter table statements to do the following.
   a. For the Student, Course, Facility and EnrollsIn tables, add foreign key referential integrity constraints.
   b. For the Department table, add a constraint to check that departmentId has only a value in the set {BUS, COMP, ELEC, HUMA, MATH}.
   c. For the Student table, add constraints to
      i. enforce the uniqueness of email values;
      ii. check that studentId and phoneNo have exactly 8 digits only;
      iii. check that cga has a value between 0 and 4; and
      iv. check that admissionYear begins with a 2 and has exactly 4 digits only.
   d. For the Course table, add a constraint to check that courseId follows the pattern of exactly four uppercase letters followed by exactly four digits.
   e. For the EnrollsIn table, add a constraint to check that grade has a value between 0 and 100.

   Note: As you construct the constraints, you can test each one <u>individually</u> for correctness by first executing it in your Lab5AddConstraints.sql script file and then executing the corresponding test query in the Lab5TestConstraints.sql script file. If a constraint is not correctly defined, then executing its corresponding test query will insert one or more tuples into a table that violates the constraint. To remove the incorrectly inserted tuples you will need to *either* delete them using appropriate delete statements *or* execute the Lab5DB.sql script file again <u>before</u> executing the constraint's test query.

5. When all your constraints are correctly specified, **execute** the Lab5TestConstraints.sql script file in SQL Developer to create the required Lab5TestConstraintsResults.txt submission file.

WHAT TO SUBMIT

1. Your modified Lab5AddConstraints.sql script file containing the completed alter table statements.
2. A text file named Lab5TestConstraintsResults.txt containing the result of executing the Lab5TestConstraints.sql script file. The Lab5TestConstraintsResults.txt file can be created by saving the SQL Developer Script Output tab to a file with this name. The expected result of executing the Lab5TestConstraints.sql script file is shown in Figure 1 and Figure 2.

HOW TO SUBMIT

By 11:00 p.m. today, upload your Lab5AddConstraints.sql script file and Lab5TestConstraintsResults.txt text file to Canvas by selecting *Lab 5* in the Assignments section of Canvas, and then selecting the Submit Assignment button.
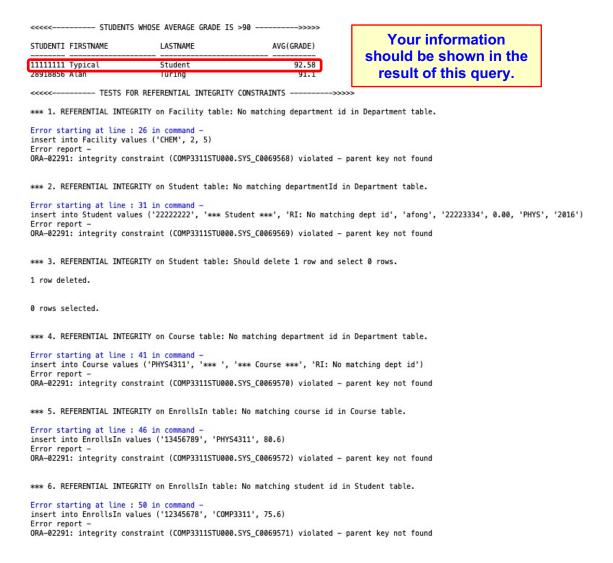
```
<<<<<---------- STUDENTS WHOSE AVERAGE GRADE IS >90 ---------->>>>>

STUDENTI FIRSTNAME           LASTNAME                AVG(GRADE)
-------- -------------------- ----------------------- ----------
11111111 Typical              Student                      92.58
28918856 Alan                 Turing                        91.1

<<<<<---------- TESTS FOR REFERENTIAL INTEGRITY CONSTRAINTS ---------->>>>>

*** 1. REFERENTIAL INTEGRITY on Facility table: No matching department id in Department table.

Error starting at line : 26 in command -
insert into Facility values ('CHEM', 2, 5)
Error report -
ORA-02291: integrity constraint (COMP3311STU000.SYS_C0069568) violated - parent key not found


*** 2. REFERENTIAL INTEGRITY on Student table: No matching departmentId in Department table.

Error starting at line : 31 in command -
insert into Student values ('22222222', '*** Student ***', 'RI: No matching dept id', 'afong', '22223334', 0.00, 'PHYS', '2016')
Error report -
ORA-02291: integrity constraint (COMP3311STU000.SYS_C0069569) violated - parent key not found


*** 3. REFERENTIAL INTEGRITY on Student table: Should delete 1 row and select 0 rows.

1 row deleted.


0 rows selected.


*** 4. REFERENTIAL INTEGRITY on Course table: No matching department id in Department table.

Error starting at line : 41 in command -
insert into Course values ('PHYS4311', '*** ', '*** Course ***', 'RI: No matching dept id')
Error report -
ORA-02291: integrity constraint (COMP3311STU000.SYS_C0069570) violated - parent key not found


*** 5. REFERENTIAL INTEGRITY on EnrollsIn table: No matching course id in Course table.

Error starting at line : 46 in command -
insert into EnrollsIn values ('13456789', 'PHYS4311', 80.6)
Error report -
ORA-02291: integrity constraint (COMP3311STU000.SYS_C0069572) violated - parent key not found


*** 6. REFERENTIAL INTEGRITY on EnrollsIn table: No matching student id in Student table.

Error starting at line : 50 in command -
insert into EnrollsIn values ('12345678', 'COMP3311', 75.6)
Error report -
ORA-02291: integrity constraint (COMP3311STU000.SYS_C0069571) violated - parent key not found
```

Your information should be shown in the result of this query.

Figure 1: Example Script Output tab showing the result of executing the referential integrity constraints.

```
<<<<<---------- TESTS FOR CHECK CONSTRAINTS ---------->>>>>

*** 7. CHECK CONSTRAINT on Department table: departmentId must be one of BUS, COMP, ELEC, HUMA or MATH.

Error starting at line : 57 in command -
insert into Department values ('DEPT','*** Department table: CHK: deptId','0000')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_DEPARTMENTID) violated


*** 8. CHECK CONSTRAINT on Student table: studentId must be all digits.

Error starting at line : 62 in command -
insert into Student values ('234567*9', '*** Student table:', 'CHK: studentId', 'afong', '22223334', 0.00, 'COMP', '2016')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_STUDENTID) violated


*** 9. CHECK CONSTRAINT on Student table: studentId must be exactly 8 digits.

Error starting at line : 67 in command -
insert into Student values ('234567', '*** Student table:', 'CHK: studentId', 'bfong', '22223334', 0.00, 'COMP', '2016')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_STUDENTID) violated


*** 10. CHECK CONSTRAINT on Student table: phoneNo must be all digits.

Error starting at line : 72 in command -
insert into Student values ('33333333', '*** Student table:', 'CHK: studentId', 'cfong', '222a3334', 0.00, 'COMP', '2016')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_PHONENO) violated


*** 11. CHECK CONSTRAINT on Student table: phoneNo must be exactly 8 digits.

Error starting at line : 77 in command -
insert into Student values ('44444444', '*** Student table:', 'CHK: studentId', 'dfong', '2222', 0.00, 'COMP', '2016')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_PHONENO) violated


*** 12. CHECK CONSTRAINT on Student table: cga must be between 0 and 4.

Error starting at line : 82 in command -
insert into Student values ('55555555', '*** Student table:', 'CHK: cga', 'ali', '25524334', 4.50, 'COMP', '2016')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_CGA) violated


*** 13. CHECK CONSTRAINT on Student table: admissionYear must be all digits.

Error starting at line : 87 in command -
insert into Student values ('77777777', '*** Student table:', 'CHK: admissionYear', 'bli', '25524334', 4.50, 'COMP', '200a')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_ADMISSIONYEAR) violated


*** 14. CHECK CONSTRAINT on Student table: admissionYear has exactly 4 digits.

Error starting at line : 92 in command -
insert into Student values ('88888888', '*** Student table:', 'CHK: admissionYear', 'cli', '25524334', 4.50, 'COMP', '200')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_ADMISSIONYEAR) violated


*** 15. CHECK CONSTRAINT on Student table: admissionYear begins with a 2.

Error starting at line : 97 in command -
insert into Student values ('99999999', '*** Student table:', 'CHK: admissionYear', 'dli', '25524334', 4.50, 'COMP', '1999')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_ADMISSIONYEAR) violated


*** 16. CHECK CONSTRAINT on Course table: course id must be exactly four uppercase letters followed by exactly four digits.

Error starting at line : 102 in command -
insert into course values ('comp3311','COMP','** Course Table: CHK: courseId','Test Man')
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_COURSEID) violated


*** 17. CHECK CONSTRAINT on EnrollsIn table: grade must be between 0 and 100.

Error starting at line : 107 in command -
insert into EnrollsIn values ('99987654', 'COMP3311', 100.1)
Error report -
ORA-02290: check constraint (COMP3311STU000.CHK_GRADE) violated


<<<<<---------- TEST FOR UNIQUE CONSTRAINT ---------->>>>>

*** 18. CHECK CONSTRAINT on Student table: email must be unique.

Error starting at line : 114 in command -
insert into Student values ('10101010', '*** Student table:', 'CHK: eEmail', 'csgrande', '22223334', 0.00, 'COMP', '2018')
Error report -
ORA-00001: unique constraint (COMP3311STU000.UNIQUE_EMAIL) violated
```

Figure 2: Example Script Output tab showing the result of executing the check constraints.