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. check that **studentId** and **phoneNo** have exactly 8 digits only;
      ii. check that **cga** has a value between 0 and 4; and
      iii. check that **admissionYear** begins with a 2 and has exactly 4 digits only;
      iv. enforce the uniqueness of **email** values.
   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.
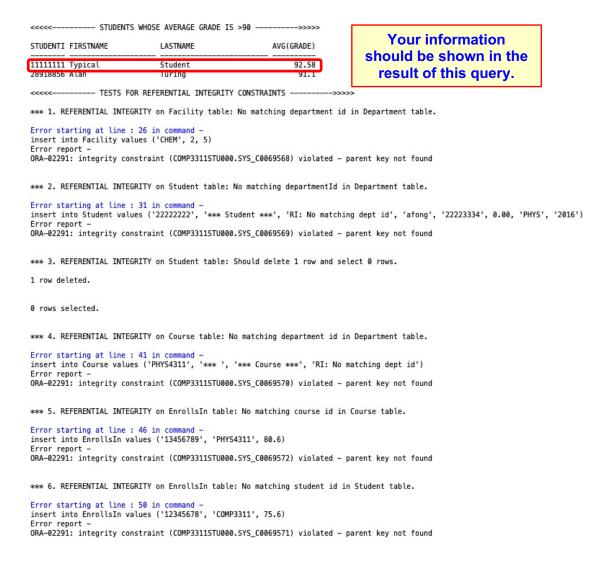

```
<<<<<---------- STUDENTS WHOSE AVERAGE GRADE IS >90 ---------->>>>>

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

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

```
<<<<<---------- 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
```

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

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```
<<<<<---------- 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.