# Department of Computing

**CS220: Database Systems**

**Class: BSCS-6C**

**Lab 03: Introduction to SQL**

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**Time: 09000-1200**

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# Introduction

* SQL DDL (Data Definition Language) commands are used to create and modify the databases. Data Manipulation Language (DML) commands are used to query the databases.

# Objectives

After performing this lab students should be able to:

1. Create tables in SQL using DDL commands.

2. Perform DML operations on created tables.

# Tools/Software Requirement

* MySQL Community Server 5.6
* MySQL Workbench 6.1

# Description

# CREATE TABLE Syntax

CREATE TABLE [IF NOT EXISTS] *tbl\_name*

(*create\_definition*,...)

***create\_definition*:**

***col\_name column\_definition***

| [CONSTRAINT [*symbol*]] PRIMARY KEY [*index\_type*] (*index\_col\_name*,...)

[*index\_option*] ...

| {INDEX|KEY} [*index\_name*] [*index\_type*] (*index\_col\_name*,...)

[*index\_option*] ...

| [CONSTRAINT [*symbol*]] UNIQUE [INDEX|KEY]

[*index\_name*] [*index\_type*] (*index\_col\_name*,...)

[*index\_option*] ...

| [CONSTRAINT [*symbol*]] FOREIGN KEY

[*index\_name*] (*index\_col\_name*,...) *reference\_definition*

| CHECK (*expr*)

***column\_definition***:

*data\_type* [NOT NULL | NULL] [DEFAULT *default\_value*]

[AUTO\_INCREMENT] [UNIQUE [KEY] | [PRIMARY] KEY]

[COMMENT '*string*']

[COLUMN\_FORMAT {FIXED|DYNAMIC|DEFAULT}]

[STORAGE {DISK|MEMORY|DEFAULT}]

[*reference\_definition*]

***data\_type*:**

INT[(*length*)] [UNSIGNED] [ZEROFILL]

| INTEGER[(*length*)] [UNSIGNED] [ZEROFILL]

| REAL[(*length*,*decimals*)] [UNSIGNED] [ZEROFILL]

| DOUBLE[(*length*,*decimals*)] [UNSIGNED] [ZEROFILL]

| FLOAT[(*length*,*decimals*)] [UNSIGNED] [ZEROFILL]

| DECIMAL[(*length*[,*decimals*])] [UNSIGNED] [ZEROFILL]

| NUMERIC[(*length*[,*decimals*])] [UNSIGNED] [ZEROFILL]

| DATE

| TIME[(*fsp*)]

| TIMESTAMP[(*fsp*)]

| CHAR[(*length*)] [BINARY]

| VARCHAR(*length*) [BINARY]

| BINARY[(*length*)]

| VARBINARY(*length*)

| BLOB

| TEXT [BINARY]

***reference\_definition***:

REFERENCES *tbl\_name* (*index\_col\_name*,...)

[ON DELETE *reference\_option*]

[ON UPDATE *reference\_option*]

***reference\_option*:**

RESTRICT | CASCADE | SET NULL | NO ACTION

# Schema Evaluation: ALTER TABLE Syntax

ALTER TABLE *tbl\_name*

[*alter\_specification* [, *alter\_specification*] ...]

[*partition\_options*]

*alter\_specification*:

*table\_options*

| ADD [COLUMN] *col\_name column\_definition*

[FIRST | AFTER *col\_name* ]

| ADD [COLUMN] (*col\_name column\_definition*,...)

| ADD {INDEX|KEY} [*index\_name*]

[*index\_type*] (*index\_col\_name*,...) [*index\_option*] ...

| ADD [CONSTRAINT [*symbol*]] PRIMARY KEY

[*index\_type*] (*index\_col\_name*,...) [*index\_option*] ...

| ADD [CONSTRAINT [*symbol*]]

UNIQUE [INDEX|KEY] [*index\_name*]

[*index\_type*] (*index\_col\_name*,...) [*index\_option*] ...

| ADD [CONSTRAINT [*symbol*]]

FOREIGN KEY [*index\_name*] (*index\_col\_name*,...)

*reference\_definition*

| ALTER [COLUMN] *col\_name* {SET DEFAULT *literal* | DROP DEFAULT}

| CHANGE [COLUMN] *old\_col\_name new\_col\_name column\_definition*

[FIRST|AFTER *col\_name*]

| MODIFY [COLUMN] *col\_name column\_definition* [FIRST | AFTER *col\_name*]

| DROP [COLUMN] *col\_name*

| DROP PRIMARY KEY

| DROP {INDEX|KEY} *index\_name*

| DROP FOREIGN KEY *fk\_symbol*

| DISABLE KEYS

| ENABLE KEYS

| RENAME [TO|AS] *new\_tbl\_name*

| ORDER BY *col\_name* [, *col\_name*] ...

# Lab Task

Given the following database schema:

Student (snum: integer, sname: char(30), major: char(25), level: char(2))

Faculty (fid: integer, fname: char(30), deptid: integer)

Class (cname: char(40), meets\_at: char(20), room: char(10), fid: integer | fid REFS Faculty.fid)

Enrolled (snum: integer, cname: char(40) | snum REFS student.snum, cname REFS class.name)

**Write SQL expressions for each of the following queries and execute them:**

1. Create a database for these four relations. You need to define the primary keys and foreign keys in your statement. After creating the database, evolve it as follows.
2. Add a new attribute age in STUDENT table. ~~.~~
3. Modify data type of attribute: NAME (i.e. cname, sname, fname) in all tables to varchar data type.
4. Add a new NOT NULL constraint to DEPTID in FACULTY table.
5. After creating the database using your SQL statements, populate the database according to the data given in text files using the SQL INSERT commands.

# Deliverables

1. Complete your lab tasks in SQL workbench and submit a word file in with queries along with the screenshots of the results to all the questions attempted. Upload it on LMS. The marking will be based on viva/lab task submitted.