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INFORMATION TECHNOLOGY FOR CLASS 12

(Study materials)

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DATE:-20.05.2020 (WEDNESDAY)

## CHAPTER-1-DATABASE MANAGEMENT SYSTEM

**Database Constraints:** DBMS can enforce several constraints for smooth operations on databases. These constraints can be specified while creating the table as shown below

- **NOT NULL:** An attribute value may not be permitted to be NULL. For example, the First name of the Teacher cannot be NULL. Hence NOT NULL constraint can be specified in this case.

```
CREATE TABLE TEACHER
(
Teacher_ID INTEGER,
First_Name VARCHAR(20) NOT NULL,
Last_Name VARCHAR(20),
Gender CHAR(1),
Salary DECIMAL(10,2),
Date_of_Birth DATE,
Dept_No INTEGER
```

);

- **DEFAULT:** If a user has not entered a value for an attribute, then default value specified while creating the table is used. For example, if a teacher's salary has not been entered, then by default the database should store 40000 assuming that the minimum salary given to every teacher is ` 40000. This is illustrated as follows:

```
CREATE TABLE TEACHER
(
Teacher_ID INTEGER,
First_Name VARCHAR(20) NOT NULL,
Last_Name VARCHAR(20),
Gender CHAR(1),
Salary DECIMAL(10,2) DEFAULT 40000,
Date_of_Birth DATE,
Dept_No INTEGER
```

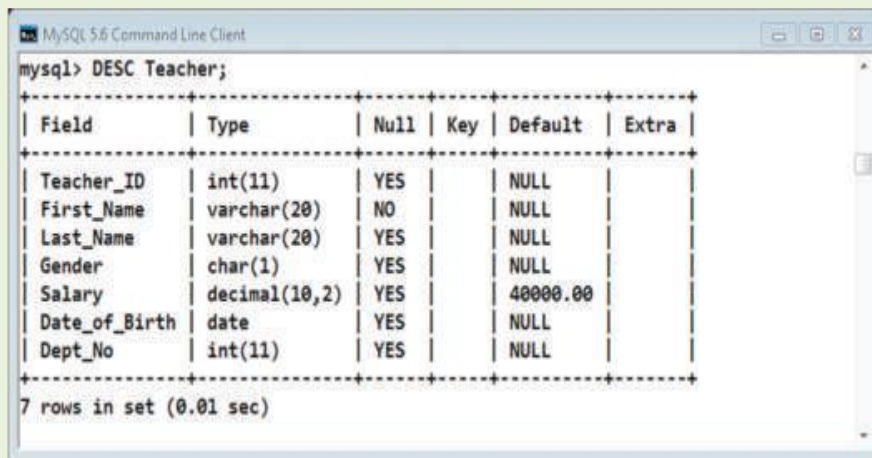
);

In MySQL, if you want to look at the structure and description of the tables created, DESC command can be used. The description of the table Teacher created above is as follows:

- **CHECK:** In order to restrict the values of an attribute within a range, CHECK constraint may be used. For example Dept\_No of any teacher must not exceed 110. This can be specified as follows:

```
CREATE TABLE TEACHER(
Teacher_ID INTEGER,
First_Name VARCHAR(20) NOT NULL,
Last_Name VARCHAR(20),
Gender CHAR(1),
Salary DECIMAL(10,2) DEFAULT 40000,
```

```
Date_of_Birth DATE,
Dept_No INTEGER CHECK (Dept_No<=110)
);
```



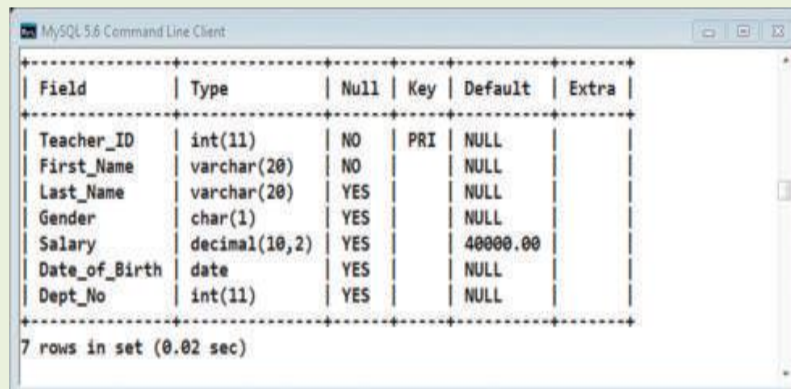
mysql> DESC Teacher;

Field	Type	Null	Key	Default	Extra
Teacher_ID	int(11)	YES		NULL	
First_Name	varchar(20)	NO		NULL	
Last_Name	varchar(20)	YES		NULL	
Gender	char(1)	YES		NULL	
Salary	decimal(10,2)	YES		40000.00	
Date_of_Birth	date	YES		NULL	
Dept_No	int(11)	YES		NULL	

7 rows in set (0.01 sec)

- **KEY CONSTRAINT:** Primary Key of a table can be specified in two ways. If the primary key of the table consist of a single attribute, then the corresponding attribute can be declared primary key along with its description. For example, if Teacher\_ID attribute of the Teacher relation is the PRIMARY KEY then it can be specified as follows:

```
CREATE TABLE TEACHER
(
Teacher_ID INTEGER PRIMARY KEY,
First_Name VARCHAR(20) NOT NULL,
Last_Name VARCHAR(20),
Gender CHAR(1),
Salary DECIMAL(10,2) DEFAULT 40000,
Date_of_Birth DATE,
Dept_No INTEGER
);
```



mysql> DESC Teacher;

Field	Type	Null	Key	Default	Extra
Teacher_ID	int(11)	NO	PRI	NULL	
First_Name	varchar(20)	NO		NULL	
Last_Name	varchar(20)	YES		NULL	
Gender	char(1)	YES		NULL	
Salary	decimal(10,2)	YES		40000.00	
Date_of_Birth	date	YES		NULL	
Dept_No	int(11)	YES		NULL	

7 rows in set (0.02 sec)

- **REFERENTIAL INTEGRITY CONSTRAINT**- This constraint is specified by using the foreign key clause. This clause contains the foreign key and the primary key referred to by this foreign key along with the name of the relation. For example consider the following tables created in the School Database:

Department (Dept\_ID, Dept\_Name) Teacher (Teacher\_ID, First\_Name, Last\_Name, Gender, Salary, Date\_of\_Birth, Dept\_No)

In this example Dept\_No is the foreign key that references Dept\_ID of Department relation which is a primary key. The SQL command for creating these tables would be as follows:

```
CREATE TABLE Department
(
Dept_ID INTEGER PRIMARY KEY,
Dept_Name VARCHAR(20) NOT NULL
);
CREATE TABLE Teacher(
Teacher_ID INTEGER PRIMARY KEY,
First_Name VARCHAR(20) NOT NULL,
Last_Name VARCHAR(20),
Gender CHAR(1),
Salary DECIMAL(10,2) DEFAULT 40000,
Date_of_Birth DATE,
Dept_No INTEGER,
FOREIGN KEY (Dept_No) REFERENCES Department(Dept_ID)
);
```

The foreign key is created separately by using the key words FOREIGN KEY followed by the attribute that is the foreign key within parenthesis, then the keyword REFERENCES followed by the name of the referred relation and its primary key within Parenthesis.

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20.05.20XX