# Lab 8

## Objectives

In this lab, we will look at Data Manipulation.
- Use the Select statement to ascertain the date and format dates.
- Use the Select statement to perform calculations.
- Use the COMMIT statement to explicitly save previous commands.
- Use the ROLLBACK statement to undo the effects of previous commands.
- Use the INSERT statement to add records to tables.
- Use the UPDATE statement to modify records.
- Use the DELETE statement to remove records.

## Date

The following statement will display the current date.

```
SELECT curdate() as 'Todays Date';
```

The following statement will display the current date and time.

```
SELECT now() as 'Todays Date and Time';
```

If you wish to format the date and display it in a more readable manner, you can use

DATE_FORMAT as follows:

```
SELECT DATE_FORMAT(curdate(),'%d %b %y')  as 'Todays Date';
```

DATE_FORMAT has 2 parameters:

1. **date**: The date to be formatted, it is a required value.
2. **format**: The format to use, it is also a required value. The format can be one or a combination of the following values:

| Format | Description |
| --- | --- |
| %a | Abbreviated week day name (Sun – Sat) |
| %b | Abbreviated month name (Jan – Dec) |
| %c | Month, Numeric (1-12) |
| %d | Day of month, numeric (01 – 31) |
| %D | Day of month with suffix (1st, 2nd....) |
| %e | Day of month, numeric (1 – 31) |
| %m | Month, numeric (01 – 12) |
| %M | Month name (January – December) |
| %W | Week day name (Sunday-Saturday) |
| %y | Year, numeric, two digits |
| %Y | Year, numeric, four digits |

You can include commas, - etc in the format string as separators as follows:

```
SELECT DATE_FORMAT(curdate(),'%d-%b-%y') as 'Todays Date';
```

## Exercise

- Output '2023-12-25' as follows:

| Christmas Day |
| --- |
| 25 December 23 |

| Christmas Day |
| --- |
| 25 Dec 2023 |

| Christmas Day |
| --- |
| December 25th, 2023 |

| Christmas Day |
| --- |
| Mon 25th December, 2023 |

| Christmas Day |
| --- |
| Monday 25th December, 2023 |

## Calculations in our database tables

DATEDIFF calculates the distance (number of days) between 2 dates.
- If we want to calculate the number of days that a book is overdue we could use DATEDIFF as follows:

```
SELECT loanId, DATEDIFF(curdate(), dateDue) as 'Number of Days
Overdue'
FROM loan
WHERE dateback IS NULL;
```

Obviously we will need to return the title of the book overdue, and the student who the book is on loan to:

```
SELECT concat(fname, ' ' , lname) as Name, title,
DATEDIFF(curdate(),dateDue) as 'Number of Days Overdue'
FROM book JOIN bookcopy ON book.isbn=bookcopy.isbn
JOIN loan ON bookcopy.copyId = loan.copyId
JOIN student ON loan.studentid = student.studentid
WHERE dateback IS NULL;
```

What if we want to use SQL to calculate a value that is not stored anywhere in the database? We can just use statements as follows:

```
SELECT 12 + 14; // Addition
SELECT 12 - 14; // Subtraction
SELECT 12 * 14; // Multiplication
SELECT 12 / 14; // Division
SELECT 12 % 14; // Modulus
SELECT 14 % 12; // Modulus
```

## Commit and Rollback

The **COMMIT** statement explicitly saves previous commands up until the last *COMMIT* or *ROLLBACK*.

The **ROLLBACK** command will undo all statements issued since the last *COMMIT* or *ROLLBACK*.

**Note:** At present, all commands issued are committed automatically. To ensure that we must explicitly use **COMMIT** or **ROLLBACK**:

- Go to the **Edit** menu, choose **Preferences…**, this opens the *Workbench Preferences* dialog box.
- Select **SQL Execution** and uncheck the *New connections use auto commit mode* checkbox.
- Click **OK**.
- Exit Workbench and open it again.

## Insert

The **INSERT** statement is used to add new records to tables, as follows:

```
INSERT INTO Book (ISBN, title, publisher, publishedDate, category,
price)
VALUES ('213345432', 'Beginning XML', 'McGraw Hill', '2010-07-
13','Computing', 43.00);
```

- Return all the book records (See the newly inserted record by issuing SELECT * FROM book;).
- Undo the above statement.

Because the above INSERT statement includes all the attributes of table Book, we could rewrite the statement as follows:

```
INSERT INTO Book VALUES
('213345432', 'Beginning XML', 'McGraw Hill', '2010-07-
13','Computing', 43.00);
```

- Again, return all the book records.
- Undo the above statement.

If you are only inserting values for a subset off the attributes, then you must specify the attribute by name. The order of the values supplied must match the order of the attribute names specified as follows:

```
INSERT INTO Book (ISBN, title, publisher, category)
VALUES ('214562899', 'DOM Scripting', 'Sitepoint', 'Computing');
```

- Again, return all the book records.
- Undo the above statement.

```
INSERT INTO Book (ISBN, title, category, publisher)
VALUES ('214562899', 'DOM Scripting', 'Computing', 'Sitepoint');
```

- Again, return all the book records.
- Undo the above statement.

If you are inserting a few records into the one table, then you can do so as follows:

```
INSERT INTO Book VALUES
('133451216', 'Backbone JS', 'Sitepoint', '2012-10-28','Computing',
60.00),
('134562135', 'Sociology in Practice', 'Prentice Hall', '2010-05-
08', 'Humanities', 78.00);
```

```
insert into BookCopy (ISBN, dateAcquired) values
 ('133451216','2012-12-10'),
 ('133451216','2012-12-10'),
 ('134562135','2011-08-01');
```

- Return all the book and bookcopy records.
- Undo the above statements.

**Notes:**
- The primary key must have a UNIQUE value entered for it.
- Any values which have been specified as NOT NULL must have a value entered for them. Note: A Primary key is always NOT NULL.
- Any foreign key values must match a primary key value in the related table or else be NULL.
- String values MUST be enclosed in quotes.
- The quotes used are very specific - the ones in MS word are not the same as the ones in SQL PLUS Worksheet.

## Update

**Note:** At present, we cannot use the *Update* and *Delete* statements without a *WHERE* clause. To prevent this happening:

- Go to the **Edit** menu, **choose Preferences…**, this opens the *Workbench Preferences* dialog box.
- Select **SQL Editor** and uncheck the *Safe Updates…* checkbox.
- Click **OK**.
- Exit Workbench and open it again.

The UPDATE statement is used to modify 0 or more records in a table. If the WHERE clause is omitted, then all records are updated.

```
SELECT * FROM student;
```

Note the different year values for each student. Now enter the following statement and note that all the student year values are set to 1:

```
UPDATE student SET year = 1;
```

- Again, return all the student records. Note that now all students are in first year.
- Undo the above statement.

To update one student record (use the Primary key value in the WHERE clause):

```
UPDATE student
SET year = 1
WHERE studentId = '20026294';
```

- Again, return all the student records.
- Undo the above statement.

To update more than one student record (but not all records):

```
UPDATE student
SET year = 1
WHERE county = 'Kilkenny';
```

- Again, return all the student records.
- Undo the above statement.

## Delete

The **DELETE** statement is used to delete 0 or more records in a table. If the WHERE clause is omitted then all records are deleted (so be careful).

```
DELETE FROM author;
```

- Return all the author records. Note that the Author table is empty!
- Undo the above statement.

To delete one Author record (use the Primary key value in the WHERE clause):

```
DELETE FROM author WHERE
aName = 'James Cooper' AND ISBN = '123675432';
```

- Again, return all the author records.
- Undo the above statement.

To delete more than one Author record (but not all records):

```
DELETE FROM author
WHERE ISBN = '123675432';
```

- Again, return all the author records.
- Undo the above statement.

## Exercise

### Insert

1. Add a new book to the book table:
   - ISBN:133312345;
   - title: Learning SQL;
   - publisher:O Reilly;
   - publishedDate:2009-05-08,
   - category: Computing;
   - price:25.00.
2. Add 3 bookcopies for this book, with dateAcquired: 2023-09-01.
3. Add a new record to the author table: Adam Beauleau is the author of the new book.
4. Commit the changes.

### Update

1. Change the price of the book to 28.00.
2. Change the dateAcquired value to 2023-09-12 for all 3 copies.
3. Commit the changes.

**Delete**

1. Delete the third copy of the book.
2. Commit the changes.