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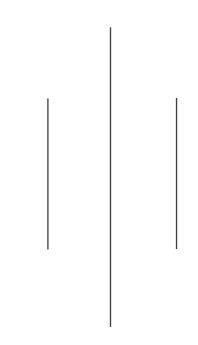
DHULIKHEL, KAVRE

Subject: COMP 232 Database Management Systems
Lab exercise no: 1

Submitted By: **Submitted To:**

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Lab Exercise#1

Lab Exercise#1:

This is the introduction of the database class. So in this class you are asked to prepare yourself to the database lab project practice.

In the first part of the lab I would like to ask to download and install the Latest version of the MySQL or Oracle in your machine.

In the second part of the exercise study the properties (you may consult to your friends also) and study the different data types, their features, latest stable version, specifications and other literals that is supported by the My SQL and Oracle.

Your task:

Prepare a simple report about the above mentioned databases and submit it online.

First Part:

5.7.18-0ubuntu0.16.04.1

The latest version of MySQL server i.e. 5.7.18-0 was installed on ubuntu0.16.04.1 successfully. On startup of MySQL server, the following message occurred.

Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 15
Server version: 5.7.18-0ubuntu0.16.04.1 (Ubuntu)

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Second Part:

1. MySQL:

Latest stable version: MySQL Server 5.7.18-0

Data types:

MySQL supports a number of SQL data types in several categories: numeric types, date and time types, string (character and byte) types, spatial types, and the JSON data type.

1. Numeric Types

i. Integer Types (Exact Value) - INTEGER, INT, SMALLINT, TINYINT, MEDIUMINT, BIGINT
ii. Fixed-Point Types (Exact Value) - DECIMAL, NUMERIC
iii. Floating-Point Types (Approximate Value) - FLOAT, DOUBLE
iv. Bit-Value Type - BIT
v. Numeric Type Attributes
vi. Out-of-Range and Overflow Handling

2. Date and Time Types

i. The DATE, DATETIME, and TIMESTAMP Types
ii. The TIME Type
iii. The YEAR Type
iv. YEAR(2) Limitations and Migrating to YEAR(4)
v. Automatic Initialization and Updating for TIMESTAMP and DATETIME
vi. Fractional Seconds in Time Values
vii. Conversion Between Date and Time Types
viii. Two-Digit Years in Dates

3. String Types

i.The CHAR and VARCHAR Types
ii.The BINARY and VARBINARY Types
iii.The BLOB and TEXT Types
iv.The ENUM Type
v.The SET Type

4. Extensions for Spatial Data

i. Spatial Data Types
ii. The OpenGIS Geometry Model
iii. Using Spatial Data

5. The JSON Data Type

I. Creating JSON Values
ii. Normalization, Merging, and Autowrapping of JSON Values
iii. Searching and Modifying JSON Values
iv. Comparison and Ordering of JSON Values
v. Converting between JSON and non-JSON values
vi. Aggregation of JSON Values

Literals supported

1 String Literals
2 Number Literals
3 Date and Time Literals
4 Hexadecimal Literals
5 Bit-Value Literals
6 Boolean Literals
7 NULL Values

Features

Many content management systems, such as WordPress, Joomla and Drupal, use MySQL databases. Whenever you plan to use one of these CMS choices, you will use MySQL. Often, these projects are on a smaller scale and MySQL provides the better choice. It's free to use, provides plenty of speed and is very user-friendly. Startup companies and smaller companies fit best with MySQL. This can also include blogs and those planning to build many niche sites.

The benefits of MySQL include:

i. Free to use
ii. Great Performance
iii. Very user-friendly
iv. Incredible security
v. Scalable
vi. Works with many operating systems
vii. Supports many development interfaces

Specifications

Drivers

- MySQL Native C Library
- MySQL Drivers for ODBC, JDBC, .Net, Python, C, C++
- Community Drivers for PHP, Perl, Python, Ruby, Go

Operating Systems

- Linux, Solaris, FreeBSD, Mac OS, Windows,BSD, Symbian, AmigaOS

2.Oracle

Latest Stable Version: Oracle Database 12*c* Release 2 (12.2.0.1.0)
                           Standard Edition 2 and Enterprise Edition

Data Types

Oracle provides the following categories of built-in datatypes:

1.   Character Datatypes
2.   Numeric Datatypes
3.   DATE Datatype
4.   LOB Datatypes
5.   RAW and LONG RAW Datatypes
6.   ROWID and UROWID Datatypes

1. Character Datatypes

The character datatypes store character (alphanumeric) data in strings, with byte values corresponding to the character encoding scheme, generally called a character set or code page.

i.   CHAR Datatype
ii.   VARCHAR2 and VARCHAR Datatypes
iii.   Length Semantics for Character Datatypes
iv.   NCHAR and NVARCHAR2 Datatypes
v.   Use of Unicode Data in Oracle Database
vi.   LOB Character Datatypes
vii.   LONG Datatype

2. Numeric Datatypes

The numeric datatypes store positive and negative fixed and floating-point numbers, zero, infinity, and values that are the undefined result of an operation (that is, is "not a number" or NAN).
This section includes the following topics:

i.   NUMBER Datatype
ii.   Floating-Point Numbers

3. DATE Datatype

The DATE datatype stores point-in-time values (dates and times) in a table. The DATE datatype stores the year (including the century), the month, the day, the hours, the minutes, and the seconds (after midnight).

i.   Use of Julian Dates
ii.   Date Arithmetic
iii.   Centuries and the Year 2000
iv.   Daylight Savings Support
v.   Time Zones

4. LOB Datatypes

The LOB datatypes BLOB, CLOB, NCLOB, and BFILE enable you to store and manipulate large blocks of unstructured data (such as text, graphic images, video clips, and sound waveforms) in binary or character format. They provide efficient, random, piece-wise access to the data. Oracle recommends that you always use LOB datatypes over LONG datatypes. You can perform parallel queries (but not parallel DML or DDL) on LOB columns.
LOB datatypes differ from LONG and LONG RAW datatypes in several ways.

   i.   BLOB Datatype

   ii. CLOB and NCLOB Datatypes

   iii. BFILE Datatype

5. RAW and LONG RAW Datatypes

The RAW and LONG RAW datatypes are used for data that is not to be interpreted (not converted when moving data between different systems) by Oracle Database. These datatypes are intended for binary data or byte strings. For example, LONG RAW can be used to store graphics, sound, documents, or arrays of binary data. The interpretation depends on the use.

6. ROWID and UROWID Datatypes

Oracle Database uses a ROWID datatype to store the address (**rowid**) of every row in the database. A single datatype called the **universal rowid**, or UNROWID, supports both logical and physical rowids, as well as rowids of foreign tables such as non-Oracle tables accessed through a gateway. A column of the UNROWID datatype can store all kinds of rowids.

Other datatypes

1. XMLType Datatype

Oracle provides the XMLTYPE datatype to handle XML data. XMLTYPE can be used like any other user-defined type. XMLTYPE can be used as the datatype of columns in tables and views.

2. Object Datatypes and Object Views

Object types and other user-defined datatypes let you define datatypes that model the structure and behavior of the data in their applications. An object view is a virtual object table.

3. Data Conversion

In some cases, Oracle Database supplies data of one datatype where it expects data of a different datatype. This is allowed when Oracle Database can automatically convert the data to the expected datatype.

Literals supported
•Text Literals
•Numeric Literals
•Datetime Literals
•Interval Literals

Features:

The latest generation of the world's most popular database, Oracle Database 12*c* Release 2 (12.2) is a very popular choice for larger enterprises. They excel most with larger business applications and large data warehouses. Those looking for the largest amount of features, will choose Oracle. It's packed with features and minimizes the need for third party software.

This latest release provides organizations of all sizes with access to the world's fastest, most scalable and reliable database technology in a cost-effective, hybrid Cloud environment. 12.2 also includes a series of innovations that helps customers easily transform to the Cloud while preserving their investments in Oracle Database technologies, skills and resources.

The benefits of Oracle include:

i.   Database for Cloud Scale Simplicity

ii. Security, Scalability, and Simplicity

iii. Capable of running large ILTB and VLDBs

iv. Very feature rich

v.   Highly reliable

vi. Flashback technology

Specifications:

Operating Systems: Windows, Mac OS X, Linux, UNIX, z/OS. It doesn't work with BSD, Symbian or AmigaOS.

Differences between MySQL and Oracle

One major difference is found in the indexes used by both. MySQL uses:

•Full-text
•Hash
•R-/R+ Tree
Oracle uses more indexes than just these three including Bitmap, Expression, Partial and Reverse.

Other major differences include:

- MySQL supports Java, while Oracle doesn't
- MySQL provides on-site and phone support, while Oracle only provides Forums support
- Oracle works with both dynamic and static systems, while MySQL only works with static
- MySQL is free, while Oracle is $180
- Oracle is sued more for larger enterprises, while MySQL is used for smaller projects.

- Out of the two, MySQL is the most popular. Since it's used with WordPress, which is the most popular content management system for blogging and building websites, its use more often than Oracle.

- However, for larger enterprises, Oracle is by far the more popular choice. Even though MySQL is used with larger sites, such as Facebook and YouTube, it's not as popular with larger enterprises as Oracle.

- If you have a choice between MySQL vs. Oracle, you will need to look at the specific project to make this decision.