

# MySQL Foundations<sup>3</sup>

## DML – Querying Data

### Student Workbook

*For Developers, Data Analysts and Development DBA's*

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# SQL DML – Querying Data –Workbook

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Before You Begin.....	5
Prerequisites .....	5
Access to Course Materials .....	5
Course Home Page .....	5
Course Video Lessons.....	5
Purpose of this Module.....	5
Big Picture .....	5
Lesson 1 – SELECT Basics.....	6
A Simple Query .....	6
WATCH VIDEO - How To Write a Basic SQL Select Statement - Part 1 .....	6
WATCH VIDEO - How To Write a Basic SQL Select Statement - Part 2 .....	6
ON YOUR OWN HANDS-ON EXERCISES.....	7
Lesson 2 – Introduction to Data Analysis.....	8
Data Analysis 101 .....	8
WATCH VIDEO – Introduction to Data Analysis .....	8
Lesson 3 – Row Restriction .....	9
Digging Deeper into the Select Statement – Row Restriction .....	9
Introducing the Where Clause .....	9
WATCH VIDEO - Introduction to Row Restriction - Part 1 .....	9
ON YOUR OWN HANDS-ON EXERCISE.....	9
More on the Where Clause – Character Data Types   Like .....	9
WATCH VIDEO - Part 2 - Row Restriction - Character Data Types .....	9
ON YOUR OWN HANDS-ON EXERCISE.....	10
More on the Where Clause – NULL.....	10
WATCH VIDEO - Part 3 - Row Restriction – NULL .....	10
ON YOUR OWN HANDS-ON EXERCISE.....	11
More on the Where Clause – Datetime.....	11
WATCH VIDEO - Part 4 - Row Restriction - Datetime Data Type .....	11
WATCH VIDEO - Part 5 - Row Restriction - Datetime Data Type (continued).....	11
ON YOUR OWN HANDS-ON EXERCISE.....	11
More on the Where Clause – OR and IN.....	12

# SQL DML – Querying Data –Workbook

WATCH VIDEO - Part 6 - Row Restriction - OR and IN Operators .....	13
ON YOUR OWN HANDS-ON EXERCISE.....	13
Lesson 4 – Query Efficiency .....	15
Query Efficiency .....	15
WATCH VIDEO - Query Efficiency.....	15
ON YOUR OWN HANDS-ON EXERCISE.....	15
Lesson 5.....	16
MySQL Functions – Numeric and String .....	16
WATCH VIDEO - Part 1 - Numeric Functions.....	16
WATCH VIDEO - Part 2 - String Functions .....	16
ON YOUR OWN HANDS-ON EXERCISE.....	16
MySQL Functions – Datetime.....	18
WATCH VIDEO - Part 3 - Datetime Functions.....	18
ON YOUR OWN HANDS-ON EXERCISE.....	18
Lesson 6.....	20
Case Logic.....	20
WATCH VIDEO - Case Logic .....	20
ON YOUR OWN HANDS-ON EXERCISE.....	20
Lesson 7 .....	23
Joining Tables.....	23
General Theory and Syntax.....	23
WATCH VIDEO- Introduction to Joining Tables Part 1 .....	23
WATCH VIDEO - Introduction to Joining Tables Part 2 .....	24
More on E-R Diagrams .....	25
WATCH VIDEO - Part 3 - ER (Entity Relation) Diagrams .....	25
WATCH VIDEO - Part 4 - Joining Multiple Tables .....	26
WATCH VIDEO - Part 5 - Join Multiple Foreign Keys to a Single Table .....	26
WATCH VIDEO - Part 6 - Why not just left join everything? .....	26
ON YOUR OWN HANDS-ON EXERCISE.....	26
One to Many Joins .....	28
WATCH VIDEO - Part 7 - One to Many .....	28

ON YOUR OWN HANDS-ON EXERCISE.....	29
Many to Many Joins .....	30
WATCH VIDEO - Part 8 - Many to Many.....	31
Query Performance on Joined Tables .....	31
WATCH VIDEO - Part 9 - Query Performance .....	31
ON YOUR OWN HANDS-ON EXERCISE.....	31
Lesson 8.....	33
Summarizing Data .....	33
Group By and Aggregate Functions .....	33
WATCH VIDEO - Part 1 - Summarizing Data - GROUP BY .....	33
WATCH VIDEO - Part 2 - Summarizing Data - Aggregate Functions.....	33
ON YOUR OWN HANDS-ON EXERCISE.....	33
Having Clause .....	34
WATCH VIDEO - Part 3 - Summarizing Data – HAVING .....	34
ON YOUR OWN HANDS-ON EXERCISE.....	34

## Before You Begin

Welcome to the class “MySQL Foundations – Querying Data”. This workbook will be **your roadmap** to guide you through this course. Follow it from beginning to end!

## Prerequisites

- Complete everything outlined in the document “MySQL\_Foundations\_DML-Getting\_Started.”
- Be logged in to MySQL Workbench

## Access to Course Materials

### Course Home Page

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/Course-MySQL\\_DML-Querying\\_Data.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/Course-MySQL_DML-Querying_Data.php)

### Course Video Lessons

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/mysql\\_dml-querying\\_data\\_lessons.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/mysql_dml-querying_data_lessons.php)

## Purpose of this Module

The purpose of this module is to provide a solid foundation for MySQL data access.

If you have experience with another flavor of SQL (SQL Server, Oracle, DB2) you should be able to quickly move through these materials.

If you are new to SQL take your time working through these materials. The foundation you learn here is important! Once you learn one version of SQL it is relatively easy to apply your knowledge to other RDBMS (**R**elational **D**atabase **M**anagement **S**ystems) like SQL Server or Oracle.

## Big Picture

Your ability to query/read SQL data is important no matter how you work with the database. A report writer or business intelligence analyst needs to access data from a backend database for the purpose of reporting, data extraction, or data aggregation. A developer needs to read data to provide data for display in an application. An interface or conversion engineers needs to read data from a source system as part of an ETL (Extract Transform Load) process to copy it to a target system.

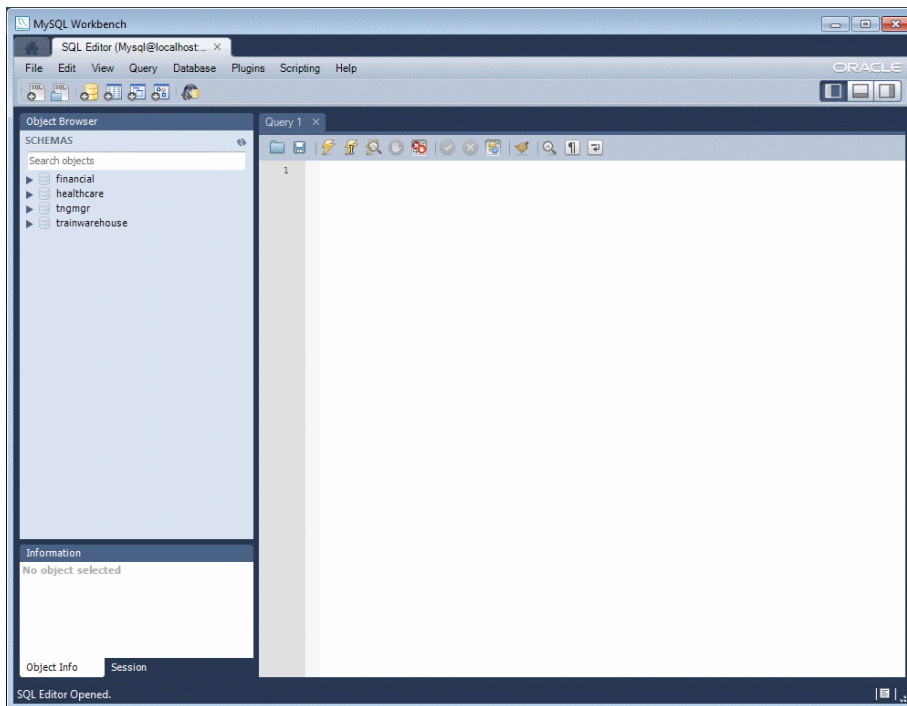
Whatever your need, being able to read data from a SQL database is a core facet of SQL DML (**D**ata **M**anipulation **L**anguage). There is a lot to learn regarding SQL DML. Let's get started.

## Lesson 1 – SELECT Basics

### A Simple Query

In this lesson I am going to show you how to write a basic SQL Select statement. In preparation for this lesson you need to do the following:

1. Open up the MySQL Workbench and login. Your canvas should look as follows.



If you are unsure how to get the “look and feel” above, you will need to review the previous lesson titled “Getting Started” from the document titled “MySQL\_Foundations\_DML-Getting\_Started.”



Do not just kick-back and watch these video. Follow along with me as I am teaching you. If I am going too fast for you pause or rewind the video and catch-up. You need to do this for every video you watch unless I tell you otherwise.

#### **WATCH VIDEO - How To Write a Basic SQL Select Statement - Part 1**

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson1-Querying\\_Data\\_Part1.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson1-Querying_Data_Part1.php)

#### **WATCH VIDEO - How To Write a Basic SQL Select Statement - Part 2**

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson1-Querying\\_Data\\_Part2.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson1-Querying_Data_Part2.php)



## ON YOUR OWN HANDS-ON EXERCISES

1. Create a query using the bb\_batting table in the trainingwarehouse database that returns 10 rows and the following columns. Save your query to a file named SimpleQuery1.sql.

	playerID	Year	At Bats	Hits	Homeruns
▶	abercda01	1871	4	0	0
	addybo01	1871	118	32	0
	allisar01	1871	137	40	0
	allisdo01	1871	133	44	2
	ansonca01	1871	120	39	0
	amstbo01	1871	49	11	0
	barkeal01	1871	4	1	0
	bamero01	1871	157	63	0
	barrebi01	1871	5	1	0
	barrofr01	1871	86	13	0

2. What is wrong with the following query? Fix it and save to a file named SimpleQuery2.sql

```
SELECT
    course_name AS "Course",
FROM
    tngmgr.courses
LIMIT 5
;
```

3. What do you think the purpose of the “AS” verb is? Note: This question was not specifically addressed in the lesson.



## Lesson 2 – Introduction to Data Analysis

### Data Analysis 101

This lesson is going to scratch the surface of data analysis by providing both insights and a few tips and tricks.



#### WATCH VIDEO – Introduction to Data Analysis

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson2-Basic\\_Data\\_Analysis.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson2-Basic_Data_Analysis.php)

There are no exercises associated with this lesson. You may proceed to the next lesson.

## Lesson 3 – Row Restriction

### Digging Deeper into the Select Statement – Row Restriction

#### Introducing the Where Clause

In this lesson I will begin teaching the basic foundations for row restriction.



#### *WATCH VIDEO - Introduction to Row Restriction - Part 1*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson3-Row\\_Restriction-Part1.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson3-Row_Restriction-Part1.php)



#### *ON YOUR OWN HANDS-ON EXERCISE*

1. Write a query that returns the following recordset. Your row restriction is to return all the rows where Homeruns is greater than 29 and Doubles are greater than 29, and stolen bases are greater than 29. Save your query to a file named SimpleQuery3.sql.

	playerID	Year	Homeruns	Doubles	Stolen Bases
▶	harpeto01	1970	31	35	38
	bondsbo01	1973	39	34	43
	willike01	1922	39	34	37
	strawda01	1987	39	32	36
	cansejo01	1988	42	34	40
	johnsho01	1989	36	41	41
	bondcha01	1990	32	32	52

#### *More on the Where Clause – Character Data Types | Like*

I expand coverage of the row restriction topic by covering row restriction on character fields and I will introduce you to the LIKE operator.



#### *WATCH VIDEO - Part 2 - Row Restriction - Character Data Types*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson3-Row\\_Restriction-Part2.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson3-Row_Restriction-Part2.php)



### *ON YOUR OWN HANDS-ON EXERCISE*

Write a query against the facility table that returns all the facilities that are located on 2<sup>nd</sup> avenue. You resultant recordset should look as follows:

Facility	Street	City
SEATTLE General Hospital	419 2nd Avenue South	Seattle
SEATTLE CHILDREN'S HOSPITAL	419 2nd Avenue South	Seattle
RENTON EXTENDED CARE CENTER^	419 2nd Ave S. Building A	Renton
AREA 52	1500 2nd Avenue	Seattle
VBMC1	419 2nd Avenue South	Seattle

Write a query against the bb\_players table in the trainwarehouse database that returns all the players whose lastname is equal to “Alou”. You resultant recordset should look as follows:

firstname	lastname	birthyear
Felipe	Alou	1935
Jesus	Alou	1942
Matty	Alou	1938
Moises	Alou	1966

### **More on the Where Clause – NULL**

I expand coverage of the row restriction topic by covering how to deal with NULLS.



### *WATCH VIDEO - Part 3 - Row Restriction – NULL*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson3-Row\\_Restriction-Part3.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson3-Row_Restriction-Part3.php)



### ON YOUR OWN HANDS-ON EXERCISE

There are no hands-on for this lesson. Continue to the next lesson.

### More on the Where Clause – Datetime

It is now time to introduce you to row restriction as applied to the datetime data types.



### WATCH VIDEO - Part 4 - Row Restriction - Datetime Data Type

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson3-Row\\_Restriction-Part4.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson3-Row_Restriction-Part4.php)

### WATCH VIDEO - Part 5 - Row Restriction - Datetime Data Type (continued)

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson3-Row\\_Restriction-Part5.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson3-Row_Restriction-Part5.php)



### ON YOUR OWN HANDS-ON EXERCISE

Using the patientaccount table in the healthcare database return the following columns with alias names as shown for the start\_date 2004-02-20 where the end date is null and the account type is E.

patient_fk	Account	Start Date	End Date	Account Type
3713	107678	2004-02-20 00:00:00	NULL	E
3716	107680	2004-02-20 00:00:00	NULL	E
2191	107686	2004-02-20 00:00:00	NULL	E
3732	107693	2004-02-20 00:00:00	NULL	E
3733	107694	2004-02-20 00:00:00	NULL	E
3734	107695	2004-02-20 00:00:00	NULL	E

## SQL DML – Querying Data –Workbook

Using the security\_transactions table in the financial database return the following columns with alias names as shown where the transaction type is Bought and the transaction date is on or after 2001-08-01 and before 2002-03-01.

Transaction Date	Transaction Type	Security	Qty	PPS
2001-08-14	Bought 20 CSCO @ 18.09	CSCO	20	18.09
2001-08-31	Bought 4 MSFT @ 56.86	MSFT	4	56.86
2001-08-31	Bought 15 CSCO @ 15.89	CSCO	15	15.89
2002-01-16	Bought 20 CSCO @ 19.39	CSCO	20	19.39
2002-01-16	Bought 10 INTC @ 33.96	INTC	10	33.96
2002-01-16	Bought 30 ORCL @ 16.66	ORCL	30	16.66
2002-01-16	Bought 100 ERICY @ 4.78	ERICY	100	4.78
2002-02-13	Bought 30 CSCO @ 17.42	CSCO	30	17.42
2002-02-14	Bought 20 ORCL @ 16.20	ORCL	20	16.2

Using the provider table in the healthcare database return the columns with alias names as shown where the inactive timestamp is not null and the inactive timestamp is on or later than 2005-01-01.

lastname	Inactive Date	Inactive Time
Mateo	2005-01-13	09:14:00
Treadway	2005-01-19	04:35:00
Borrego	2005-03-23	06:36:00
Treece	2006-02-24	14:51:00
Welsh	2005-04-19	13:38:00
Landis	2005-09-15	07:00:00
Jessee	2006-02-16	11:56:00
Crabb	2005-03-01	10:31:00

### More on the Where Clause – OR and IN

Here I cover Boolean OR logic and the importance of using parenthesis in row restriction that uses OR logic! I also cover the IN keyword.

In well over twenty years of working with SQL one of the biggest mistakes I have observed with queries (and this includes myself) result in the improper use of “OR”. It is mission critical that you properly use parenthesis in any row restriction that includes the use of the Boolean “OR” operator!



### *WATCH VIDEO - Part 6 - Row Restriction - OR and IN Operators*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson3-Row\\_Restriction-Part6.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson3-Row_Restriction-Part6.php)



### *ON YOUR OWN HANDS-ON EXERCISE*

Using bb\_batting table in the trainwarehouse database return the following columns where the player has 250 or more hits (H) or 50 or more homeruns (HR) or 125 or more RBI's or 30 or more triples (TRPL) or 100 or more stolen bases (SB). Your query should return 340 rows.

playerID	yearID	H	HR	TRPL	RBI	SB
collin02	1934	200	35	12	128	2
ottme01	1934	190	35	10	135	0
greenha01	1935	203	36	16	170	4
bergewa01	1935	174	34	4	130	3
medwijo01	1935	224	23	13	126	4
andlilo01	1936	204	6	7	128	10

Using bb\_batting table in the trainwarehouse database return the following columns where the following criteria is met for each row returned:

- H greater than or equal to 200 and SB H greater than or equal to 100  
OR
- TRPL greater than or equal to 30 OR HR greater than or equal to 55
- All rows returned must have greater than or equal to 100 RBI's

The following is the full recordset.

## SQL DML – Querying Data –Workbook

playerID	yearID	H	HR	TRPL	RBI	SB
greenha01	1938	175	58	4	146	7
marisro01	1961	159	61	4	142	0
brownpe01	1887	220	4	16	118	103
reitzhe01	1894	135	2	31	105	18
ruthba01	1921	204	59	16	171	17
ruthba01	1927	192	60	8	164	7
wilsoha01	1930	208	56	6	191	3
foxoji01	1932	213	58	9	169	3
griffke02	1997	185	56	3	147	15
griffke02	1998	180	56	3	146	20
mcgwima01	1998	152	70	0	147	1
sosasa01	1998	198	66	0	158	18
mcgwima01	1999	145	65	1	147	0
sosasa01	1999	180	63	2	141	7
bondsba01	2001	156	73	2	137	13
gonzalu01	2001	198	57	7	142	1
sosasa01	2001	189	64	5	160	0
rodrial01	2002	187	57	2	142	9

Using the patient table in the healthcare database return the following columns based on the following row restriction:

- facility\_fk is either 1,2,3,5,6
- race is either 5,6
- gender\_flag equal to F
- deceased\_flag equal to N

Your query should return 893 rows.

lastname	firstname	DOB	id
Smith	Ellen	1982-03-11	01000223
Mccall	Evangeline	1960-03-11	01000249
Gallegos	Dora	1913-03-11	01000256
Cotten	Florine	1981-03-11	01000280
Conner	Stacy	1982-03-11	01000298

## Lesson 4 – Query Efficiency

### Query Efficiency

In this lesson I will teach you how to determine if your query is using an index or the primary key to efficiently access the data.



#### *WATCH VIDEO - Query Efficiency*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson4-Query\\_Efficiency.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson4-Query_Efficiency.php)



#### *ON YOUR OWN HANDS-ON EXERCISE*

Open the following files and answer the questions contained within them. You can also view the schema for this table as well (bb\_pitching.sql).

- query\_efficiency3a.sql
- query\_efficiency3b.sql
- query\_efficiency3c.sql

These files are located at \webroot\LEARN\MySQL-Foundations\Examples.



## Lesson 5

### MySQL Functions – Numeric and String

You have already had some exposure to functions. In this lesson we will dive deeper into the use of common numeric and string functions. I will cover nested functions and casting data types as well.

The following URL's provide documentation on the available MySQL string and numeric functions:

<http://dev.mysql.com/doc/refman/5.5/en/string-functions.html>

<http://dev.mysql.com/doc/refman/5.5/en/numeric-functions.html>

Before starting the video open the following files located at webroot\LEARN\MySQL-Foundations\Examples in the workbench.

- functions\_numeric.sql
- functions\_string\_ucase-lcase.sql
- functions\_string\_substring.sql
- functions\_string\_concat.sql
- functions\_string\_length.sql
- functions\_string\_trim.sql



#### WATCH VIDEO - Part 1 - Numeric Functions

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson5\\_Part1-Functions-Numeric.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson5_Part1-Functions-Numeric.php)

#### WATCH VIDEO - Part 2 - String Functions

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson5\\_Part2-Functions-String.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson5_Part2-Functions-String.php)



#### ON YOUR OWN HANDS-ON EXERCISE

Complete the following exercises below. (Note: The challenge exercise is optional)

Using securities table in the financial database return the following columns where the following criteria is met for each row returned: Order by tradedate. Only return rows for 2007. The returned recordset should look as follows...

Date	Symbol	Open	Close	Diff
2007-12-31	ABT	56.94	56.15	0.79
2007-12-31	AEP	46.65	46.56	0.09
2007-12-31	ALE	39.87	39.58	0.29
2007-12-31	CLX	65.49	65.17	0.32
2007-12-31	JNJ	67.29	66.7	0.59
2007-12-31	JPM	43.07	43.65	-0.58
2007-12-31	KFT	32.79	32.63	0.16
2007-12-31	LLY	53.77	53.39	0.38
2007-12-31	LNCE	20.7	20.42	0.28
2007-12-28	ABT	57.08	57.23	-0.15
2007-12-28	AEP	46.88	46.88	0.00

Using the security\_transactions table in the financial database return the following columns where the following criteria is met for each row returned: Only return rows where the symbol is not null. The return recordset should look as follows...

(This exercise is having you format the data in a JSON format. <name>:<value>. The first two concatenated columns end with a comma.)

symbol	quantity	transactionid
symbol:AOL,	quantity:20,	transactionid:604908113
symbol:T,	quantity:50,	transactionid:604908116
symbol:CSCO,	quantity:25,	transactionid:604908119
symbol:ERICY,	quantity:40,	transactionid:604908122
symbol:GE,	quantity:20,	transactionid:604908125
symbol:IBM,	quantity:10,	transactionid:604908128
symbol:MSFT,	quantity:96,	transactionid:604908131
symbol:NOK,	quantity:20,	transactionid:604908134
symbol:ORCL,	quantity:40,	transactionid:604908137
symbol:TGEN,	quantity:75,	transactionid:604908140
symbol:ORCL,	quantity:40,	transactionid:625502751
symbol:ERICY,	quantity:30,	transactionid:625508609

### Challenge Exercise (Optional)

Return the following Recordset from the department table in the healthcare database. Hint: in order to complete this exercise you will likely need to use the SUBSTRING\_INDEX function which was not taught in any of the lessons. You can find details on this function at the MySQL website. This is a difficult challenge, especially for someone new to SQL.

name	Complex Nested Functions
NURSING SERVICES	Nursing Services
INPATIENT PHARMACY	Inpatient Pharmacy
OUTPATIENT PHARMACY	Outpatient Pharmacy
PHARMACY SERVICES	Pharmacy Services
DIAGNOSTIC RADIOLOGY	Diagnostic Radiology
SPEECH THERAPY	Speech Therapy
IMAGING SERVICES	Imaging Services
NUCLEAR MEDICINE	Nuclear Medicine
LABORATORY	Laboratory Laboratory
MICROBIOLOGY	Microbiology Microbiology

## MySQL Functions – Datetime

In this lesson we will dive deeper into the use of common datetime functions.

The following URL provides documentation on the available MySQL datetime functions:

<http://dev.mysql.com/doc/refman/5.5/en/date-and-time-functions.html>

Before starting the video open the following files located at webroot\LEARN\MySQL-Foundations\Examples in the workbench.

- functions\_datetime\_current\_datetime.sql
- functions\_datetime\_current\_adddate.sql
- functions\_datetime\_current\_addtime.sql
- functions\_datetime\_datediff.sql



### WATCH VIDEO - Part 3 - Datetime Functions

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson5\\_Part3-Functions-Datetime.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson5_Part3-Functions-Datetime.php)



### ON YOUR OWN HANDS-ON EXERCISE

Using patient table in the healthcare database return the following columns where the following criteria is met for each row returned: Limit your output to 1000 rows. The returned recordset should look as follows...

Patient	Birthdate	Age
Pam Austin	1955-08-07	57
Tiffani Newlin	1955-08-07	57
Nora Dixon	1955-08-07	57
Joann Parker	1955-08-07	57
Elnora Ratliff	1955-08-07	57
Marian Malley	1955-08-07	57
Erica Schiller	1955-08-07	57
Alexandria Riffle	1955-08-07	57
Lelia Barry	1955-08-07	57
Nichole Chan	1970-01-12	42
Jennifer Wharton	1971-03-10	41
Clifford Bell	1979-03-10	33

Using the findings table in the healthcare database return the following columns where the following criteria is met for each row returned: Limit your output to 1000 rows. The returned recordset should look as follows...

patient_fk	finding_timestamp	Formatted Date
10	2003-03-11	Tuesday March 11, 2003
10	2003-03-11	Tuesday March 11, 2003
10	2003-03-11	Tuesday March 11, 2003
10	2003-03-11	Tuesday March 11, 2003
10	2003-03-11	Tuesday March 11, 2003
10	2003-03-11	Tuesday March 11, 2003
10	2003-03-11	Tuesday March 11, 2003
10	2003-03-11	Tuesday March 11, 2003
11	2006-01-06	Friday January 6, 2006
11	2006-01-06	Friday January 6, 2006
11	2006-01-06	Friday January 6, 2006

## Lesson 6

### Case Logic

Case is the standard conditional logic of SQL. We will explore the use of the case statement in this lesson.

Before starting the video open the following files located at webroot\LEARN\MySQL-Foundations\Examples in the workbench.

- case1.sql
- case2.sql
- case3.sql
- case4.sql



### WATCH VIDEO - Case Logic

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson6-Case\\_Logic.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson6-Case_Logic.php)



### ON YOUR OWN HANDS-ON EXERCISE

Using the findings table in the healthcare database return the following columns where the following criterion is met: Limit to first 100 rows. The returned recordset should look as follows...

type	Subtype
FINDNG	SKIN
FINDNG	SKIN
FINDNG	SKIN
FINDNG	SKIN
FINDNG	SKIN
FINDNG	No Subtype
FINDNG	No Subtype
FINDNG	No Subtype

## SQL DML – Querying Data –Workbook

Using the securities table in the financial database return the following columns where the following criteria is met:

- When volume is less or equal to 4,000,000 - “Light volume”
- When volume is between 4,000,001 and 7,999,999 – “Medium Volume”
- When volume is greater or equal to 8,000,000 - “Heavy volume”
- Limit to first 100 rows

The returned recordset should look as follows...

symbol	tradedate	volume	Volume Type
ABT	2006-01-03	8280500	Heavy volume
ABT	2006-01-04	7837300	Medium volume
ABT	2006-01-05	5551300	Medium volume
ABT	2006-01-06	6587300	Medium volume
ABT	2006-01-09	11335900	Heavy volume
ABT	2006-01-10	5773800	Medium volume
ABT	2006-01-11	4633500	Medium volume
ABT	2006-01-12	3379300	Light volume
ABT	2006-01-13	2895000	Light volume
ABT	2006-01-17	3792900	Light volume

### Challenge Exercise (Optional)

Using the bb\_batting table in the trainwarehouse database for the following row restriction...

- yearID = 1980
- TRPL > 5 or RBI > 99

...create a case statement that concatenates the following data based upon the following criterion:

- TRPL >= 5 AND RBI < 100
- TRPL < 5 AND RBI > 99
- TRPL >= 5 AND RBI > 99

Your results should look like those in the recordset below.

## SQL DML – Querying Data –Workbook

yearID	playerID	TRPL	RBI	Case Challenge
1980	amasto01	8	109	Triples:8, RBI's:109
1980	baineha01	6	49	Triples:6
1980	brettge01	9	118	Triples:9, RBI's:118
1980	brookto01	9	66	Triples:9
1980	bumbra01	9	53	Triples:9
1980	carewro01	7	59	Triples:7
1980	castijo01	7	64	Triples:7
1980	coopece01	4	122	RBI's:122
1980	dilonmi01	9	40	Triples:9

## Lesson 7

### Joining Tables

At the crux of learning SQL is your ability to join tables together. In the following lessons I will expose you to the key aspects of joining tables. I will introduce you to theory as it can be readily applied to this subject.

If you are relatively new to SQL this is a subject that can take some time to understand. Everything covered is important and foundational. Take your time and be patient. You may need to watch a video more than once. I have tried to break the subject into small segments that are easier for you to absorb.

### General Theory and Syntax



#### *WATCH VIDEO- Introduction to Joining Tables Part 1*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson7\\_Part1-Joining\\_Tables.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson7_Part1-Joining_Tables.php)

Before watching the next video, answer the following questions.

customer	
num	lastname
1	Smith
2	Jones
3	Jones
4	Cristy
5	Biden
6	Chang
7	Freelander

order		
orderdate	ordernum	custnum
2013-01-12	1	6
2013-02-12	2	5
2013-02-12	3	5
2013-01-12	4	4
2013-01-12	5	5
2013-01-12	6	1

Given the following table data (above) what is the recordset returned by the following query?

```
SELECT lastname, orderdate
FROM order
JOIN customer ON num = custnum
WHERE orderdate = '2013-01-12'
```



Given the following table data (above) what is the recordset returned by the following query?

```
SELECT num, custnum, ordernum  
  
FROM order  
  
LEFT JOIN customer ON num = custnum  
  
WHERE orderdate = '2013-01-12'
```



### *WATCH VIDEO - Introduction to Joining Tables Part 2*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson7\\_Part2-Joining\\_Tables.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson7_Part2-Joining_Tables.php)

At this point you should understand the syntax to join tables. For example, the following is the join statement to join the two tables below.



```
JOIN bb_players ON bb_players.lahmanID = bb_pitching.playerID
```

Or

```
JOIN bb_pitching ON bb_players.lahmanID = bb_pitching.playerID
```

Note: Both join statements will produce the same recordset.

Before proceeding to the next lesson answer the following questions.

## SQL DML – Querying Data –Workbook

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Write a join statement for the following:



### More on E-R Diagrams

The following segment continues covering the use of E-R diagrams and how to use them. It is not 100% necessary to understand the relationship between tables in order to join them together. However, the more you understand about the relationship between two tables the easier it is to write your query.



### *WATCH VIDEO - Part 3 - ER (Entity Relation) Diagrams*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson7\\_Part3-Joining\\_Tables.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson7_Part3-Joining_Tables.php)

## *WATCH VIDEO - Part 4 - Joining Multiple Tables*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson7\\_Part4-Joining\\_Tables.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson7_Part4-Joining_Tables.php)

## *WATCH VIDEO - Part 5 - Join Multiple Foreign Keys to a Single Table*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson7\\_Part5-Joining\\_Tables.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson7_Part5-Joining_Tables.php)

After watching the videos above it still may not be clear to you when losing rows in your row count is a normal or a problem. The quickest to to this question is when you have the NULL marker in a column that is actually a foreign key column to another table this is is not a data problem. If you desire to return the rows in your query for the left table you will need to remember to left join the table. When you have an actual foreign key value stored and drop the row on a join this is what is referred to as an orphan. The row now longer exists in the table that you are joining to. This scenario represents a problem with the data.

Please watch this addendum video below before proceeding to your exercises.

## *WATCH VIDEO - Part 6 - Why not just left join everything?*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson7\\_Part6-Joining\\_Tables.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson7_Part6-Joining_Tables.php)



## *ON YOUR OWN HANDS-ON EXERCISE*

Given the following E-R Diagram write a query that returns the following recordset.



## SQL DML – Querying Data –Workbook

Team	Firstname	Lastname	Year	Wins	Losses	Complete Games	BB	SO	ERA
St. Louis Cardinals	Bob	Gibson	1968	22	9	28	62	268	1.12
St. Louis Cardinals	Nelson	Bries	1968	19	11	13	55	141	2.81
St. Louis Cardinals	Ray	Washburn	1968	14	8	8	47	124	2.26
St. Louis Cardinals	Steve	Carlton	1968	13	11	10	61	162	2.99
St. Louis Cardinals	Larry	Jaster	1968	9	13	3	38	70	3.5
St. Louis Cardinals	Joe	Hoerner	1968	8	2	0	12	42	1.48
St. Louis Cardinals	Wayne	Granger	1968	4	2	0	12	27	2.25
St. Louis Cardinals	Mike	Torrez	1968	2	1	0	12	6	2.79
St. Louis Cardinals	Mel	Nelson	1968	2	1	1	9	16	2.91
St. Louis Cardinals	Dick	Hughes	1968	2	2	0	21	49	3.52
St. Louis Cardinals	Ron	Willis	1968	2	3	0	28	39	3.39
St. Louis Cardinals	Pete	Mikkelsen	1968	0	0	0	7	8	1.12
St. Louis Cardinals	Hal	Gilson	1968	0	2	0	11	19	4.57

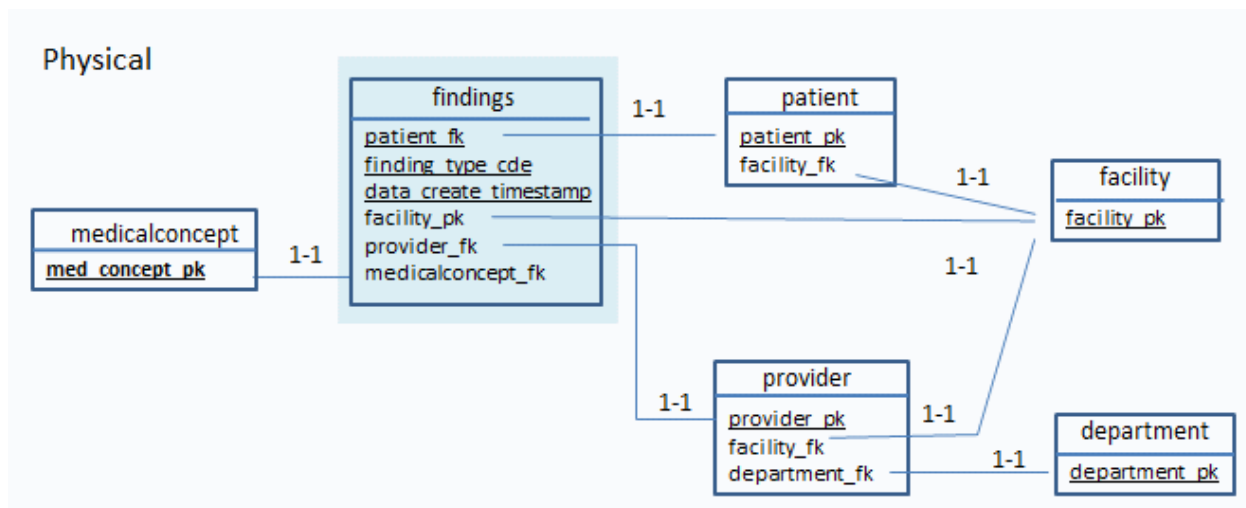
The query should have the following:

Row Restriction

- yearID = 1968
- teamID = SLN

Order by the W column in descending order.

Given the following E-R Diagram write a query that returns the following recordset.



Note: Knowing which tables you need to join to produce the recordset below will require some analysis on the tables above to determine which tables you need to join.

Patient	Date	Time	Vital Sign	Finding	UOM
Wharton, Jennifer	2006-01-06	09:35:00	TEMPERATURE (F)	98.5	F
Wharton, Jennifer	2006-01-06	09:35:00	RR	20	BPM
Medlock, Kathleen	2003-03-18	11:29:00	TEMPERATURE (F)	100	F
Medlock, Kathleen	2003-03-18	11:29:00	RR	60	BPM
Medlock, Kathleen	2003-03-18	11:29:00	SYSTOLIC BP	90	MMHG
Medlock, Kathleen	2003-03-18	11:29:00	DIASTOLIC BP	120	MMHG
Medlock, Kathleen	2003-03-18	11:29:00	PULSE RATE	88	BPM

The query should have the following:

Row Restriction

- `finding_subtype_cde = VS`

Return the following Columns (formatted as defined in the column formatting section below and as depicted above.

- `lastname`
- `firstname`
- `finding_timestamp`
- `item`
- `value`
- `uom`

Column Formatting

- Concatenate the patients first and last name as depicted.
- Return the date portion of the `finding_timestamp` as depicted.
- Return the time portion of the `finding_timestamp` as depicted.

### One to Many Joins

The mechanics of one to many joins are identical to one to one joins. This lesson delves into the nuances between the two and how to determine table cardinality.



#### *WATCH VIDEO - Part 7 - One to Many*

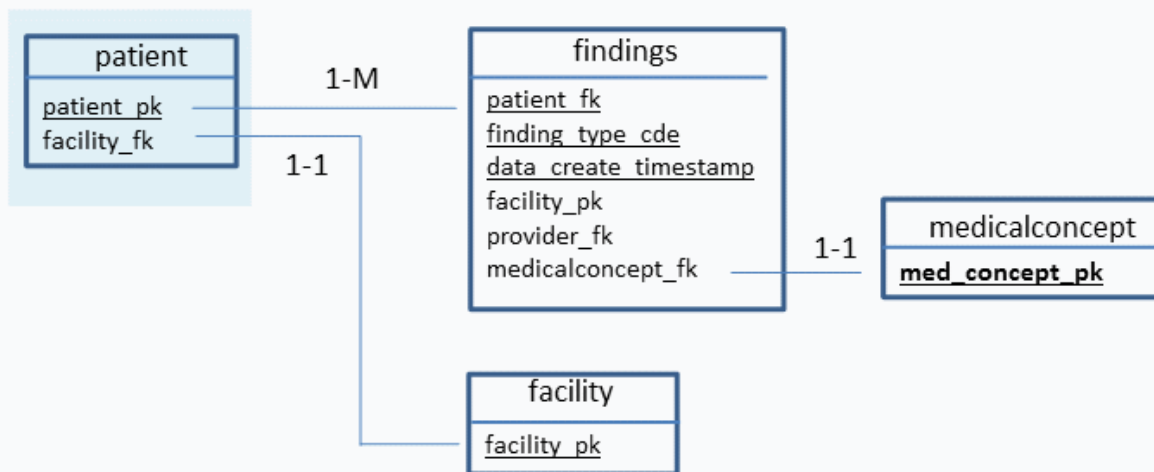
[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson7\\_Part7-Joining\\_Tables.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson7_Part7-Joining_Tables.php)



## ON YOUR OWN HANDS-ON EXERCISE

Given the following E-R Diagram write a query that returns the following recordset.

### Physical



Patient	Gender	Date	Time	Item	Value
Thelma Roach	F	2003-07-15	12:32:00	TEMPERATURE (F)	98.2 F
Thelma Roach	F	2003-07-15	12:32:00	RR	35 BPM
Thelma Roach	F	2003-07-15	12:32:00	SYSTOLIC BP	110 MMHG
Thelma Roach	F	2004-02-13	14:32:00	TEMPERATURE (F)	98.2 F
Thelma Roach	F	2004-04-08	09:58:00	TEMPERATURE (F)	104 F
Thelma Roach	F	2004-04-08	09:58:00	TEMPERATURE (F)	104 F
Thelma Roach	F	2004-04-08	09:58:00	PULSE RATE	76 BPM
Thelma Roach	F	2004-04-14	18:26:00	TEMPERATURE (F)	104 F
Thelma Roach	F	2004-04-14	18:26:00	SYSTOLIC BP	88 MMHG
Thelma Roach	F	2004-04-14	18:26:00	PULSE RATE	76 BPM

The query should have the following:

Row Restriction

- patient\_pk = 949

- finding\_subtype\_cde = VS

Return the following Columns (formatted as defined in the column formatting section below and as depicted above.

- lastname
- firstname
- finding\_timestamp
- item
- value
- uom

### Column Formatting

- Concatenate the patients first and last name as depicted.
- Return the date portion of the finding\_timestamp as depicted.
- Return the time portion of the finding\_timestamp as depicted.
- Concatenate the value and uom as depicted

### (Optional) Formatting Challenge

This is a difficult challenge!

After you have completed the above exercise make a copy and recode the Select section to format the time column and the vitals column as depicted below.

Patient	Gender	Date	Time	Vitals	Value
Thelma Roach	F	2003-07-15	12:32	Temperature	98.2 F
Thelma Roach	F	2003-07-15	12:32	Respiration	35 BPM
Thelma Roach	F	2003-07-15	12:32	Systolic	110 MMHG
Thelma Roach	F	2004-02-13	14:32	Temperature	98.2 F
Thelma Roach	F	2004-04-08	9:58	Temperature	104 F
Thelma Roach	F	2004-04-08	9:58	Temperature	104 F
Thelma Roach	F	2004-04-08	9:58	Pulse	76 BPM
Thelma Roach	F	2004-04-14	18:26	Temperature	104 F
Thelma Roach	F	2004-04-14	18:26	Systolic	88 MMHG
Thelma Roach	F	2004-04-14	18:26	Pulse	76 BPM

### Many to Many Joins

In this lesson we will be covering how to join associative tables. Prior to watching the video open the following files in the workbench.

- join\_mm1a.sql
- join\_mm1b.sql
- join\_mm1c.sql
- join\_mm1d.sql
- join\_mm1e.sql

These files are located at...

\webroot\LEARN\MySQL-Foundations\Examples

Also have slide 13 of the powerpoint out and available.



### ***WATCH VIDEO - Part 8 - Many to Many***

There is no exercise for this lesson.

### **Query Performance on Joined Tables**

In this lesson we pick up where we left off on by showing you how to do explain plans against a query that has joins. If you understand the purpose of a primary key and the purpose of an index then you should be able to understand if your query is written efficiently by examining its explain plan.



### ***WATCH VIDEO - Part 9 - Query Performance***

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson7\\_Part9-Joining\\_Tables.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson7_Part9-Joining_Tables.php)



### ***ON YOUR OWN HANDS-ON EXERCISE***

Open the files exercise\_explain\_plan.sql, ddl\_hospitalization.sql, and ddl\_provider.sql found in \webroot\LEARN\MySQL-Foundations\Examples. Run an explain plan against this query and answer the following questions.

Is this query efficient? If not, why not?



## SQL DML – Querying Data –Workbook

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What could be done to make this a more efficient query?

Would you ask the DBA group to add an index on this table? If yes, explain why?

## Lesson 8

### Summarizing Data

We finish the course by covering how to write queries that group and summarize data. Please note that I will be using the terms summarize and roll-up interchangeably throughout the video presentation.



#### Group By and Aggregate Functions

In the workbench, open up the files groupby\_prelude.sql, groupby1a.sql, and groupby1b.sql. These files can be found in \webroot\LEARN\MySQL-Foundations\Examples.

#### *WATCH VIDEO - Part 1 - Summarizing Data - GROUP BY*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson8\\_Part1-Summarizing\\_Data.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson8_Part1-Summarizing_Data.php)

#### *WATCH VIDEO - Part 2 - Summarizing Data - Aggregate Functions*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson8\\_Part2-Summarizing\\_Data.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson8_Part2-Summarizing_Data.php)



#### *ON YOUR OWN HANDS-ON EXERCISE*

Write a query against the bb\_pitching and the bb\_players tables in the trainwarehouse database that returns the following recordset based upon the following criterion. At a high level the spec is to return a recordset of the top ten pitchers with the most wins in the 1990's.

Pitcher	Wins	Losses
Jack Morris	162	119
Dave Stieb	140	109
Bob Welch	137	93
Fernando Valenzuela	128	103
Charlie Hough	128	114
Bert Blyleven	123	103
Nolan Ryan	122	104
Jim Clancy	119	126
Frank Viola	117	98
Rick Sutcliffe	116	93

- For years 1990 through 1999

- Only return the first 10

For more details on aggregate functions you can visit the MySQL website documentation.

### Having Clause

You use the having clause when you need to perform row restriction on an aggregate function.

#### *WATCH VIDEO - Part 3 - Summarizing Data – HAVING*

[http://www.sqlinfo.net/mysql/courses/DML-Querying\\_Data/lesson8\\_Part3-Summarizing\\_Data.php](http://www.sqlinfo.net/mysql/courses/DML-Querying_Data/lesson8_Part3-Summarizing_Data.php)



### *ON YOUR OWN HANDS-ON EXERCISE*

Return the top 250 home run hitters of all time. You may not use the “LIMIT” keyword to accomplish this task. Return the recordset as depicted below using the bb\_batting and the bb\_players tables in the trainwarehouse database

Player	Total Homeruns
Hank Aaron	755
Babe Ruth	714
Barry Bonds	708
Willie Mays	660
Sammy Sosa	588
Frank Robinson	586
Mark McGwire	583
Hammon Killebrew	573
Rafael Palmeiro	569
Reggie Jackson	563
Miles Schmidt	540