COP 4710: Database Systems Fall 2013

Chapter 5 – Introduction To SQL – Part 1

Instructor :	Dr. Mark Llewellyn
	markl@cs.ucf.edu
	HEC 236, 407-823-2790
	http://www.cs.ucf.edu/courses/cop4710/fall2013

Department Of Electrical Engineering and Computer Science Computer Science Division University of Central Florida

COP 4710: Database Systems (Chapter 5)



The Physical Design Stage of SDLC



SQL Overview

- $SQL \equiv Structured Query Language.$
- SQL is pronounced S-Q-L. Although you will also undoubtedly hear it pronounced as *sequel*.
- The standard for relational database management systems (RDBMS).
- SQL: 2007 Standards Purpose:
 - Specify syntax/semantics for data definition and manipulation.
 - Define data structures.
 - Enable portability.
 - Specify minimal (level 1) and complete (level 2) standards.
 - Allow for later growth/enhancement to standard.
- SQL: 20XX Standard



Benefits of a Standardized Relational Language

- Reduced training costs
- Productivity
- Application portability
- Application longevity
- Reduced dependence on a single vendor
- Cross-system communication



The SQL Environment

• Catalog

– A set of schemas that constitute the description of a database.

- Schema
 - The structure that contains descriptions of objects created by a user (base tables, views, constraints).
- Data Definition Language (DDL)
 - Commands that define a database, including creating, altering, and dropping tables and establishing constraints.
- Data Manipulation Language (DML)
 - Commands that maintain and query a database.
- Data Control Language (DCL)
 - Commands that control a database, including administering privileges and committing data.



A simplified schematic of a typical SQL environment, as described by the SQL:20xx standard



Some SQL Data Types (from Oracle 11g)

- String types
 - CHAR(n) fixed-length character data, n characters long Maximum length = 2000 bytes
 - VARCHAR2(n) variable length character data, maximum 4000 bytes
 - LONG variable-length character data, up to 4GB. Maximum 1 per table
- Numeric types
 - NUMBER(p,q) general purpose numeric data type
 - INTEGER(p) signed integer, p digits wide
 - FLOAT(p) floating point in scientific notation with p binary digits precision
- Date/time type
 - DATE fixed-length date/time in dd-mm-yy form





DDL, DML, DCL, and the database development process



COP 4710: Database Systems (Chapter 5)

Page 8

COMMAND OR OPTION	DESCRIPTION
CREATE SCHEMA AUTHORIZATION	Creates a database schema
CREATE TABLE	Creates a new table in the user's database schema
NOT NULL	Ensures that a column will not have null values
UNIQUE	Ensures that a column will not have duplicate values
PRIMARY KEY	Defines a primary key for a table
Foreign Key	Defines a foreign key for a table
DEFAULT	Defines a default value for a column (when no value is given)
CHECK	Validates data in an attribute
CREATE INDEX	Creates an index for a table
CREATE VIEW	Creates a dynamic subset of rows and columns from one or more tables (see Chapter 8, Advanced SQL)
ALTER TABLE	Modifies a table's definition (adds, modifies, or deletes attributes or constraints)
CREATE TABLE AS	Creates a new table based on a query in the user's database schema
DROP TABLE	Permanently deletes a table (and its data)
DROP INDEX	Permanently deletes an index
DROP VIEW	Permanently deletes a view

Some Common SQL DDL Commands

COP 4710: Database Systems (Chapter 5)



SQL Database Definition – Basic DDL Commands

- Data Definition Language (DDL)
- Major CREATE statements:
 - CREATE SCHEMA defines a portion of the database owned by a particular user.
 - CREATE TABLE defines a table and its columns.
 - CREATE VIEW defines a logical table from one or more views.
- Other CREATE statements: CHARACTER SET, COLLATION, TRANSLATION, ASSERTION, DOMAIN.



Table Creation

General syntax for CREATE TABLE

CREATE TABLE tablename ({column definition [table constraint] } [ON COMMIT {DELETE | PRESERVE} ROWS]);

where column definition ::= column_name

{domain name | datatype [(size)] } [column_constraint_clause . . .] [default value] [collate clause]

and table constraint ::= [CONSTRAINT constraint_name] Constraint_type [constraint_attributes]

Steps in table creation:

- 1. Identify data types for attributes
- 2. Identify columns that can and cannot be null
- 3. Identify columns that must be unique (candidate keys)
- 4. Identify primary keyforeign key mates
- 5. Determine default values
- 6. Identify constraints on columns (domain specifications)
- 7. Create the table and associated indexes



COP 4710: Database Systems (Chapter 5)

The following slides create tables for this enterprise data model







Page 14

Ø	MySQL Workbench	- 🗆 🗙
Local instance MySQL56 ×		
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> ataba	ase <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	ORACLE"
8 8 6 6 6 6 6		Ø _
Navigator	Query 1 SQL File 3* SQL File 4* SQL File 5* SQL File 6* chapter5script ×	SQLAdditions
SCHEMAS 🕺 🕯	🖿 🖬 🗲 🛣 🔘 🔀 🖽 📀 😂 🕖 🔍 🕦 🖃	🗢 🍨 Jump to 🔹
 Filter objects test vendors Tables customer Columns Indexes Foreign Keys Foreign Keys Triggers emp emp emp employee invoice invoice Columns 	<pre>91 • CREATE TABLE EMPLOYEE (92 EMP_NUM INT PRIMARY KEY, 93 EMP_TITLE CHAR(10), 94 EMP_LNAME VARCHAR(15) NOT NULL, 95 EMP_FNAME VARCHAR(15) NOT NULL, 96 EMP_INITIAL CHAR(1), 97 EMP_DOB DATE, 98 EMP_HIRE_DATE DATE, 99 EMP_YEARS INT, 100 EMP_AREACODE CHAR(3), 101 EMP_PHONE CHAR(8)); 102 Cutput</pre>	Topic: CONSTRAINT MySQL supports foreign keys, which let you cross-reference related data across tables, and foreign key constraints, which help keep this spread-out data consistent. The essential syntax for a foreign key constraint definition in a CREATE TABLE or ALTER TABLE statement looks like this: Image: Constraint Sector S
► ♦ LINE NUMBE	Time Action Message	Duration / Fetch
► ♦ P_CODE	INST 13:19:34 INSERT INTO EMPLOYEE VALUES(106,'Mrs.','Smith' ,'Jeanine','K', '19 1 row(s) affected	0.032 sec
► ♦ LINE_UNITS ► ♦ LINE PRICE ▼	⊘ 1088 13:19:34 INSERT INTO EMPLOYEE VALUES(107, 'Mr.', 'Diante', 'Jorge', 'D', '197 1 row(s) affected	0.016 sec
< >	1089 13:19:34 INSERT INTO EMPLOYEE VALUES(108, 'Mr.', 'Wiesenbach', 'Paul', 'R', ' 1 row(s) affected	0.031 sec
Management Schemas	1090 13:19:34 INSERT INTO EMPLOYEE VALUES(109,'Mr.', 'Smith', 'George', 'K', '19 1 row(s) affected	0.047 sec
Information	1091 13:19:35 INSERT INTO EMPLOYEE VALUES(110, 'Mrs.', 'Genkazi', 'Leighla', 'W', '1 1 row(s) affected	0.047 sec
Schema: vendors	1092 13:19:35 INSERT INTO EMPLOYEE VALUES(111, 'Mr.', 'Washington', 'Rupert', 'E', ' 1 row(s) affected	0.047 sec
	1093 13:19:35 INSERT INTO EMPLOYEE VALUES(112, 'Mr.', 'Johnson', 'Edward', 'E', '1 1 row(s) affected	0.015 sec
	1094 13:19:35 INSERT INTO EMPLOYEE VALUES(113, 'Ms.', 'Smythe', 'Melanie', P', '1 1 row(s) affected	0.031 sec
	 1095 13:19:35 INSERT INTO EMPLOYEE VALUES(114, 'Ms.', 'Brandon', 'Marie', 'G', '1 1 row(s) affected 	0.031 sec
	1096 13:19:35 INSERT INTO EMPLOYEE VALUES(115, Mrs.', Saranda', 'Hermine', R', ' 1 row(s) affected	0.015 sec
Object Info Session	1097 13:19:35 INSERT INTO EMPLOYEE VALUES(116, Mr., Smith) , George , A., 19 Trow(s) affected 1098 13:19:35 COMMIT 0 row(s) affected	0.031 sec
object this Session		· · · · · · · · · · · · · · · · · · ·

Page 15



Data Integrity Controls

- Referential integrity constraint that ensures that foreign key values of a table must match primary key values of a related table in 1:M relationships.
- Restricting:
 - Deletes of primary records.
 - Updates of primary records.
 - Inserts of dependent records.







Restricted Update: A customer ID can only be deleted if it is not found in ORDER table.

CREATE TABLE CUSTOMER_T (CUSTOMER_ID INTEGER DEFAULT 'C999' NOT NULL, CUSTOMER_NAME VARCHAR(40) NOT NULL,

CONSTRAINT CUSTOMER_PK PRIMARY KEY (CUSTOMER_ID), ON UPDATE RESTRICT);

Cascaded Update: Changing a customer ID in the CUSTOMER table will result in that value changing in the ORDER table to match.

... ON UPDATE CASCADE);

Set Null Update: When a customer ID is changed, any customer ID in the ORDER table that matches the old customer ID is set to NULL.

... ON UPDATE SET NULL);

Set Default Update: When a customer ID is changed, any customer ID in the ORDER tables that matches the old customer ID is set to a predefined default value.

... ON UPDATE SET DEFAULT);

Relational integrity is enforced via the primarykey to foreignkey match



Data Integrity Controls

- To illustrate how referential integrity is enforced by the DBMS, consider the following case using the sample database illustrated in these notes:
 - There is an invoice number 1008 in the INVOICE table.
 - This invoice number is referenced by three different rows in the LINE table.
 - The following few slides illustrate the initial configuration of the data in these two tables, followed by an update to the INVOICE table that sets invoice number 1008 to 1010. Notice that the subsequent view of the LINE table that the invoice number 1008 has been updated to 1010. This is because of the ON UPDATE CASCADE constraint on the INVOICE table (see page 14).



			MyS	QL Workbench			- 🗆 🗙
Local instance MySQL56 ×							
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	se <u>S</u> erver <u>T</u>	ools <u>S</u> cripting <u>H</u> elp					ORACLE"
	0				Before shot of	INVOICE	ð 🔲 🗌 🖸
Navigator		SQL File 3* SQL Fi	le 4* SQL File	5* SQL File 6* chapter5scri	pt	SQLAdditions	
SCHEMAS 🛪 🏷	🗀 🖬 🗲	🦻 👰 🕑 I 🔀 🖽	💿 🛽 📓 🚽	Q. 1 7		🗢 🄿 SELECT	•
Q Filter objects	1 • 9	SELECT * from invo	ice;			Topic: SELECT	^
▶ 📄 bikedb	2					TOPIC: SELECT	
mailinglist						Syntax: SELECT	
project3						[ALL DISTINCT DISTINCTROW]	
project4 test	<				>	[HIGH_PRIORITY]	
vendors	Result Set Filter		A Fdit	🔏 🖶 🛼 Export/Import 🛍 🖏	Wrap Cell Content	[SQL_SMALL_RESUL BIG_RESULT] [SOL_BUFFF	T] [SQL_ R_RESULT]
						[SQL_CACHE SQL 1 [SQL_CACHE SQL	NO_CACHE
	▶ 1001	10014	2012-01-16			select_expr [, sel	ect_expr
	1002	10011	2012-01-16			[FROM table_refere	nces
	1003	10012	2012-01-16			partition_list]	
	1004	10011	2012-01-17			[WHERE Where_condi [GROUP BY {col_nam	tionj e expr
	1005	10018	2012-01-17			ASC DESC],	. [WITH
	1006	10014	2012-01-17			[HAVING where_cond	ition]
	1007	10015	2012-01-17			[ORDER BY {col_nam position}	e expr
Management Schemas	1008	10011	2012-01-17			[ASC DESC], [LIMIT {[offset,]	.] row count
Information	*	NULL	NULL			row_count OFFSET of	fset}]
Schema: vendors						procedure_name(argumen	t_list)]
						[CHARACTER SET	c_name
	invoice 10 ×				Apply Cancel	Context Help Snippets	
	Output second						
		tout -					
Object Info Section	Time	e Action		Message		Duration	/ Fetch
object into Session							
COP 4710: Data	base Sy	stems (Chap	oter 5)	Page 19	Dr. Mark Lle	ewellyn ©	

N					MySQL Work	bench					- 🗆 🗙
Local instance MySQL56 ×											
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> ataba	ise	<u>S</u> erver <u>T</u> ools	<u>S</u> cripting <u>H</u> elp				_				ORACLE"
Before shot of LINE											Ø – – – –
Navigator	Qu	ery 1 SQL Fil	e 3* SQL File 4*	SQL File !	5* SQL File 6*	chapter5scrip	t SQL me	JUL SUL FI		SQLAdditions	
SCHEMAS 📲 🏶	C	I 日 🗲 😿 🖇	🤇 🕐 🔀 🖽 📀	🛛 📓 🕩	0, 11 Ŧ					🖕 🍨 🛛 CRE	ATE TABLE -
Q Filter objects		1 • select	* from line							Topic: CP	
▶ 📄 bikedb	<								>	TOPIC: UN	
Colorsurvey mailinglist					<u>a</u>		I	—	,	Syntax: CREATE [TEMP	ORARY] TABLE [IF
project3	Resu	It Set Filter:		🚷 Edit:	🖆 🔜 🔜 Expo	ort/Import 识 🐻	Wrap Cell Content	: <u>‡A</u>		NOT EXISTS] (create	tbl_name definition)
project4 test		INV_NUMBER	LINE_NUMBER	P_CODE	LINE_UNITS	LINE_PRICE				[table_c	ptions]
endors	•	1001	1	13-Q2/P2	1.00	14.99				[parcici	on_operons]
		1001	2	23109-HB	1.00	9.95				Or:	
		1002	1	54//8-21	2.00	4.99				CREATE [TEMPORARY] TABLE [IF	
		1003	1	2238/QPD	1.00	38.95		NOT EXISTS] tbl_name [(create definition)]			
	⊢	1003	2	1546-QQ2	1.00	39.95		[table_options]			
		1003	3	13-Q2/P2	5.00	14.99				select_s	tatement
		1004	1	04/78-21	3.00	4.99				0.0	
		1004	2		2.00	5.55				01.	
	⊢	1000	1	CM 10277	2.00	0.07				CREATE [TEMP	ORARY] TABLE [IF
		1006	2	2222/OTV	1.00	109.92				{ LIKE C	ld_tbl_name (LIKE
		1006	2	2232/QTT	1.00	9.95				oid_tbi_nam	e) }
Management Schemas	H	1006	4	23103110 89-WRE-0	1.00	256.99				create_defin	ition:
Information	Ŀ	1007	1	13-02/P2	2.00	14 99				COI_NAME	INT [symbol]]
No object selected	H	1007	2	54778-2T	1.00	4.99				(index_col_n	[index_type] ame,)
	(1008	1	PVC23DRT	5.00	5.87				[index {INDEX K	<pre>c_option] (EY} [index_name]</pre>
		1008	2	WR3/TT3	3.00	119.95				[index_type] (index_col_n	ame)
		1008	3	23109-HB	1.00	9.95				[index	_option]
	*	INVER	NOLL	noce	1046	NOLL				UNIQUE [INDE	X KEY]
		1								< [110ex	name index type *
	line	1 x						Apply	Cancel	Context Help	Snippets
Object Info Session	Out	tput									

Page 20

	MySQL Workbench	- 🗆 🗙
Local instance MySQL56 ×		
File Edit View Query Databas	Execute UPDATE to INVO	
Navigator	Query 1 SQL File 3* SQL File 4* SQL File 5* SQL File 6* chapter5script SQL File 9* × SG (SQL Ad	ditions
SCHEMAS 🕺 🕺	💼 🖬 🗲 🛣 🛞 🔀 🖽 📀 😂 😻 🔍 🕦 🤤	UPDATE -
Q Filter objects	<pre>1 • update invoice set inv_number = 1010 where inv_number=1008</pre>	
bikedb	Торі	
colorsurvey mailinglist	< S Contex	t Help Shippets
project3	Output	
project4	☐ Action Output ▼	
vendors	Time Action Message 1074 12 40 50 INICEPT INTO EMPLOYEE VALUES (104 IN L II) 1 - (1) // - (1)	Duration / Fetch
	1874 13:40:58 INSERTINTO EMPLOYEE VALUES(104, Mr., Lange , John , Trow(s) affected	0.094 sec
	1875 13:40:58 INSERT INTO EMPLOTEE VALUES(105, Mr., Williams, Robert, Trow(s) anected	0.047 sec
	1875 13:40:59 INSERT INTO EMPLOTEE VALUES(100, Mis., Smith , Jeanine Trow(s) anecled	0.031 sec
	1878 13:40:58 INSERT INTO EMPLOYEE VALUES(107, Mr., Diance , Joige , How(s) and ded	0.047 sec
	1879 13:40:58 INSERT INTO EMPLOYEE VALUES(109 /mr. ; Wiesenbach, rau How(s) affected	0.047 sec
	1880 13:40:58 INSERT INTO EMPLOYEE VALUES(110 Mrs.' Genkazi' / Leinbla' 1 mw(s) affected	0.031 sec
	1881 13:40:58 INSERT INTO EMPLOYEE VALUES(111 'Mr.' 'Washington' 'Buner 1 row(s) affected	0.016 sec
	1882 13:40:58 INSERT INTO EMPLOYEE VALUES(112 'Mr.' 'Johnson' 'Edward 1 row(s) affected	0.032 sec
Management Schemas	1883 13:40:58 INSERT INTO EMPLOYEE VALUES(113.'Ms.', 'Smythe', 'Melanie, 1 row(s) affected	0.046 sec
Information	1884 13:40:59 INSERT INTO EMPLOYEE VALUES(114, 'Ms.', 'Brandon', 'Marie', 1 row(s) affected	0.031 sec
No object selected	1885 13:40:59 INSERT INTO EMPLOYEE VALUES(115, 'Mrs.', 'Saranda', 'Hermin 1 row(s) affected	0.031 sec
	✓ 1886 13:40:59 INSERT INTO EMPLOYEE VALUES(116, 'Mr.', 'Smith', 'George', ' 1 row(s) affected	0.031 sec
	⊘ 1887 13:40:59 COMMIT 0 row(s) affected	0.000 sec
	1888 13:44:57 SELECT * FROM invoice LIMIT 0, 1000 8 row(s) returned	0.000 sec / 0.000 sec
	1889 13:45:39 select * from line LIMIT 0, 1000 18 row(s) returned	0.000 sec / 0.000 sec
	1890 13:48:57 update invoice set inv_number = 1010 where inv_number=1008 1 row(s) affected Rows matched: 1 Changed: 1 Warnings	: 0 0.047 sec
Object Info Session		v

D		Ν	MySQL Workbench		- • ×
Local instance MySQL56 ×					
File Edit View Query Databas	se <u>S</u> erver <u>T</u> ools	<u>S</u> cripting <u>H</u> elp		After shot of IN	
Navigator SCHEMAS n ^a ◆ Q Filter objects D bikedb Colorsurvey mailinglist D project3 D project4	Query 1 × SQL F SQL F SQL F SELEC 2 FROM 3	File 3* SQL File 4* SQL Fi	le 5* SQL File 6* (Notice that the INV_NU has been updated to 10 INVOICE table as the re direct update command against the INVOICE ta previous slide).	MBER 1008 10 in the esult of the issued ble (see
 test vendors 	< Result Set Filter:	🚷 E	dit: 🔏 🔜 🔜 Export/Imp	ort 🏭 📷 Wrap Cell Content: 🏗	SET col_name1={expr1 DEFAULT} [, col_name2={expr2 DEFAULT}] [WHERE where_condition]
Management Schemas Information Information No object selected Information	INV_NUMBER ► 1001 1002 1003 1004 1005 1006 1007 1010 ★ invoice 17 ×	CUS_CODE INV_DATE 10014 2012-01-16 10011 2012-01-16 10012 2012-01-16 10011 2012-01-17 10018 2012-01-17 10014 2012-01-17 10015 2012-01-17 10011 2012-01-17		Apply Cancel	[ORDER BY] [LIMIT row_count] Multiple-table syntax: UPDATE [LOW_PRIORITY] [IGNORE] table_references SET col_name1={expr1 DEFAULT} [, col_name2={expr2 DEFAULT}] [WHERE where_condition] For the single-table syntax, the UPDATE statement updates columns of existing rows in the named table with new values. The SET clause indicates which columns to modify Context Help Snippets
Object Info Session	Output Action Output Time 1890 13:48:57 1891 13:51:07	Action update invoice set inv_number = 1010 SELECT * FROM invoice LIMIT 0. 100	where inv_number=1008 0	Message 1 row(s) affected Rows matched: 1 Changed: 1 8 row(s) returned	Duration / Fetch Warnings: 0 0.047 sec 0.000 sec / 0.000 sec
COP 4710: Data	abase Syste	ems (Chapter 5)	Page 2	2 Dr. Mark Lle	wellyn ©

				My	SQL Workber	ch		- 🗆 ×		
Local instance MySQL56 ×										
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	se	<u>S</u> erver <u>T</u> ools	<u>S</u> cripting <u>H</u> elp					ORACLE"		
	Ċ						After shot of INVOICE	@		
Navigator	SQL	File 3* SQL I	File 4* SQL File 5	5* SQL File	e 6* chapter5	script SQL F	File 9* SQL File 10* SQLAdditions			
SCHEMAS 📲 🎨	C	I 🖬 쭏 🕱 🖇	र् 🕐 । 🔀 🖽 । 📀	🕺 🔞 🗹	0. 1 7		🗢 🔿 Jump to	-		
Q Filter objects		1 • select	<pre>* from line;</pre>				Nation that the INIV ANDER 10	200		
▶ 📄 bikedb	<									
colorsurvey mailinglist	Result Set Filter.									
project3		INV NUMBER	LINE NUMBER	P CODE	LINE UNITS	LINE PRICE	table as well as a result of the O	N		
project4 test	•	1001	1	- 13-Q2/P2	1.00	14.99	UPDATE CASCADE constraint t	hat		
vendors		1001	2	23109-HB	1.00	9.95	was in effect on the INVOICE tak	ole		
		1002	1	54778-2T	2.00	4.99	when the undate to that table			
		1003	1	2238/QPD	1.00	38.95				
		1003	2	1546-QQ2	1.00	39.95	occurrea.			
		1003	3	13-Q2/P2	5.00	14.99				
		1004	1	54778-2T	3.00	4.99				
		1004	2	23109-HB	2.00	9.95				
		1005	1	PVC23DRT	12.00	5.87				
		1006	1	SM-18277	3.00	6.99				
		1006	2	2232/QTY	1.00	109.92				
	_	1006	3	23109-HB	1.00	9.95				
		1006	4	89-WRE-Q	1.00	256.99				
	_	1007	1	13-Q2/P2	2.00	14.99				
Management Schemas		1007	2	54//8-21	1.00	4.99				
Information	H	1010	1	PVC23DR1	5.00	5.8/				
No object selected	H	1010	2	WR3/113	3.00	119.95				
	line		3	23109-HB	1.00	9.90	Apply Cancel Context Help Snippets			
	0									
	-									
		Action Output	• 			Manage	-	a (Frank		
	0	1891 13:51:07 SI	ction ELECT * FROM invoice	LIMIT 0. 1000		8 row(s)) returned 0.000 s	sec / 0.000 sec		
	0	1892 13:52:36 se	lect * from line LIMIT 0.	1000		18 row(s	s) returned 0.000 s	sec / 0.000 sec		
Object Info Session	0	1893 13:54:11 se	elect * from line LIMIT 0,	1000		18 row(s	(s) returned 0.000 s	sec / 0.000 sec 🗸		
COP 4710: Data	ba	se Syste	ms (Chapt	er 5)	Pag	je 23	Dr. Mark Llewellyn ©			

Data Integrity Controls

- The previous few slides illustrated how the ON UPDATE CASCADE constraint was used to enforce referential integrity in the database.
- The following example is similar, except that it uses the ON DELETE CASCADE constraint:
 - There is an invoice number 1008 in the INVOICE table.
 - This invoice number is referenced by three different rows in the LINE table.
 - The following few slides illustrate the initial configuration of the data in these two tables, followed by a deletion to the LINE table that removes rows belonging to invoice number 1008.
- Note that this deletion is occurring in the foreign key table, i.e., where INV_NUMBER is a foreign key.

COP 4710: Database Systems (Chapter 5)





D			M	ySQL Workber	nch			- 🗆 🗙
Local instance MySQL56 ×								
File Edit View Query Databas	se <u>S</u> erver <u>T</u> ools	<u>S</u> cripting <u>H</u> elp				Before sho	t of LINE	
Navigator	3* SQL File 4*	SQL File 5*	SQL File 6*	chapter5script-ve	rsion2 SQL File S	9* SQL File 10* 🗙 🜗	SQLAdditions	************************
SCHEMAS 🛪 🏶	🗀 🛛 🗲 寮	👰 🔘 1 🔀 🗐 🛛) 🛛 🕄 🚽	0.17			🗢 🔿 🛛 Jump to	• •
Sector State Activity Contract State Activity Contr	1 • sele	ct * from line;					Tapic CON	ICTDAINT
▶ 📄 bikedb							Topic: COM	ISTRAINT
colorsurvey mailinglist							MySQL support you cross-refer	s foreign keys, which let ence related data across
project3	<						tables, and fore which help keep	eign key constraints,
project4	Result Set Filter:		🚷 Edit	🖌 🖶 🖶 Exp	port/Import 🔚 🐻 🛛	Wrap Cell Content: 🚺	consistent. The	essential syntax for a
vendors	INV_NUMBER	LINE_NUMBER	P_CODE	LINE_UNITS	LINE_PRICE		CREATE TABLE (or ALTER TABLE
	1006	1	SM-18277	3.00	6.99		statement looks	like this:
	1006	2	2232/QTY	1.00	109.92		[CONSTRAINT [symbol]] FOREIGN KEY
	1006	3	23109-HB	1.00	9.95		[index_nam)	me] (index_col_name,
	1006	4	89-WRE-Q	1.00	256.99		REFERENCES (index col nar	5 tbl_name ne)
	1007	1	13-Q2/P2	2.00	14.99		ON DELETE	reference_option]
	1007	2	54778-2T	1.00	4.99		Low or DATE	reference_optionj
	1008	1	PVC23DRT	5.00	5.87		reference_opti	ion: L CASCADE L SET NULL
Management Schemas	1008	2	WR3/113	3.00	119.95		NO ACTION	
Information	1008	3 NULL	23109-HB	1.00	9.95	,	See also: Onlin	ne help
No object selected	*						create-table-for	eign-keys
	line 4 ×					Apply Cancel	Context Help S	Snippets
	Output ::::::::::::::::::::::::::::::::::							
	Action Output	-						
	Time	Action			Message			Duration / Fetch
	2117 14:03:36	COMMIT			0 row(s) affect	cted		0.000 sec
Object Info Session	2118 14:03:46	SELECT * FROM invoic	e LIMIT 0, 1000		8 row(s) retur	ned		0.000 sec / 0.000 sec
COP 4710: Data	abase Syst	ems (Chap	ter 5)	Pag	ge 27	Dr. Mark L	lewellyn ©	

.

	MySQL Workbench	- 🗆 🗙
Local instance MySQL56 ×		
File Edit View Query Databas	Execute de	
Navigator	* SQL File 5* SQL File 6* chapter5script-version2 SQL File 9* SQL File 10* SQL File 11* ×	SQLAdditions
SCHEMAS 🕺 🕺	🗀 🖬 🗲 🛣 🛞 🔀 🖽 📀 🛞 😻 < 🔍 🕦 🖃	🗢 👳 SELECT 🔹
Filter objects Bikedb Colorsuprey	<pre>1 • delete from line 2 where inv_number = 1008;</pre>	Topic: SELECT
 mailinglist project3 project4 		Syntax: SELECT [ALL DISTINCT DISTINCTRON [HIGH_PRIORITY]
▶ 📄 test	< > >	Context Help Snippets
vendors	Output	
	Action Output	
	Time Action Message	Duration / Fetch
	2337 14:07:52 INSERT INTO EMPLOYEE VALUES(107, 'Mr.', 'Diante', 'Jorge', ' 1 row(s) affected	0.016 sec
	2338 14:07:53 INSERT INTO EMPLOYEE VALUES(108, 'Mr.', 'Wiesenbach', 'Paul' 1 row(s) affected	0.032 sec
	2339 14:07:53 INSERT INTO EMPLOYEE VALUES(109,'Mr.', 'Smith', 'George', ' 1 row(s) affected	0.016 sec
	2340 14:07:53 INSERT INTO EMPLOYEE VALUES(110, 'Mrs.', 'Genkazi', 'Leighla' 1 row(s) affected	0.015 sec
	2341 14:07:53 INSERT INTO EMPLOYEE VALUES(111, 'Mr.', 'Washington', 'Ruper 1 row(s) affected	0.015 sec
Management Schemas	2342 14:07:53 INSERT INTO EMPLOYEE VALUES(112,'Mr.','Johnson', 'Edward 1 row(s) affected	0.031 sec
Information	2343 14:07:53 INSERT INTO EMPLOYEE VALUES(113, 'Ms.', 'Smythe', 'Melanie 1 row(s) affected	0.047 sec
No object selected	2344 14:07:53 INSERT INTO EMPLOYEE VALUES(114, 'Ms.', 'Brandon', 'Marie' 1 row(s) affected	0.047 sec
	2345 14:07:53 INSERT INTO EMPLOYEE VALUES(115, 'Mrs.', 'Saranda', 'Hermin 1 row(s) affected	0.032 sec
	2346 14:07:53 INSERT INTO EMPLOYEE VALUES(116,'Mr.', 'Smith', 'George', ' 1 row(s) affected	0.031 sec
	⊘ 2347 14:07:53 COMMIT 0 row(s) affected	0.000 sec
	2348 14:08:01 select * from line LIMIT 0, 1000 18 row(s) returned	0.000 sec / 0.000 sec
		0.281 sec
Object Info Session		0.000 sec / 0.000 sec 🗸

Page 28



D			My	SQL Workben	ch		- 🗆 🗙	
Local instance MySQL56 ×								
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	se <u>S</u> erver <u>T</u> ools	<u>S</u> cripting <u>H</u> elp				After abot of	LINE ORACLE	
on an	Q 🙀					Alter shot of		
Navigator	* SQL File 5*	SQL File 6* cha	pter5script-ver	sion2 SQL File	e 9*			
SCHEMAS 📲 🚸	🗀 🖬 🖉 😿 🖇	🔍 🕐 🔀 🖽 📀	🛛 🕄 📝	0. 11 7	INOTIC	e that all rows invo	iving invoice	
Q Filter objects	1 • select	<pre>* from line;</pre>			numb	per 1008 have beer	n deleted from	
bikedb					the L	INE table		
colorsurvey	<					>	Syntax: DELETE IS a DML statement	
project3	Result Set Filter		A Fdit	🔏 🖦 🛼 Evo	ort/Import	Wran Cell Content	Single-table syntax	
project4							Single table syntaxi	
vendors			13-02/P2	1.00	14.99		DELETE [LOW_PRIORITY] [QUICK] [IGNORE] FROM th] name	
	1001	2	23109-HB	1.00	9.95			
	1002	1	54778-2T	2.00	4.99		[WHERE where_condition]	
	1003	1	2238/QPD	1.00	38.95		[ORDER BY] [LIMIT row_count]	
	1003	2	1546-QQ2	1.00	39.95		The DELETE statement deletes rows	
	1003	3	13-Q2/P2	5.00	14.99		from tbl_name and returns the	
	1004	1	54778-2T	3.00	4.99		number of deleted rows. To check the number of deleted rows, call the	
	1004	2	23109-HB	2.00	9.95		ROW_COUNT() function described in Online help information-functions	
	1005	1	PVC23DRT	12.00	5.87		Main Clauses	
	1006	1	SM-18277	3.00	6.99		The conditions in the optional	
	1006	2	2232/QTY	1.00	109.92		WHERE clause identify which rows to	
Management Schemas	1006	3	23109-HB	1.00	9.95		rows are deleted.	
T-f	1006	4	89-WRE-Q	1.00	256.99		where_condition is an expression	
Information	1007	1	13-Q2/P2	2.00	14.99		that evaluates to true for each row to be deleted. It is specified as	
no object selected	1007	2	54778-2T	1.00	4.99		described in Online help select .	
	* NULL	NULL	NULL	NULL	NULL		If the ORDER BY clause is specified, the rows are deleted in the order	
	line 0						that is specified. The LIMIT clause	
	line 9 ×					Apply Cancel	Context Help Snippets	
	Output ::::::::::::::::::::::::::::::::::							
	Action Output	-						
Object Info Consign	Time A	ction			Message		Duration / Fetch	
Subject Into Session	♥ 2338 14:07:53 IN	ISERT INTO EMPLOYE	E VALUES(108,	, Mr.', Wiesenbach',	Paul' 1 row(s) affe	ected	0.032 sec	

Page 29



			MySQL	Workbench			- 🗆 🗙
Local instance MySQL56 ×							
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	se <u>S</u> erver <u>T</u> ools	<u>Scripting</u> <u>H</u> elp					ORACLE"
8 5 6 6 6 6 6	i 🥵 🖓					After shot of INVOICE	0
Navigator	* SQL File 5*	SQL File 6*	chapter5script-version2	SQL File 9*	SQL File 10*	SQL File 11* × SQLAdditions *****	
SCHEMAS 🛪 🕸	🗀 🖬 🗲 🛣 🖞	🍳 🕐 i 😘 🖽	💿 🛞 🔞 🕩 🍳	1 7		🗢 🗼 Jump to	•
Q Filter objects	1 • select	t * <mark>from</mark> invo	ice;			No Context He	un -
bikedb					Why is	the inv_number 1008 still i	in
 mailinglist 					the INV	OICE table after the deleti	on in
project3	<				the LIN	IE table?	
▶ est	Result Set Filter:		🚷 Edit: 🔏	Export/Impo	rt		
vendors	INV_NUMBER	CUS_CODE	INV_DATE		MySQL	does not actually impleme	ent
	▶ 1001	10014	2012-01-16		the ON	DELETE CASCADE	
	1002	10011	2012-01-16		constra	aint from the FK table into t	he
	1003	10012	2012-01-16		PK tab	le! MvSQL only supports the	he
	1004	10011	2012-01-17			LETE CASCADE constrair	nt
	1005	10018	2012-01-17		from th	a PK table to the FK table	1+
	1006	10014	2012-01-17		in only	there to allow portability to	n
	1007	10015	2012-01-17		IS UTILY		
	WULL	NULL	2012-01-17		other D	BINS. SQL Server and Or	
	*				system	s do support the ON DELE	:16
Management Schemas					CASCA	ADE constraint. Oracle doe	es
- Information					not sup	port ON UPDATE CASCA	DE,
No object selected					but SQ	L Server does.	
					Oracle	supports the SET NULL, S	SQL
					Server	does not.	
	invoice 1 ×					Apply Cancel Context Help Snir	ppets
	Output						
	Action Output	•					
	Time	Action			Message		Duration / Fetch
Object Info Session	⊘ 2342 14:07:53 II	NSERT INTO EMP	LOYEE VALUES(112, 'Mr.',	Johnson' ,'Edward	1 row(s) affected	0).031 sec
COP 4710: Data	base Syste	ms (Cha	pter 5)	Page 3)	Dr. Mark Llewellyn ©	

Data Integrity Controls

• One last look...this time deleting the invoice number in the table in which it is the primary key (INVOICE). Note that the ON UPDATE CASCADE clause will cascade the update into the foreign key table.



Dr. Mark Llewellyn ©

COP 4710: Database Systems (Chapter 5)

Σ	MySQL Workbench									×
Local instance MySQL56 ×										
ile <u>E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabase <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp									ORACI	E
Before sh								f LINE	Ø 🗖	
Navigator									,	00000
SCHEMAS 📲 🚸	* * 🗀 🖬 🗲 🜴 💭 🔀 🖽 🔿 🛇 🕱 < Q. 🤋 🖃								TE -	
Q , Filter objects	1 • select * from line;								ETE	~
▶ 📄 bikedb								TOPIC: DEL	EIE	
colorsurvey								Syntax: DELET	is a DML statement	
project3								Single-table sv	ntav:	
▶				A				Single table sy		
vendors	Result Set Filter:		tit:	🖆 🔜 🖶 Exp	oort/Import 📳 🐻	Wrap Cell Content		DELETE [LOW_P	RIORITY] [QUICK] [
	INV_NUMBER	LINE_NUMBER	P_CODE	LINE_UNITS	LINE_PRICE	_	^	[PARTITIO	N	
	1003	1	2238/QPD	1.00	38.95			[WHERE where_condition]		
	1003	2	1546-QQ2	1.00	39.95		[ORDER BY] [LIMIT row_count]			
	1003	3	13-Q2/P2	5.00	14.99					
	1004	1	54778-2T	3.00	4.99			from tbl_name	name and returns the	
	1004	2	23109-HB	2.00	9.95			number of deleted rows. To che the number of deleted rows, cal		
	1005	1	PVC23DRT	12.00	5.87			ROW_COUNT()	OW_COUNT() function described in	
	1006	1	SM-18277	3.00	6.99			Maia Clauses	ormacion-runcions .	
	1006	2	2232/QTY	1.00	109.92			Main Clauses	to the contract	
	1006	3	23109-HB	1.00	9.95			WHERE clause identify which re		
	1006	4	89-WRE-Q	1.00	256.99			delete. With no rows are delete	WHERE clause, all d.	
Management Schemas	1007	1	13-Q2/P2	2.00	14.99			where condition	n is an expression	
Information	1007	2	54//8-21	1.00	4.99			that evaluates t	o true for each row	
No object selected	1008	1	PVC23DR1	5.00	5.87			described in Online help select .		
	1008	2	WR3/113	3.00	119.95			If the ORDER I	BY clause is specified,	
	NULL	3 NULL	23109-HB	1.00	9.95		~	the rows are d that is specified	eleted in the order . The LIMIT clause	
	line 12 ×					Apply Cancel		Context Help	Snippets	
	Output ::::::::::::::::::::::::::::::::::									00000
	Action Output	-								
	Time A	ction			Message				Duration / Fetch	^
Object Info Session	⊘ 2572 14:19:18 IN	ISERT INTO EMPLOY	EE VALUES(105	"Mr.' ,'Williams' ,'Ro	obert',' 1 row(s) affe	ected			0.031 sec	

Page 32

2	MySQL Workbench								x
Local instance MySQL56 ×									
File Edit View Query Databas	se <u>S</u> erver <u>T</u> ools	<u>S</u> cripting <u>H</u> elp			Befor	e shot o	of INVOICE		je L
Navigator	* SQL File 5*	SQL File 6*	chapter5script-ver	sion2 SQL Fil	e 9* SQL File 10	• •	SQLAdditions		
SCHEMAS 📲 🏶	🗀 🖯 🗲 🛣	R 🕑 🕅 🖽	I 💿 💿 🔞 I 🕑	0. 11 🖬			🗢 🔿 🛛 DELETE	-	
 Filter objects bikedb colorsurvey mailinglist project3 	1 • selec	t * from invo	ice;			>	Topic: DELETE Syntax: DELETE is a D that removes rows fro	ML statement om a table.	^
project4	Result Set Filter:		🚷 Edit	🔏 🖶 🖶 🛙 Exp	ort/Import 🔚 🐻		Single-table syntax:		
Management Schemas Information No object selected	INV_NUMBER ↓ 1001 1002 1003 1004 1005 1006 1007 1008 1008	CUS_CODE 10014 10011 10012 10011 10018 10014 10015 10011 NUUL	INV_DATE 2012-01-16 2012-01-16 2012-01-16 2012-01-17 2012-01-17 2012-01-17 2012-01-17 2012-01-17				DELETE [LOW_PRIORIT IGNORE] FROM tbl_na [PARTITION (partition_name, [WHERE where_co [ORDER BY] [LIMIT row_cound The DELETE statemen from tbl_name and red number of deleted row the number of deleted ROW_COUNT() function Online help information Main Clauses The conditions in the of WHERE clause identify delete. With no WHER rows are deleted.	Y] [QUICK] [me)] ndition] t] t deletes rows turns the vs. To check rows, call the on described in on-fundions.	
	invoice 4 ×				Apply	Cancel	where condition is an Context Help Snippet	expression s	
	Output								
		-							
		Action			Message		Durat	tion / Fetch	^
Object Info Session	⊘ 2573 14:19:18 I	NSERT INTO EMP	LOYEE VALUES(106	,'Mrs.','Smith' 1	row(s) affected		0.031	sec	
COP 4710: Databa	ase Systems	(Chapter	r 5)	Page 33	Dr.	Mark L	lewellyn ©		

$\boldsymbol{\nu}$		MySQL Workb	ench			- 🗆 ×
Local instance MySQL56 ×						
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	e <u>S</u> erver <u>T</u> ools	<u>S</u> cripting <u>H</u> elp				ORACLE
8 8 8 8 8 8 8			Execute de	elete ir	n PK table	
Navigator	SQL File 5*	SQL File 6* chapter5script-version2	SQL File 9* × SQL File 10*		SQLAdditions	
SCHEMAS 🛪 🕏	🗀 🖬 🗲 🛣	Á 🕑 🔀 🖽 📀 🛛 🕫 🕩 Q	1		🗢 🔿 🛛 DELETE	-
Q Filter objects	1 • dele	te from invoice where inv_number	=1008;		T . DELETE	^
▶ 📄 bikedb					TOPIC: DELETE	
colorsurvey					Syntax: DELETE is a D	ML statement
project3	<			>	Context Help Shipped	5
project4	Output					
Test Vendors	Action Output	•				
	Time	Action	Message		Durat	ion / Fetch
	2572 14:19:18	INSERT INTO EMPLOYEE VALUES(105, 'Mr.'	, Williams' 1 row(s) affected		0.031	sec
	2573 14:19:18	INSERT INTO EMPLOYEE VALUES(106, 'Mrs.	','Smith' 1 row(s) affected		0.031	sec
	2574 14:19:19	INSERT INTO EMPLOYEE VALUES(107, 'Mr.'	'Diante' 1 row(s) affected		0.031	sec
	2575 14:19:19	INSERT INTO EMPLOYEE VALUES(108, 'Mr.'	Wiesenb 1 row(s) affected		0.047	sec
	2576 14:19:19	INSERT INTO EMPLOYEE VALUES(109, 'Mr.'	,'Smith' 1 row(s) affected		0.046	sec
	2577 14:19:19	INSERT INTO EMPLOYEE VALUES(110, 'Mrs.	,'Genkazi 1 row(s) affected		0.031	sec
	2578 14:19:19	INSERT INTO EMPLOYEE VALUES(111, 'Mr.'	,'Washing 1 row(s) affected		0.031	sec
Management Schemas	2579 14:19:19	INSERT INTO EMPLOYEE VALUES(112, 'Mr.'	'Johnson' 1 row(s) affected		0.031	sec
a filling chieft ochemis	2580 14:19:19	INSERT INTO EMPLOYEE VALUES(113, 'Ms.'	,'Smythe' 1 row(s) affected		0.031	sec
Information	2581 14:19:19	INSERT INTO EMPLOYEE VALUES(114, 'Ms.'	,'Brandon 1 row(s) affected		0.031	sec
No object selected	2582 14:19:19	INSERT INTO EMPLOYEE VALUES(115, 'Mrs.	,'Saranda 1 row(s) affected		0.031	sec
	2583 14:19:19	INSERT INTO EMPLOYEE VALUES(116, 'Mr.'	'Smith' 1 row(s) affected		0.031	sec
	2584 14:19:19	COMMIT	0 row(s) affected		0.000	sec
	2585 14:23:12	select * from line LIMIT 0, 1000	18 row(s) returned		0.000	sec / 0.000 sec
	2586 14:23:52	select * from invoice LIMIT 0, 1000	8 row(s) returned		0.000	sec / 0.000 sec
	2587 14:24:36	delete from invoice where inv_number=1008	1 row(s) affected		0.031	sec
Object Info Session						Y

Page 34



D	MySQL Workbench								×	
Local instance MySQL56 ×										
File Edit View Query Databas	e <u>S</u> erver] [0] (⊕	<u>T</u> ools	<u>S</u> cripting <u>H</u> elp			A	fter shot of	INVOICE		ile"
Navigator	SQL Fi	ile 6*	chapter5script-vers	sion2 SQL File	∋9* SQLF	File 10* SQL Fil	e 11* 🗙 🚺 🍁	SQLAdditions		
SCHEMAS 🗚 🗞		🗲 🛣	🔍 🕑 I 🔀 🖽	💽 🛞 📓 🚽	(Q. 🏾 🖃			🗢 😐 DELETE	•	
 Filter objects bikedb colorsurvey mailinglist 	1 •	selec	t * from invoi	.ce j				Topic: DELE Syntax: DELETE i	TE s a DML statement	t ^
project3	Parult Cat Eile			A) tab	- <u>/-</u>	Event (mant)	- -	Single-table synt	ax:	
project4	Result Set Filt						ବ	Single cubic sync		
vendors	INV_I	NUMBER	10014	2012-01-16				DELETE [LOW_PRI IGNORE] FROM tb	ORITY] [QUICK] [l_name	[
	1002		10011	2012-01-16				[PARTITION (partition_name	- ,)]	
	1003		10012	2012-01-16				[WHERE when [ORDER BY .	e_condition]	
	1004		10011	2012-01-17				[LIMIT row_	count]	
	1005		10018	2012-01-17				The DELETE state	ement deletes row	s
	1006		10014	2012-01-17				from tbl_name an number of delete	nd returns the d rows. To check	
	1007		10015	2012-01-17			the number of deleted rows, call the ROW_COUNT() function described in			
	* NULL		NULL	NULL				Online help infor	mation-functions .	
Management Schemas								Main Clauses		
Information								The conditions in WHERE clause ide delete. With no V	the optional entify which rows to VHERE clause, all	0
	invoice 5	×				Apply	Cancel	Context Help Sn	ippets	
	Output									
	Action Output									
	Time Action Message					Message	e Duration / Fetch			^
	2587 14:24:36 delete from invoice where inv_number=1008				1 row(s) affected			0.031 sec		
Object Info Session	⊘ 2588	14:25:23 s	elect * from invoice	LIMIT 0, 1000		7 row(s) returned			0.000 sec / 0.000 se	ec
COP 4710: Databa	ase Sys	stems	(Chapter	· 5)	Page 3	5	Dr. Mark L	lewellyn ©		2

2	MySQL Workbench				forkbench –				
Local instance MySQL56 ×									
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	se <u>S</u> erver <u>T</u> ools	<u>Scripting</u> <u>H</u> elp						ORACLE	Ē
					A	fter shot	of LINE	0]
Navigator	SQL File 6*	chapter5script-version2	2 SQL File	9* SQL File	e 10* 🗙 SQL File 11*	• 🔹 🔶	SQLAdditions		
SCHEMAS 🗚 🗞	🗀 🖬 🗲 🛣 :	👰 🕐 I 🔀 🖽 I 🖉) 🛞 🔞 🚽	0.17			🗢 🎐 DELETE	•	
Q Filter objects	1 • selec	t * from line;					Tania DELETE	-	
▶ 📄 bikedb							TOPIC: DELETE		
colorsurvey mailinglist	<					>	Syntax: DELETE is a DML statement that removes rows from a table.		
project3	Result Set Filter		A Edit	- <u>/</u> =. =. -	xport/import		Single-table syntax:		
project4						^			
vendors	1003	3	13-02/P2	5.00	14.99		DELETE [LOW_PRIORITY] [QUICK] [IGNORE] FROM tbl_name [PARTITION (partition_name,)] [WHERE where_condition] [ORDER BY] [LIMIT row_count]		
	1004	1	54778-2T	3.00	4.99				
	1004	2	23109-HB	2.00	9.95				
	1005	1	PVC23DRT	12.00	5.87				
	1006	1	SM-18277	3.00	6.99		The DELETE statemer	nt deletes rows	
	1006	2	2232/QTY	1.00	109.92		from tbl_name and re number of deleted ro	eturns the ws. To check	
	1006	3	23109-HB	1.00	9.95		the number of deleter	rows, call the	
	1006	4	89-WRE-Q	1.00	256.99		Online help information-functions		
Management Scheman	1007	1	13-Q2/P2	2.00	14.99		Main Clauses		
Finanagement Schemas	1007	2	54778-2T	1.00	4.99		The conditions in the	optional	
Information	* NULL	NULL	NULL	NULL	NULL		WHERE clause identify delete. With no WHE	y which rows to RE clause, all	
No object selected	line 13 x				Apply	Cancel	Context Help Snippe	ts	
	Output								
	Action Output								
	Time	Action		Message			Dura	ation / Fetch	^
	2588 14:25:23 select * from invoice LIMIT 0, 1000 7 row(s) returned						0.00	0 sec / 0.000 sec	
Object Info Session	2589 14:25:58 s	select * from line LIMIT 0	. 1000		15 row(s) returned		0.00	0 sec / 0.000 sec	
COP 4710: Databa	ase Systems	Gir (Chapter 5))	Page 36	Dr	. Mark L	lewellyn ©		
Additional DDL Commands

- Table structure can always be modified after table creation occurs. It may not occur very often if the designer has done a good job, but some structural changes might be inevitable over the long haul.
- SQL DDL commands allow for attributes to be added, deleted, or rearranged in order within a table.
- Additional DDL commands allow tables to be cloned (copied) in whole or in part as well as deleted from a schema.
- The next few pages illustrate some of these additional DDL commands.



Changing and Removing Tables

• ALTER TABLE command is primarily used for changing column specifications. It has three options available: ADD, MODIFY, and DROP. The syntax is shown below:

ALTER TABLE tablename {ADD | MODIFY} (columnname datatype [{ADD | MODIFY} columnname datatype]);

• The ALTER TABLE command can also be used to add table constraints. In this case the syntax is:

ALTER TABLE tablename ADD constraint [ADD constraint];

COP 4710: Database Systems (Chapter 5)



Changing and Removing Tables

- To remove a column or constraint the syntax is: ALTER TABLE tablename DROP
 {PRIMARY KEY |COLUMN columnname | CONSTRAINT constraintname];
- Changing a column's data type is also done with the ALTER TABLE command. In this case the syntax becomes:
 ALTER TABLE tablename MODIFY (columnname datatype);
- Note that many RDBMSs will not allow columns to be deleted or have their datatypes modified unless the column is empty (contains no data). Also note that a column's datatype can be modified if it contains data but the modification does not change the underlying data type, e.g., decimal(7,2) to decimal(10,2).



Creating SQL Indices

- Indices are used to improve the efficiency of searches and to avoid duplicate column values.
- The declaration of the primary key in any table in SQL will automatically cause the creation of a unique index on the key attributes.
- Even with the automatically created indices, you often need additional indices. This is done with the CREATE INDEX command in SQL. The syntax is:

CREATE [UNIQUE} INDEX indexname ON

tablename (column1 | column2]);

• If you wanted to create an index on the attribute P_INDATE in the PRODUCT table in our example database, the following command would create an index named P_INDATE_INDEX: CREATE INDEX P INDATE INDEX ON PRODUCT (P INDATE);

COP 4710: Database Systems (Chapter 5)



SQL DML Commands

- SQL DML commands allow for manipulation of the data in tables within a schema.
- The table on the next slide list the basic SQL DML commands and special operators that can be used in conjunction with the DML commands.
- Often the first DML command you will need is that of INSERT, as once you've specified the definition of your table, you will then need to populate the table with data before you can query the table.
- The page after the table, begins with a look at the INSERT command.



COMMAND OR OPTION	DESCRIPTION							
INSERT	Inserts row(s) into a table							
SELECT	Selects attributes from rows in one or more tables or views							
WHERE	Restricts the selection of rows based on a conditional expression							
GROUP BY	Groups the selected rows based on one or more attributes							
HAVING	Restricts the selection of grouped rows based on a condition							
ORDER BY	Orders the selected rows based on one or more attributes							
UPDATE	Modifies an attribute's values in one or more table's rows							
DELETE	Deletes one or more rows from a table							
COMMIT	Permanently saves data changes							
Rollback	Restores data to their original values							
Comparison operators								
=, <, >, <=, >=, <>	Used in conditional expressions							
Logical operators								
AND/OR/NOT	Used in conditional expressions							
Special operators	Used in conditional expressions							
BETWEEN	Checks whether an attribute value is within a range							
IS NULL	Checks whether an attribute value is null							
LIKE	Checks whether an attribute value matches a given string pattern							
IN	Checks whether an attribute value matches any value within a value list							
EXISTS	Checks whether a subquery returns any rows							
DISTINCT	Limits values to unique values							
Aggregate functions	Used with SELECT to return mathematical summaries on columns							
COUNT	Returns the number of rows with non-null values for a given column							
MIN	Returns the minimum attribute value found in a given column							
MAX	Returns the maximum attribute value found in a given column							
SUM	Returns the sum of all values for a given column							
AVG	Returns the average of all values for a given column							

Some Common SQL DML Commands

COP 4710: Database Systems (Chapter 5)



Insert Command

- SQL requires the use of the INSERT command to enter data into a table.
- While there are several different variations of the INSERT command, the syntax for the most common form is: INSERT INTO tablename VALUES

(value1, value2, . . . ,valueN);

- The restrictions on the INSERT command are as follows:
 - Character string and date value must be entered between apostrophes (').
 - Numerical data is not enclosed in apostrophes.
 - Attribute entries are separated by commas.
 - A value is required for each column in the table. Null and default values are still separated by commas.
 - Explicit null values are entered as NULL.
- Example:

INSERT INTO PRODUCT VALUES ('BRT-345", 'Titanium drill bit','2013-10-03',75, 10, 4.50,0.006, NULL);

COP 4710: Database Systems (Chapter 5)





D	MySQL Workbench	- 🗆 🗙
Local instance MySQL56 ×		
<u>File Edit View Query Databas</u>	se <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	ORACLE'
		0
Navigator	SQLAdditions	
SCHEMAS 🕺 🕺	🗀 🖬 🗲 🛣 🕲 🔀 🖽 📀 🛞 🗃 🕩 🔍 🕦 🖃	🖕 🔿 Jump to 🔹
Q Filter objects	1 • insert into product values ('BRT-345', 'Titanium drill bit','2013-10-03',75,10,4.50,0.06,NULL);	No Context Help
► test ∧ ▼ endors ▼ Tables ↓ customer	< >	Context Help Snippets
 Columns Indexes Foreign Keys Triagers 	Output Output Image: Action Output	ert command
emp	Time Action Message	0.021 app
employee	1000 13.13.34 INSERT INTO EMPLOTEE VALUES(100, Wr., Williams, Robert, D., 15 Trow(s) affected	0.031 sec
V line	109/ 13:13:34 INSERT INTO EMPLOYEE VALUES(100, Mis., Similar , Jeanine, K, 15 How(s) affected	0.052 sec
Columns	1089 13:19:34 INSERT INTO EMPLOYEE VALUES(108 'Mr ' 'Wiesenbach' 'Paul' 'B' ' 1 mw(s) affected	0.031 sec
► ♦ INV_NUMBE	1090 13:19:34 INSERT INTO EMPLOYEE VALUES(109 'Mr.' 'Smith' 'George' 'K' '19 1 row(s) affected	0.047 sec
► ◆ P_CODE	1091 13:19:35 INSERT INTO EMPLOYEE VALUES(110 'Mrs.' Genkazi' 'I eighta' W' '1 1 row(s) affected	0.047 sec
► ♦ LINE_UNITS	1092 13:19:35 INSERT INTO EMPLOYEE VALUES(111 'Wr' 'Washington' 'Bunett' 'F' ' 1 row(s) affected	0.047 sec
< >	1093 13:19:35 INSERT INTO EMPLOYEE VALUES(112 'Wr' 'Johnson' 'E' '1. 1 row(s) affected	0.015 sec
Management Schemas	1094 13:19:35 INSERT INTO EMPLOYEE VALUES(113.'Ms.'.'Smythe''Melanie'.'P'.'1 1 row(s) affected	0.031 sec
Information	1095 13:19:35 INSERT INTO EMPLOYEE VALUES(114, 'Ms.', 'Brandon', 'Marie', 'G', '1 1 row(s) affected	0.031 sec
Schema: vendors	1096 13:19:35 INSERT INTO EMPLOYEE VALUES(115, 'Mrs.', 'Saranda', 'Hermine', 'R', ' 1 row(s) affected	0.015 sec
	O 1097 13:19:35 INSERT INTO EMPLOYEE VALUES(116,'Mr.', 'Smith' ,'George', 'A', '19 1 row(s) affected	0.031 sec
	⊘ 1098 13:19:35 COMMIT 0 row(s) affected	0.016 sec
	⊘ 1099 17:26:37 SELECT * from product LIMIT 0, 1000 16 row(s) returned	0.000 sec / 0.000 sec
		0.000 sec / 0.000 sec
	1101 17:30:12 insert into product values ('BRT-345', 'Titanium drill bit','2013-10-03',75,10, 1 row(s) affected	0.047 sec
Object Info Session		~

D				MySQ	L Workbe	nch					- 🗆	x
A Local instance MySQL56 ×												
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	se <u>S</u> erver <u>T</u> o	ols <u>S</u> cripting <u>H</u> elp									ORA	CLE"
	0										0	
Navigator	Query 1 \times S	QL File 3* SQL File	4* SQLI	File 5* SQ	L File 6*	chapter5scrip	t			SQLAdditions :		
SCHEMAS ** * 📄 🗟 🗲 🛣 💿 🔀 🖽 📀 💿 🔞 ! 🕩 🔍 🕦 🖃										🖕 👳 🛛 Jump	to 🔹	
Q Filter objects 1 SELECT * from product No Context Help												
▶	3	ILKE F_INDATE 2	, 10-01-01 ,									
Tables	<								>			
▼ □ customer	Result Set Filter		•	Edit: 🔏 🖶 🖡	Evport/In	nort 🗈 🖶	Wran Cell Content	Ā				
► market Indexes												
Foreign Keys	▶ 89-WRE-Q	Hicut chain saw. 16 in	2013-02-07	11	5	256.99	0.05	24288				
emp	BRT-345	Titanium drill bit	2013-10-03	75	10	4.50	0.06	NULL				
employee	* NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL				
V line												
Columns												
► ♦ LINE_NUMBE							_					
P_CODE			Aftor of	ot chou	wing th		tod					
► ♦ LINE_PRICE ▼		· · · · · · · · · · · · · · · · · · ·	Drodu	lot show	wing ti	ho now						
< >			FIUUU	incort	od rov		ly					
Management Schemas				IIISEII	eu iov	v.						
Information	product 9 ×							Apply 0	ancel	Context Help	Snippets	
Junema, venuors	Output sessesses											
	Time	Action				Mere					Duration / Fetch	^
	1087 13:19:	34 INSERT INTO EMPL	OYEE VALUES	(106, 'Mrs.', 'Smith	n' "'Jeanine'	,'K' ,'19 1 row	r(s) affected				0.032 sec	
	1088 13:19:34 INSERT INTO EMPLOYEE VALUES(107,'Mr.', 'Diante', 'Jorge', 'D', '197 1 row(s) affected									0.016 sec		
Object Info Session	1089 13:19:	34 INSERT INTO EMPL	OYEE VALUES	(108, 'Mr.', 'Wies	enbach','Paul	.'R'.' 1 row	(s) affected				0.031 sec	~
COP 4710: Dat	tabase S	ystems (Cl	hapter	5)	Pa	ge 46		Dr. Mark	Llew	ellyn ©		2

Delete Statement

- Removes rows from a table.
- Syntax:

DELETE FROM tablename [WHERE conditionlist];

- To delete all rows in a table, simply provide no WHERE clause.
- To delete only certain rows in a table, provide a WHERE clause.
- The following few slides illustrate some of the variations of the DELETE command.

COP 4710: Database Systems (Chapter 5)



N				My	SQL Work	bench					- 🗆 🗙	
Local instance MySQL56 ×												
File Edit View Query Database Server Tools Scripting Help										ORACLE"		
Initial Product table instance										0		
Navigator SQL File 4* SQL File 5* SQL File 6* chapter5script-version2 SQL												
SCHEMAS * * * 📋 🔚 🗲 🛣 🔕 👘 🚳 🕮 📀 🚳 🗐 🗹 🔍 🕦 🖃									🔄 👳 SELECT	•		
Q Filter objects		1 • sel	<pre>ect * from product;</pre>							Topic: SELECT		
bikedb												
mailinglist	`									Syntax: SELECT		
project3	Resu	It Set Filter:		🔥 🛛 Edit: 🖆 誌 🛛 Export/Import: 🏭 🌇 🛛 Wrap Cell Content: 🏗						ALL DISTINCT DISTINCTROV [HIGH PRIORITY]		
project4 test		P_CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE	[STRAIGHT_JOIN]	T] [SOL BTC	
vendors	•	11QER/31	Power painter, 15 psi., 3-nozzle	2011-11-03	8	5	109.99	0.00	25595	RESULT]		
		13-Q2/P2	7.25-in. pwr. saw blade	2011-12-13	32	15	14.99	0.05	21344	select_expr [, select_expr	lect_expr	
		14-Q1/L3	9.00-in. pwr. saw blade	2011-11-16	18	12	17.49	0.00	21344	[FROM table_refere [PARTITION parti	nces ition_list]	
		1546-QQ2	Hrd. cloth, 1/4-in., 2x50	2012-01-15	15	8	39.95	0.00	23119	[WHERE where_condi [GROUP BY {col nam	.tion] me expr	
		1558-QW1	Hrd. cloth, 1/2-in., 3x50	2012-01-15	23	5	43.99	0.00	23119	[ASC DESC], [WITH ROI [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE_procedure_name(arc	WITH ROL	
		2232/QTY	B&D jigsaw, 12-in. blade	2011-11-03	8	5	109.92	0.05	24288		ie expr	
		2232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288		.j row_count	
		2238/QPD	B&D cordless drill, 1/2-in.	2012-01-20	12	5	38.95	0.05	25595		ure name(are	
		23109-HB	Claw hammer	2012-01-20	23	10	9.95	0.10	21225	[INTO OUTFILE 'fil	le_name'	
		23114-AA	Sledge hammer, 12 lb.	2012-01-02	8	5	14.40	0.05	NOLL	export_options	;	
		54778-2T	Rat-tail file, 1/8-in. fine	2011-01-15	43	20	4.99	0.00	21344	INTO DUMPFILE INTO var_name	'file_name' [, var_name	
Management Schemas		89-WRE-Q	Hicut chain saw, 16 in.	2013-02-07	11	5	256.99	0.05	24288	[FOR UPDATE LOCK	IN SHARE N	
Information		PVC23DRT	PVC pipe, 3.5-in., 8-ft	2012-02-20	188	75	5.87	0.00	NOLL	SELECT is used to retriev	re rows seled	
No object selected		SM-18277	1.25-in. metal screw, 25	2012-03-01	172	75	6.99	0.00	21225	tables, and can include UN UNION, and Online help s	VION stateme	
		SW-23116	2.5-in. wd. screw, 50	2012-02-24	237	100	8.45	0.00	21231	The most commonly use	d clauses of	
	L	WR3/TT3	Steel matting, 4x8x1/6", .5"	2012-01-17	18	5	119.95	0.10	25595	these:		
	*											
	product 14 × Apply Cancel							Cancel	Context Help Snippets	ndicates a co		
	Out	tput seeseeseesee										
Object Info Session	đ	Action Output	•									
										1		

Page 48

D	MySQL Workbench -								
Local instance MySQL56 ×									
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp								
Delete command with a condition									
Navigator	* SQL File 4* SQL File 5* SQL File 6* chapter5script-version2 SQL File 9* SQL File 10* × SQL File 11* 🔹 🌾	SQLAdditions							
SCHEMAS 🛪 🕸	🖮 🖬 🗲 ዥ 👰 🔘 🔀 🖽 🥥 🚳 🕖 🔍 🕦 🖃	🗢 🔿 Jump to 👻							
Q Filter objects	1 • delete from product	No Context Help							
▶ 📄 bikedb	<pre>2 where p_code = "1558-QW1";</pre>								
colorsurvey mailinglist		Context Hole Coincide							
project3		Context Help Shippets							
project4	Output								
vendors	Action Output -								
	Time Action Message	Duration / Fetch							
	2573 14:15:18 INSERT INTO EMPLOTEE VALUES(105, Mis., Smith , Jeanine, K, T., Trow(s) affected	0.031 sec							
	2574 14:15:15 INSERT INTO EMPLOTEE VALUES(107, Mr., Diante, Jorge, D., 15 Trow(s) allected	0.047 app							
	2575 14:19:19 INSERT INTO EMPLOTEE VALUES(100, Mr., Wiesenbach, Fault, R., How(s) alleded	0.047 sec							
	2576 14:19:19 INSERT INTO EMPLOTEE VALUES(100, Mr., Smith , Geolge , K, T Trow(s) alreaded	0.021 sec							
	2577 14:19:19 INSERT INTO EMPLOYEE VALUES(111 'Mr.' 'Washington' 'Runet' 'F' 1 row(s) affected	0.031 sec							
	2579 14:19:19 INSERT INTO EMPLOYEE VALUES(112 'Mr.' 'Johnson' 'Edward' 'E' ' 1 mw(s) affected	0.031 sec							
	2580 14:19:19 INSERT INTO EMPLOYEE VALUES(113 'Ms.' 'Smythe' 'Melanie' 'P'.' 1 row(s) affected	0.031 sec							
	2581 14:19:19 INSERT INTO EMPLOYEE VALUES(114.'Ms.', 'Brandon', .'Marie', 'G', '1, 1 row(s) affected	0.031 sec							
	2582 14:19:19 INSERT INTO EMPLOYEE VALUES(115, 'Mrs.', 'Saranda', 'Hermine', 'R',, 1 row(s) affected	0.031 sec							
Management Schemas	2583 14:19:19 INSERT INTO EMPLOYEE VALUES(116, 'Mr.', 'Smith', 'George', 'A', '1 1 row(s) affected	0.031 sec							
Information	⊘ 2584 14:19:19 COMMIT 0 row(s) affected	0.000 sec							
No object selected	2585 14:23:12 select * from line LIMIT 0, 1000 18 row(s) returned	0.000 sec / 0.000 sec							
	⊘ 2586 14:23:52 select * from invoice LIMIT 0, 1000 8 row(s) returned	0.000 sec / 0.000 sec							
	⊘ 2587 14:24:36 delete from invoice where inv_number=1008 1 row(s) affected	0.031 sec							
	⊘ 2588 14:25:23 select * from invoice LIMIT 0, 1000 7 row(s) returned	0.000 sec / 0.000 sec							
		0.000 sec / 0.000 sec							
	© 2590 14:36:39 select * from product LIMIT 0, 1000 16 row(s) returned	0.000 sec / 0.000 sec							
Object to fee Occa i	2591 15:08:55 delete from product where p_code = "1558-QW1" 1 row(s) affected	0.047 sec							
Object Info Session		v							

\mathcal{D}				MySC	QL Workbei	nch				-	
Local instance MySQL56 ×											
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	se	<u>S</u> erver <u>T</u> ool	s <u>S</u> cripting <u>H</u> elp							0	RACLE"
	Ċ	1					F	Product tal	ble afte	r deletion	
avigator SQL File 4* SQL File 5* SQL File 6* chapter5script-version2 SQL Note row containing P_CODE = 1558-										000000000	
SCHEMAS 📲 🆘	C	🛛 🗔 🗲 🙍	7 👰 🕐 🔀 🖽 ⊘ 😣 🤅	i 🖉 🖉 🛐	F) (F)			QW	1 is gor	ne.	
Q Filter objects		1 • sel	<pre>ect * from product;</pre>							No Context Heip	
bikedb	<								>		
mailinglist	Resu	lt Set Filter:	😯 Edit: 🖾 誌 Export/Import: 🏣 🐻					ntent 🚹			
project4		P_CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE		
▶ 📄 test	•	11QER/31	Power painter, 15 psi., 3-nozzle	2011-11-03	8	5	109.99	0.00	25595		
Vendors		13-Q2/P2	7.25-in. pwr. saw blade	2011-12-13	32	15	14.99	0.05	21344		
		14-Q1/L3	9.00-in. pwr. saw blade	2011-11-16	18	12	17.49	0.00	21344		
		1546-QQ2	Hrd. cloth, 1/4-in., 2x50	2012-01-15	15	8	39.95	0.00	23119		
		2232/QTY	B&D jigsaw, 12-in. blade	2011-11-03	8	5	109.92	0.05	24288		
		2232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288		
		2238/QPD	B&D cordless drill, 1/2-in.	2012-01-20	12	5	38.95	0.05	25595		
		23109-HB	Claw hammer	2012-01-20	23	10	9.95	0.10	21225		
		23114-AA	Sledge hammer, 12 lb.	2012-01-02	8	5	14.40	0.05	NULL		
		54778-2T	Rat-tail file, 1/8-in. fine	2011-01-15	43	20	4.99	0.00	21344		
		89-WRE-Q	Hicut chain saw, 16 in.	2013-02-07	11	5	256.99	0.05	24288		
Manager Change		PVC23DRT	PVC pipe, 3.5-in., 8-ft	2012-02-20	188	75	5.87	0.00	NULL		
Management Schemas		SM-18277	1.25-in. metal screw, 25	2012-03-01	172	75	6.99	0.00	21225		
Information		SW-23116	2.5-in. wd. screw, 50	2012-02-24	237	100	8.45	0.00	21231		
No object selected		WR3/TT3	Steel matting, 4'x8'x1/6", .5" mesh	2012-01-17	18	5	119.95	0.10	25595		
	*	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL		
	<								>		
	рго	duct 15 ×						Apply	Cancel	Context Help Snippets	
	Ou	tput :::::::::::::::::::::::::::::::::::									
	đ	Action Output	•								
Object Info Session		Time	Action			м				Duration / Est	rh 🔺
COP 4710: Dat	ab	ase Sv	stems (Chapter	r 5)	Pa	ge 50		Dr. Mai	'k Llew	ellyn ©	
		- /		,							

D				My	SQL Work	bench				- 🗆 🗙
Local instance MySQL56 >	ĸ									
Eile Edit View Query Database Server Iools Scripting Help Table P initial instance (Table D is a computed table Dree										
(Iable P Is a copy of table Product but It										
										(See next slide.)
Q Filter objects			ſ 🔍 Ŭ 100 ⊞ 10 Ŭ	10 10 10	11 🖻					
▶		i • select • from p;						¥	Topic: DELETE	
 colorsurvey mailinglist 	Resu	ılt Set Filter:		🚷 Edit 🔏	💼 🔜 Expo	rt/Import 🏢	Wrap Cell	Content 1		Syntax: DELETE is a DML statement that removes rows from a table.
project3		P_CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE	Single-table syntax:
<pre>project4 test</pre>	۱.	11QER/31	Power painter, 15 psi., 3-nozzle	2011-11-03	8	5	109.99	0.00	25595	DELETE FLOW DETERTAL FOUTOR!
vendors		13-Q2/P2	7.25-in. pwr. saw blade	2011-12-13	32	15	14.99	0.05	21344	DELETE [LOW_PRIORITY] [QUICK] [IGNORE] FROM tbl_name [PARTITION (partition_name,)]
		14-Q1/L3	9.00-in. pwr. saw blade	2011-11-16	18	12	17.49	0.00	21344	
		1546-QQ2	Hrd. cloth, 1/4-in., 2x50	2012-01-15	15	8	39.95	0.00	23119	[WHERE where_condition]
		1558-QW1	Hrd. cloth, 1/2-in., 3x50	2012-01-15	23	5	43.99	0.00	23119	[LIMIT row_count]
		2232/QTY	B&D jigsaw, 12-in. blade	2011-11-03	8	5	109.92	0.05	24288	The DELETE statement deletes rows
		2232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288	from tbl_name and returns the
		2238/QPD	B&D cordless drill, 1/2-in.	2012-01-20	12	5	38.95	0.05	25595	the number of deleted rows, ro check
		23109-HB	Claw hammer	2012-01-20	23	10	9.95	0.10	21225	ROW_COUNT() function described in Online help information-functions.
		23114-AA	Sledge hammer, 12 lb.	2012-01-02	8	5	14.40	0.05	NULL	Main Clauses
		54778-2T	Rat-tail file, 1/8-in. fine	2011-01-15	43	20	4.99	0.00	21344	The conditions in the optional
Management Schemas		89-WRE-Q	Hicut chain saw, 16 in.	2013-02-07	11	5	256.99	0.05	24288	WHERE clause identify which rows to
Information		PVC23DRT	PVC pipe, 3.5-in., 8-ft	2012-02-20	188	75	5.87	0.00	NULL	rows are deleted.
No object selected		SM-18277	1.25-in. metal screw, 25	2012-03-01	172	75	6.99	0.00	21225	where_condition is an expression
		SW-23116	2.5-in. wd. screw, 50	2012-02-24	237	100	8.45	0.00	21231	that evaluates to true for each row to be deleted. It is specified as
		WR3/TT3	Steel matting, 4'x8'x1/6", .5"	2012-01-17	18	5	119.95	0.10	25595	described in Online help select .
	*	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	If the ORDER BY clause is specified, the rows are deleted in the order
	pro	duct 14 ×						Apply	Cancel	Context Help Snippets
	Ou	tput								
Object Info Session	Ū	Action Output	•							
Query Completed										E,
		-	(0)	-		_				

2	MySQL Workbench	<mark>_ </mark>
Local instance MySQL56 ×		
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	Table D definition
Navigator	SQL File 4* SQL File 5* SQL File 6* chapter5script-version2 × SQL File 9*	SQL File 10* SQL File 11* 🚺 🔹 SQL Additions
SCHEMAS 📲 🏵	🗀 🖬 🗲 ዥ 👰 🔘 🔀 🖽 🥥 💿 🐻 🕑 🔍 🕦 🖃	🗢 🔿 DELETE 🗸
 Filter objects bikedb colorsurvey mailinglist project3 project4 test vendors 	<pre>27 • CREATE TABLE P (28 29 29 30 30 31 32 32 33 34 34 35 35 36 37 38 • CREATE TABLE VENDOR (39 40 41 41 42 44 44 44 45 45 46 47 46 47 46 47 47 47 47 47 47 47 47 47 47</pre>	<pre>^ Topic: DELETE Syntax: DELETE is a DML statement that removes rows from a table. Single-table syntax: DELETE [LOW_PRIORITY] [QUICK] [IGNORE] FROM tbl_name [PARTITION (partition_name,)] [WHERE where_condition] [ORDER BY] [LIMIT row_count] The DELETE statement deletes rows from tbl_name and returns the number of deleted rows. To check the number of deleted rows, call the</pre>
Management Schemas Information No object selected	<pre>45 V_ORDER CHAR(1) NOT NULL, PRIMARY KEY (V_CODE)); 47 48 49 • CREATE TABLE PRODUCT (50 P_CODE VARCHAR(10) PRIMARY KEY, 51 P_DESCRIPT VARCHAR(35) NOT NULL, 52 P_INDATE DATE NOT NULL, 53 P_QOH INT NOT NULL, 54 P_MIN INT NOT NULL, 55 P_PRICE DECIMAL(8,2) NOT NULL, 56 P_DISCOUNT DECIMAL(5,2) NOT NULL, 57 V_CODE INT, 58 FOREIGN KEY (V_CODE) REFERENCES VENDOR (V_CODE) ON UPDATE CO 59 Cutput</pre>	CASCADE); CASCADE); CASCADE); CASCADE); CASCADE); ROW_COUNT() function described in Online help information-functions Main Clauses The conditions in the optional WHERE clause identify which rows to delete. With no WHERE clause, all rows are deleted. Where_condition is an expression that evaluates to true for each row to be deleted. It is specified as described in Online help select. If the ORDER BY clause is specified, the rows are deleted in the order that is specified. The LIMIT clause Context Help Snippets
Object Info Session	T Action Output	
Query Completed		

Page 52

D	MySQL Workbench								
A Local instance MySQL56 ×									
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp								
Navigator	SQL File 4* SQL File 5* SQL File 6* chapter5script-version2	SQL File 9* SQL File 10* × SQL File 11* 🜗 🔶	SQLAdditions						
SCHEMAS 🕺 🕺	🗀 🖬 🗲 🛣 👰 🔘 🔀 🖽 🕥 🚳 🗐 🛫 🍳 🕦 🖃		🗢 🔿 DELETE 🔹						
Q Filter objects	<pre>1 • set sql_safe_updates=0;</pre>								
▶ 📄 bikedb	2 • delete from p;								
colorsurvey mailinglist	<	>	Context Help Snippets						
project3	Output								
project4 test	Action Output								
vendors	Time Action	Message	Duration / Fetch						
	2954 16:29:51 INSERT INTO EMPLOYEE VALUES(103,'Ms.','Jones', 'Anne'	,'M' ,'1 1 row(s) affected	0.063 sec						
	2955 16:29:51 INSERT INTO EMPLOYEE VALUES(104,'Mr.', 'Lange', 'John'	,'P','19 1 row(s) affected	0.141 sec						
	2956 16:29:51 INSERT INTO EMPLOYEE VALUES(105, Mr.', Williams', 'Robert	,'D' ,'1 1 row(s) affected	0.047 sec						
	2957 16:29:51 INSERT INTO EMPLOYEE VALUES(106, Mrs. ', Smith' , Jeanin	', 'K', '1 1 row(s) affected	0.031 sec						
	2958 16:29:51 INSERT INTO EMPLOYEE VALUES(107, 'Mr.', 'Diante', 'Jorge'	,'D' ,'19 1 row(s) affected	0.031 sec						
	2959 16:29:51 INSERT INTO EMPLOYEE VALUES(108, 'Mr.', 'Wiesenbach', 'Paulon', 'Wiesenbach', 'Wiesenbach', 'Paulon', 'Wiesenbach', 'Wiesenbach', 'Paulon', 'Wiesenbach', 'Wiesenbach', 'Paulon', 'Wiesenbach', 'Wiesenbach', 'Paulon', 'Wiesenbach', 'Paulon', 'Wiesenbach', 'Wiesenbach', 'Wiesenbach', 'Paulon', 'Wiesenbach', 'Wiesenbach', 'Wiesenbach', 'Paulon', 'Wiesenbach', 'Wiesenbach', 'Paulon', 'Wiesenbach', 'Wiesen	I', 'R', 1 row(s) affected	0.032 sec						
	2960 16:29:51 INSERT INTO EMPLOYEE VALUES(109, 'Mr.', 'Smith', 'George	,'K', '1 1 row(s) affected	0.015 sec						
	2961 16:29:51 INSERT INTO EMPLOYEE VALUES(110, 'Mrs.', 'Genkazi', 'Leight')	a','W' ,' 1 row(s) affected	0.031 sec						
Management Schemas	2962 16:29:51 INSERT INTO EMPLOYEE VALUES(111, Mr.', Washington', Rup	ert', 'E', 1 row(s) affected	0.031 sec						
Information	2963 16:29:52 INSERT INTO EMPLOYEE VALUES(112, 'Mr.', 'Johnson', 'Edward')	d', 'E', ' 1 row(s) affected	0.016 sec						
No object selected	2964 16:29:52 INSERT INTO EMPLOYEE VALUES(113, 'Ms.', 'Smythe', 'Melar	ie','P' ,' 1 row(s) affected	0.031 sec						
	2965 16:29:52 INSERT INTO EMPLOYEE VALUES(114, 'Ms.', 'Brandon', 'Marie	','G','1 1 row(s) affected	0.047 sec						
	2966 16:29:52 INSERT INTO EMPLOYEE VALUES(115, 'Mrs.', 'Saranda', 'Hem'	ne','R', 1 row(s) affected	0.078 sec						
	2967 16:29:52 INSERT INTO EMPLOYEE VALUES(116, 'Mr.', 'Smith', 'George George 16:29:52 INSERT INTO EMPLOYEE VALUES(116, 'Mr.', 'Smith', 'George	('A', '1 1 row(s) affected	0.032 sec						
	O 2968 16:29:52 COMMIT	U row(s) affected	0.000 sec						
	2353 16:30:05 set sql safe updates=0	U row(s) affected	0.000 sec						
Object Info Session	23/0 10:30:00 delete from p	16 row(s) arrected	U.U32 Sec						
Query Completed			E.,						

Page 53



	MySQL Workbench ·								
A Local instance MySQL56 ×									
<u>File E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	se <u>Server Tools Scripting Help</u>		l against table D	FLS"					
Navigator	SQL File 4* SQL File 5* SQL File 6* chapter5script-version2 SQL File 9* SQL File 10* × SQL File	11* 🔹 🔶	SQLAdditions						
SCHEMAS 📲 🏶	🗀 🖬 🗲 🕂 👰 🔘 🔀 🖽 ⊘ 😂 🝠 🔍 🕦 🖃		🗢 🔿 DELETE 🔹						
Q Filter objects	<pre>1 • set sql_safe_updates=0;</pre>		Topic: DELETE	^					
bikedb	2 • delete from p;								
colorsurvey mailinglist	<	>	Context Help Snippets	n+					
project3	Output								
project4 test	Action Output ▼			_					
vendors	Time Action Message		Duration / Fetch	^					
	2954 16:29:51 INSERT INTO EMPLOYEE VALUES(103, 'Ms.', 'Jones', 'Anne', 'M', '1 1 row(s) affected		0.063 sec						
	2955 16:29:51 INSERT INTO EMPLOYEE VALUES(104, 'Mr.', 'Lange', 'John', 'P', '19 1 row(s) affected		0.141 sec						
	2956 16:29:51 INSERT INTO EMPLOYEE VALUES(105, 'Mr.', 'Williams', 'Robert', 'D', '1 1 row(s) affected		0.047 sec						
	2957 16:29:51 INSERT INTO EMPLOYEE VALUES(106, 'Mrs.', 'Smith', 'Jeanine', 'K', '1 1 row(s) affected		0.031 sec						
	2958 16:29:51 INSERT INTO EMPLOYEE VALUES(107, 'Mr.', 'Diante', 'Jorge', 'D', '19 1 row(s) affected		0.031 sec						
	2959 16:29:51 INSERT INTO EMPLOYEE VALUES(108, 'Mr.', 'Wiesenbach', 'Paul', 'R', 1 row(s) affected		0.032 sec						
	2960 16:29:51 INSERT INTO EMPLOYEE VALUES(109, 'Mr.', 'Smith', 'George', 'K', '1 1 row(s) affected		0.015 sec						
	2961 16:29:51 INSERT INTO EMPLOYEE VALUES(110, 'Mrs.', 'Genkazi', 'Leighla', W', ' 1 row(s) affected		0.031 sec	_					
Management Schemas	2962 16:29:51 INSERT INTO EMPLOYEE VALUES(111, 'Mr.', 'Washington', 'Rupert', 'E', 1 row(s) affected		0.031 sec						
Information	2963 16:29:52 INSERT INTO EMPLOYEE VALUES(112,'Mr.','Johnson', 'Edward','E',' 1 row(s) affected		0.016 sec	_					
No object selected	2964 16:29:52 INSERT INTO EMPLOYEE VALUES(113;Ms.', Smythe', , Melanie', P',, 1 row(s) affected		0.031 sec						
	2955 16:29:52 INSERTINTO EMPLOYEE VALUES(114, Ms.', Brandon', Mane', G., T Trow(s) affected		0.04/sec	_					
	2900 10:25:02 INSERTINTO EMPLOTE: VALUES(110; Mis., Saranda, Hermine, K., Trow(s) affected		0.078 sec						
	2962 16:29:52 COMMIT Draw(s) affected		0.002 sec	_					
	2909 16:20:05 set on safe undates=0		0.000 sec						
	2970 16:30:05 delete from p 16 row(s) affected		0.032 sec						
Object Info Session			0.002.000	v					
Query Completed									

Page 54

		MySQL Workbench		- • ×		
A Local instance MySQL56 ×						
<u>File E</u> dit <u>Vi</u> ew <u>Q</u> uery <u>D</u> atabas	se <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	After shot of P table. No	ote all rows have bee	en deleted.		
				0		
Navigator	SQL File 4* SQL File 5* SQL File 6* chapte	er5script-version2 SQL File 9* SQL File 10*	SQL File 11° 🗙 🚺 🛊 SQLAddi	tions		
SCHEMAS 🔐 🗞	🖿 🖶 🗲 ዥ 👰 🕐 🔀 🖽 ⊘ 😂 😒 🧕	é 🔍 🕦 🖃	ф . Ф	DELETE -		
 Q Filter objects ▶	1 • select * from p; 2		Торіс	: DELETE		
colorsurvey			Syntax:	DELETE is a DML statement		
project3	<		Singled	table system		
▶ 📄 project4	Result Set Filter: 🛛 🚷 Edit	t 🖆 🔜 📪 Export/Import. 🏣 🔯 Wrap Cell Content		lable Syntax.		
 test vendors 	P_CODE P_DESCRIPT P_INDATE P	_QOH P_MIN P_PRICE P_DISCOUNT	V_CODE NULL DELETE IGNORE] [PA (partit [W] [OR [LI The DE	[LOW_PRIORITY] [QUICK] [FROM tbl_name RTITION tion_name,)] HERE where_condition] RDER BY] (MIT row_count] LETE statement deletes rows		
Management Schemas			number	of deleted rows. To check		
Information			ROW_C	COUNT() function described in		
No object selected			<u>Unine</u>	neip information-functions .		
			Main Ci	duses		
	p 15 x		Apply Cancel Context	Help Snippets		
	Output					
Object Info Session	Action Output					
Query Completed				E		
COP 4710: Dat	abase Systems (Chapter 5)	Page 55	Dr. Mark Llewellyn	©		

Update Statement

- Modifies data in existing rows of a table.
- General syntax is:

```
UPDATE tablename
SET columnname = expression
   [,columnname = expression]
WHERE conditionlist;
```

- Without a WHERE clause, the update is applied to all rows of a table.
- The following few slides illustrate the UPDATE command.



Extent instance MySQL82 X Bit Verw Levity Detakers Server Kold Scripting Help Defore should of PRODUCT table Windput Sold File Y So	Ν				М	lySQL Work	bench				- 🗆 🗙
Bit for Query Database Sout File 5 Sout F	Local instance MySQL56 ×										
Deficite Strot of PRODUCT Table Deficite Strot of PRODUCT Table Schman Solf list Solf list <ths< td=""><td><u>F</u>ile <u>E</u>dit <u>V</u>iew <u>Q</u>uery <u>D</u>atabas</td><td>se <u>S</u></td><td>erver <u>T</u>ool</td><td>s <u>S</u>cripting <u>H</u>elp</td><td></td><td></td><td>ſ</td><td></td><td>fara aha</td><td></td><td></td></ths<>	<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>Q</u> uery <u>D</u> atabas	se <u>S</u>	erver <u>T</u> ool	s <u>S</u> cripting <u>H</u> elp			ſ		fara aha		
Number SQL File 5' SQL File 5' SQL File 5' SQL File 5' SQL File 10' SQL File								Be	etore sho	t of PROL	
Management Sciences Management <th>Navigator SCHEMAS n[#] ↔ Q Filter objects > bikedb > colorsurvey</th> <th>SQL</th> <th>File 4* 5</th> <th>SQL File 5* SQL File 6*</th> <th>chapter5scr</th> <th>ript-version2</th> <th>SQL File</th> <th>9* SQL Fi</th> <th>le 10* SQL Fi</th> <th>le 11° × 🔹 🔪</th> <th>SQLAdditions</th>	Navigator SCHEMAS n [#] ↔ Q Filter objects > bikedb > colorsurvey	SQL	File 4* 5	SQL File 5* SQL File 6*	chapter5scr	ript-version2	SQL File	9* SQL Fi	le 10* SQL Fi	le 11° × 🔹 🔪	SQLAdditions
Project3	▶ ■ mailinglist	Result	Set Filter:		🚯 Edit: 🔏	Exp	ort/Import	Wrap Ce	Content		SELECT
Interf	 project3 project4 		P_CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE	DISTINCTROW]
Imagement Schemas 1302/P2 725m, park saw blade 2011-12:13 32 15 14.39 0.05 21344 140/1/3 9.00m, park saw blade 2011-11:6 18 12 17.49 0.00 21344 154G002 Hd. doth, 1/4m, 2x50 201201:15 15 8 39.995 0.00 2119 1556Q02 Hd. doth, 1/4m, 2x50 201201:15 15 8 39.995 0.00 2119 1556Q02 Hd. doth, 1/4m, 2x50 201201:15 15 8 39.995 0.00 2119 1556Q02 Hd. doth, 1/4m, 2x50 201201:15 25 5 43.99 0.00 2119 12222/QTY B&D jgsaw, 8m blade 2011-12:24 6 5 99.87 0.05 24288 2309-HB Caw harmer 201201:0 12 5 34.40 0.5 2014 123114A Sedge harmer, 12b. 201201:0 23 10 9.95 0.10 21225 1444 Sedmas No object selected Simmark (16m, 20120-127 15 26.99 0.00 21244	▶ 🗎 test	F	11QER/31	Power painter, 15 psi., 3-nozzle	2011-11-03	8	5	109.99	0.00	25595	[HIGH_PRIORITY] [STRAIGHT_JOIN]
Management Schemas [14/1/1.3] [14/1/3] [14/1/3] [14/1/3] [15/1/2000_806] [15	►		13-Q2/P2	7.25-in. pwr. saw blade	2011-12-13	32	15	14.99	0.05	21344	[SQL_SMALL_RESULT] [SQL_ BIG_RESULT] [SQL_BUFFER_RESULT]
Management Schemas 1546-Q02 Hd. dok, 1/4m, 2x50 2012/01-15 15 8 39.95 0.00 23119			14-Q1/L3	9.00-in. pwr. saw blade	2011-11-16	18	12	17.49	0.00	21344	[SQL_CACHE SQL_NO_CACHE] [SQL_CALC_FOUND_ROWS]
Management: Schemas Schemas <td></td> <td></td> <td>1546-QQ2</td> <td>Hrd. cloth, 1/4-in., 2x50</td> <td>2012-01-15</td> <td>15</td> <td>8</td> <td>39.95</td> <td>0.00</td> <td>23119</td> <td><pre>select_expr [, select_expr]</pre></td>			1546-QQ2	Hrd. cloth, 1/4-in., 2x50	2012-01-15	15	8	39.95	0.00	23119	<pre>select_expr [, select_expr]</pre>
Management Schemas [2232/QTY B&D jgsaw, 9n. blade 2011-11-03 8 5 109.92 0.05 24288 partition_list) Management Schemas 2233/QPD B&D ordess dil, 1/2in. 2012-01-20 12 5 38.95 0.05 24288 partition_list) Management Schemas 23109-HB Claw hammer 2012-01-20 12 5 38.95 0.05 24288 partition_list) Management Schemas 23109-HB Claw hammer 2012-01-20 12 5 38.95 0.05 24288 partition_list) Management Schemas Schemas Schemas 10 9.95 114.40 0.05 000 21244 No object selected WR3/TT3 Schemas Schemas 10 5 5.87 0.00 21225 Schemas 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.005.87 100.00			1558-QW1	Hrd. cloth, 1/2-in., 3x50	2012-01-15	23	5	43.99	0.00	23119	[FROM table_references
2232/QWE B&D jgsaw, 8in. blade 2011-12-24 6 5 99.87 0.05 24288 [[GOUR] condition] 2380/QPD B&D condess dill, 1/24n. 2012-01-20 12 5 38.95 0.05 25595 [[GOUR] condess dill, 1/24n. 2012-01-20 23 10 9.955 0.10 21225 2310-HB Caw hammer 2012-01-20 23 10 9.955 0.10 21225 23114-AA Sledge hammer, 12.b. 2012-01-02 8 5 14.40 0.05 Image: condition] [GOUR] eyr (col_name expr [row: cont [ASI DES:],] [LITH 11.11/24n. Selege hammer, 12.b. 2012-01-02 8 5 14.40 0.05 Image: condition] [row: cont [ASI DES:],] [LITH Sole Expr [ASI DES:],] [LITH [ASI DES:], .			2232/QTY	B&D jigsaw, 12-in. blade	2011-11-03	8	5	109.92	0.05	24288	partition_list]
Management Schemas 2330/QPD B&D cordless dill, 1/2 in. 2012/01-20 23 10 9.95 0.10 21225 Management Schemas 23114-AA Sledge hammer, 12 lb. 2012/01-20 8 5 14.40 0.05 Imma Management Schemas 54778-27 Rattalifie, 1/8 in. fine 2011/01-15 43 20 4.99 0.00 21344 No object selected SM-NREQ Hout chain saw, 16 in. 2013/02/07 11 5 256.99 0.05 24288 PVC230RT PVC230RT PVC230RT PVC230RT PVC2020 188 75 5.87 0.00 Imma [Information [Information sorew, 25 2012/02/24 237 100 8.45 0.00 21225 [Informatic Precodemer, anale(argument_11st)] [Information sorew, 25 2012/02/24 237 100 8.45 0.00 21231 [Informatic Precodemer, anale(argument_11st)] [I			2232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288	[WHERE where_condition] [GROUP BY {col_name expr
Management Schemas 23193-HB Claw hammer 2012-01-20 23 10 9.95 0.10 21225 RotLing] RotLing] Management Schemas 23114-AA Sledge hammer, 12 lb. 2012-01-02 8 5 14.40 0.05 RotLing] [H-WTM] [Hore condition] S4778-2T Rattalifie, 1/8in, fine 2011-01-15 43 20 4.99 0.00 21344 B9WRE-Q Hout chain saw, 16 in. 2013-02-07 11 5 256.99 0.05 24288 PVC23DRT PVC20BRT PVC pipe. 3.5in 8th 2012-02-20 188 75 5.87 0.00 IUM [montoin condition] [Poccours No object selected SW-8277 125in. metal screw, 50 2012-02-24 237 100 8.45 0.00 21231 [Intro Output]			2238/QPD	B&D cordless drill, 1/2-in.	2012-01-20	12	5	38.95	0.05	25595	position} [ASC DESC], [WITH
23114-AA Sledge hammer, 12 lb. 2012-01-02 8 5 14.40 0.05 Interconstruction Management Schemas S4778-2T Rattai file, 1/8 in. fine 2011-01-15 43 20 4.99 0.00 21344 B9-WRE-Q Hicut chain saw, 16 in. 2013-02-07 11 5 256.99 0.05 24288 function offset]] [LINTI Offset,]] row, count Information PVC23DRT PVC pipe, 3.5 in. 84 2012-02-20 188 75 5.87 0.00 IUTO Out offset]] [PROCEDURE] No object selected SM-18227 1.25 in. wd. screw, 50 2012-02-24 237 100 8.45 0.00 21231 [INTO OurFLE] *file_name' [Charame (argument_list)]] [INTO OurFLE] *file_name' [Charame (argument_list)]] [INTO OurFLE] *file_name' [INTO OurFLE] *file_name' [Charame [argument_list)]] [INTO OurFLE] *file_name' [LINTO Var			23109-HB	Claw hammer	2012-01-20	23	10	9.95	0.10	21225	ROLLUP]]
S4778-2T Rattal file, 1/8 in. fine 2011-01-15 43 20 4.99 0.00 21344 [Ipposting] Management Schemas 89-WREQ Hiout chain saw, 16 in. 2013-02-07 11 5 256.99 0.05 24288 [Ipposting] [Ippost			23114-AA	Sledge hammer, 12 lb.	2012-01-02	8	5	14.40	0.05	NULL	[ORDER BY {col_name expr
Management Schemas 89-WRE-Q Hicut chain saw, 16 in. 2013-02-07 11 5 256.99 0.05 24288 [rulor] (rulor] (rightst, 1 row_count Information PVC23DRT PVC pipe, 3.5 in., 8th 2012-02-20 188 75 5.87 0.00 IUIII [rwc_count of Fist, 1 row_count [PROCEDURE No object selected SM-18277 1.25 in. metal screw, 25 2012-02-24 237 100 8.45 0.00 21231 [CHAR2(rigrument_list)] [INTO OUTFILE 'file_name' [CHAR2(rigrument_list)] [INTO DUFFILE 'file_name' [CHAR2(rigrument_list)] [INTO DUFFILE 'file_name' [INTO DUFFILE 'file_name' [INTO DUFFILE 'file_name' [INTO DUFFILE 'file_name' [INTO Var_name [, Context Help Snippets [INTO Var_name [, Context Help Snippets [INTO Var_name [, Context Help Snippets [INTO Var_name [, [INTO Var_na			54778-2T	Rat-tail file, 1/8-in. fine	2011-01-15	43	20	4.99	0.00	21344	[ASC DESC],]
Information PVC 23DRT PVC pipe, 3.5:n., 8t 2012-02-20 188 75 5.87 0.00 IIII Procedure_name(argument_list)] No object selected SM-18277 1.25:n. metal screw, 25 2012-03-01 172 75 6.99 0.00 21225 procedure_name(argument_list)] [INTO OUTFILE 'file_name' SW-23116 2.5:n. wd. screw, 50 2012-02-24 237 100 8.45 0.00 21231 WR3/TT3 Steel matting, 4x8x1/6", .5" 2012-01-17 18 5 119.95 0.10 25595 INTO OUTFILE 'file_name' wR3/TT3 Steel matting, 4x8x1/6", .5" 2012-01-17 18 5 119.95 0.10 25595 INTO outpfile * INTO INTO INTO INTO Outpfile 'INTO o	Management Schemas		89-WRE-Q	Hicut chain saw, 16 in.	2013-02-07	11	5	256.99	0.05	24288	[LIMIT {[offset,] row_count row_count OFFSET offset}]
No object selected SM-18277 1.25in. metal screw, 25 2012-03-01 172 75 6.99 0.00 21225 Protection output SW-23116 2.5in. wd. screw, 50 2012-02-24 237 100 8.45 0.00 21231 WR3/TT3 Steel matting, 4x8x1/6", 5" 2012-01-17 18 5 119.95 0.10 25595 INTO DUMPFILE 'file_name' * WR3/TT3 Steel matting, 4x8x1/6", 5" 2012-01-17 18 5 119.95 0.10 25595 INTO DUMPFILE 'file_name' * WR3/TT3 Steel matting, 4x8x1/6", 5" 2012-01-17 18 5 119.95 0.10 25595 INTO DUMPFILE 'file_name' 'file_nam	Information		PVC23DRT	PVC pipe, 3.5-in., 8-ft	2012-02-20	188	75	5.87	0.00	NULL	[PROCEDURE procedure name(argument list)]
SW-23116 2.5-in. wd. screw, 50 2012-02-24 237 100 8.45 0.00 21231 charset_name] export_options WR3/TT3 Steel matting, 4x8x1/6", .5" 2012-01-17 18 5 119.95 0.10 25595 INTO DUMPFILE * INTO	No object selected		SM-18277	1.25-in. metal screw, 25	2012-03-01	172	75	6.99	0.00	21225	[INTO OUTFILE 'file_name'
WR3/TT3 Steel matting, 4x8x1/6", .5" 2012-01-17 18 5 119.95 0.10 25595			SW-23116	2.5-in. wd. screw, 50	2012-02-24	237	100	8.45	0.00	21231	charset_name]
* Image: Section Context Help Shippets Object Info Session Output Query Completed COP 4710: Database Systems (Chapter 5) Page 57 Dr. Mark I lewellyin ©			WR3/TT3	Steel matting, 4'x8'x1/6", .5"	2012-01-17	18	5	119.95	0.10	25595	export_options INTO DUMPFILE
product 16 x Apply Cancel Context Help Snippets Object Info Session Image: Artion Massana Duration / Earch A Query Completed Image: Artion Massana Duration / Earch A		*	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	'file_name'
Object Info Session Object		prod	luct 16 ×						Apply	Cancel	Context Help Snippets
Object Info Session Query Completed COP 4710: Database Systems (Chapter 5) Page 57 Dr Mark Llewellyn ©		Outp	put								
Object Info Session Query Completed COP 4710: Database Systems (Chapter 5) Page 57 Dr Mark Llewellyn ©		J	Action Output	-							
Query Completed	Object Info Session		Time	Action				Messane			Duration / Fatch
COP 4710: Database Systems (Chapter 5) Page 57 Dr. Mark Llewellyn ©	Query Completed										E.,;
	COP 4710: Dat	aba	ase Sv	stems (Chapt	er 5)	F	Page 5	57	Dr. I	Aark Llew	rellyn ©

\square	MySQL Workbench								
A Local instance MySQL56 ×									
File Edit View Query Databas	e Server Tools Scripting Help A restricted UPDATE comman	nd							
Navigator	SQL File 4* SQL File 5* SQL File 6* chapter5script-version2 SQL File 9* SQL File 10* × SQL File 11* (SQL Additions ×								
SCHEMAS 📲 🏵	🗀 🔜 🗲 🛣 👰 🕑 🔀 🖽 🥥 🛞 😽 🔍 🖺 🖓	to 🔹							
 Filter objects bikedb colorsurvey mailinglist project3 	1 set sql_safe_updates=0; update product Topic: SET 3 set p_min = p_min + 40 where p_code = "11QER/31"; Syntax: SET va variable_assign Context Help	.riable_assignment [, nment] Snippets							
project4	Output								
vendors	Action Output								
	Time Action Message	Duration / Fetch							
	2959 16:29:51 INSERT INTO EMPLOYEE VALUES(108, 'Mr.', 'Wiesenbach', 'Paul', 'R', 1 row(s) affected	0.032 sec							
	2960 16:29:51 INSERT INTO EMPLOYEE VALUES(109,'Mr.', 'Smith', 'George', 'K', '1 1 row(s) affected	0.015 sec							
	2961 16:29:51 INSERT INTO EMPLOYEE VALUES(110, 'Mrs.', 'Genkazi', 'Leighla', 'W', ' 1 row(s) affected	0.031 sec							
	2962 16:29:51 INSERT INTO EMPLOYEE VALUES(111, 'Mr.', 'Washington', 'Rupert', 'E', 1 row(s) affected	0.031 sec							
	2963 16:29:52 INSERT INTO EMPLOYEE VALUES(112, 'Mr.', 'Johnson', 'Edward', 'E', ' 1 row(s) affected	0.016 sec							
	2964 16:29:52 INSERT INTO EMPLOYEE VALUES(113, 'Ms.', 'Smythe', 'Melanie', 'P', ' 1 row(s) affected	0.031 sec							
	2965 16:29:52 INSERT INTO EMPLOYEE VALUES(114, 'Ms.', 'Brandon', 'Marie', 'G', '1 1 row(s) affected	0.047 sec							
Management Schemas	2966 16:29:52 INSERT INTO EMPLOYEE VALUES(115, 'Mrs.', 'Saranda', 'Hermine', 'R', 1 row(s) affected	0.078 sec							
Information	2967 16:29:52 INSERT INTO EMPLOYEE VALUES(116, 'Mr.', 'Smith', 'George', 'A', '1 1 row(s) affected	0.032 sec							
No object selected	⊘ 2968 16:29:52 COMMIT 0 row(s) affected	0.000 sec							
	2969 16:30:05 set sql_safe_updates=0 0 row(s) affected	0.000 sec							
	2970 16:30:05 delete from p 16 row(s) affected	0.032 sec							
	2971 16:31:14 select * from p LIMIT 0, 1000 0 row(s) returned	0.000 sec / 0.000 sec							
	2972 16:32:56 select * from product LIMIT 0, 1000 16 row(s) returned	0.000 sec / 0.000 sec							
	2973 16:39:52 set sql_safe_updates=0 0 row(s) affected	0.000 sec							
Object Info Session	2974 16:39:52 update product set p_min = p_min + 40 where p_code = "11QER/31" 1 row(s) affected Rows matched: 1 Changed: 1 Warnings: 0	0.047 sec 🗸							
Query Completed									

			My	SQL Workb	ench						×
A Local instance MySQL56 ×											
File Edit View Query Database Ser	ver <u>T</u> ools	<u>S</u> cripting <u>H</u> elp QL File 5* SQL File 6*	chapter5scrip	-version2	SQL	After ex	shot of P ecuting U	RODU PDATE	CT table a E comman	ıfter d	
SCHEMAS 📲 🏶 🛅	. 🗲 😽	<u>6 0 8 8 8 0 0 0</u>	 📓 i 🍼 🔍 i							o •	_
Q Filter objects	• sele	ct * from product;	A								
▶ 📄 bikedb <			Topic: SET	Topic: SET							
colorsurvey mailinglist	et Filter:		🚷 🛛 Edit: 🔏 🗄	🔓 🚟 🛛 Expor	t/Import 📳	Syntax: SET va variable_assigr	Syntax: SET variable_assignment [, variable_assignment]				
▶	CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE	^	-	_
▶ groject4	IQER/31	Power painter, 15 psi., 3-nozzle	2011-11-03	8	45	109.99	0.00	25595	variable_assi user_va	gnment: r_name = expr	_
vendors 13	3-Q2/P2	7.25-in. pwr. saw blade	2011-12-13	32	15	14.99	0.05	21344	[GLOBAL system var na	[SESSION] me = expr	_
14	I-Q1/L3	9.00-in. pwr. saw blade	2011-11-16	18	12	17.49	0.00	21344	[@@glob	al. @@session.	I
15	546-QQ2	Hrd. cloth, 1/4-in., 2x50	2012-01-15	15	8	39.95	0.00	23119	GG12322CEUTAD	_name = expr	_
15	558-QW1	Hrd. cloth, 1/2-in., 3x50	2012-01-15	23	5	43.99	0.00	23119	The SET staten	nent assigns values t of variables that affe	to ect
22	232/QTY I	B&D jigsaw, 12-in. blade	2011-11-03	8	5	109.92	0.05	24288	the operation o	the operation of the server or your	
22	232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288	client.		
22	238/QPD	B&D cordless drill, 1/2-in.	2012-01-20	12	5	38.95	0.05	25595	See also: Onli	ne help set-statemen	<u>nt</u>
23	3109-HB (Claw hammer	2012-01-20	23	10	9.95	0.10	21225			_
23	3114-AA	Sledge hammer, 12 lb.	2012-01-02	8	5	14.40	0.05	NULL			_
Management Schemas 54	4778-2T	Rat-tail file, 1/8-in. fine	2011-01-15	43	20	4.99	0.00	21344			
Information 89)-WRE-Q	Hicut chain saw, 16 in.	2013-02-07	11	5	256.99	0.05	24288			
No object selected	VC23DRT	PVC pipe, 3.5-in., 8-ft	2012-02-20	188	75	5.87	0.00	NULL	~		
produc	st 17 🗙						Apply	Cancel	Context Help	Snippets	
Output	t :										
	ction Output	•									
	Time	Action				Message				Duration / Fetch	^
296	60 16:29:51	INSERT INTO EMPLOYEE VAI	LUES(109,'Mr.' ,'S	mith','Georg	e','K','1	1 row(s) affected				0.015 sec	
Object Info Session 🥥 296	61 16:29:51	INSERT INTO EMPLOYEE VAI	LUES(110,'Mrs.','(ienkazi' ,'Leiq	hla','W' ,'	1 row(s) affected				0.031 sec	
Query Completed											E :
COP 4710: Databa	se Sys	stems (Chapte	er 5)	Pa	age 59)	Dr. Ma	nrk Lle	wellyn ©		2

D	MySQL Workbench	- • ×
Local instance MySQL56 ×		
File Edit View Query Databas	An unrestricted UPDAT	E command. The to all rows of the
Navigator	SQL FIIE 4 SQL FIIE 5 SQL FIIE 6 CRAPTERSCRIPT-VERSIONZ SQL OPERAND TA	able.
SCHEMAS x ⁻ ♥ Q Filter objects ▶ bikedb ▶ colorsurvey ▶ mailinglist	<pre></pre>	No Context Help
project3	<	> Context Help Snippets
test	Output	
vendors	Action Output	
	Time Action Message	Duration / Fetch
	2962 16:29:51 INSERT INTO EMPLOYEE VALUES(111, 'Mr.', 'Washington', 'Rupert', 'E', 1 row(s) affected	0.031 sec
	⊘ 2963 16:29:52 INSERT INTO EMPLOYEE VALUES(112,'Mr.','Johnson', 'Edward','E',' 1 row(s) affected	0.016 sec
	2964 16:29:52 INSERT INTO EMPLOYEE VALUES(113,'Ms.','Smythe', 'Melanie','P',' 1 row(s) affected	0.031 sec
	2965 16:29:52 INSERT INTO EMPLOYEE VALUES(114, 'Ms.', 'Brandon', 'Marie', 'G', '1 1 row(s) affected	0.047 sec
	2966 16:29:52 INSERT INTO EMPLOYEE VALUES(115,'Mrs.','Saranda', 'Hermine','R', 1 row(s) affected	0.078 sec
	2967 16:29:52 INSERT INTO EMPLOYEE VALUES(116, 'Mr.', 'Smith', 'George', 'A', '1, 1 row(s) affected	0.032 sec
	⊘ 2968 16:29:52 COMMIT 0 row(s) affected	0.000 sec
Management Schemas	⊘ 2969 16:30:05 set sql_safe_updates=0 0 row(s) affected	0.000 sec
Information	2970 16:30:05 delete from p 16 row(s) affected	0.032 sec
No object selected	2971 16:31:14 select * from p LIMIT 0, 1000 0 row(s) returned	0.000 sec / 0.000 sec
	2972 16:32:56 select * from product LIMIT 0, 1000 16 row(s) returned	0.000 sec / 0.000 sec
	⊘ 2973 16:39:52 set sql_safe_updates=0 0 row(s) affected	0.000 sec
	2974 16:39:52 update product set p_min = p_min + 40 where p_code = "11QER/31" 1 row(s) affected Rows matched: 1 Changed: 1 W	/amings: 0 0.047 sec
	2975 16:41:28 select * from product LIMIT 0, 1000 16 row(s) returned	0.000 sec / 0.000 sec
	⊘ 2976 16:43:12 set sql_safe_updates=0 0 row(s) affected	0.000 sec
Object Info Session	2977 16:43:12 update product set p_min = p_min + 40 16 row(s) affected Rows matched: 16 Changed: 16	Warnings: 0 0.046 sec 🗸
Query Completed		

Dr. Mark Llewellyn ©

Page 60

<u>__</u>

			М	ySQL Work	bench					- 5	
Local instance MySQL56 × File Edit View Query Databas E I I I I I I I I I I I I I I I I I I I	se <u>S</u> erver <u>T</u> oo] [] SQL File 4*	ls <u>S</u> cripting <u>H</u> elp SQL File 5* SQL File 6*	chapter5scr	ipt-version2	SQL	After exec comr	shot of the cuting the nand. Note MIN valu	e PROE unresti e that a ue incre	DUCT tabl ricted UPE Ill rows ha	le after DATE Ive the 40.	
SCHEMAS n ^{at} ↔ ♥ Filter objects ▶ bikedb ▶ colorsurvey ▶ mailinglist	1 • sel 2 4	[♀ ♥ ₩ ♥ ⊗) 📓 🧟 Late 🦽		er#/lenent	www.co		>	No Contex	ct Help	
 project3 project4 test vendors 	P_CODE 11QER/31 13-Q2/P2	P_DESCRIPT Power painter, 15 psi., 3-nozzle 7.25-in. pwr. saw blade	P_INDATE 2011-11-03 2011-12-13	P_QOH 8 32	P_MIN 85 55	P_PRICE 109.99 14.99	P_DISCOUNT 0.00 0.05	V_CODE 25595 21344	^		
	14-Q1/L3 1546-QQ2 1558-QW1	9.00-in. pwr. saw blade Hrd. cloth, 1/4-in., 2x50 Hrd. cloth, 1/2-in., 3x50 P&D iscour, 12-in, blado	2011-11-16 2012-01-15 2012-01-15 2011 11 02	18 15 23	52 48 45	17.49 39.95 43.99	0.00 0.00 0.00	21344 23119 23119 24299			
	2232/QWE 2238/QPD 23109-HB	B&D jigsaw, 1241. blade B&D jigsaw, 8-in. blade B&D cordless drill, 1/2-in. Claw hammer	2011-11-03 2011-12-24 2012-01-20 2012-01-20	6 12 23	45 45 45 50	99.87 38.95 9.95	0.05 0.05 0.05 0.10	24288 25595 21225			
Management Schemas	23114-AA 54778-2T 89-WRE-Q	Sledge hammer, 12 lb. Rat-tail file, 1/8-in. fine Hicut chain saw, 16 in.	2012-01-02 2011-01-15 2013-02-07	8 43 11	45 60 45	14.40 4.99 256.99	0.05 0.00 0.05	NULL 21344 24288			
Information	PVC23DRT SM-18277 SW-23116 WR3/TT3	PVC pipe, 3.5-in., 8-ft 1.25-in. metal screw, 25 2.5-in. wd. screw, 50 Steel matting, 4x8'x1/6'', .5''	2012-02-20 2012-03-01 2012-02-24 2012-01-17	188 172 237 18	115 115 140 45	5.87 6.99 8.45 119.95	0.00 0.00 0.00 0.10	21225 21231 25595			
	product 18 × Output						Apply	Cancel	Context Help	Snippets	
Object Info Session Query Completed	Time	Action 2 INSERT INTO EMPLOYEE W	ALLIES/112 'Mr '	'lohoson' 'Er	lward' 'E' '	Message 1 mwle) affecte	ad			Duration / Fetch 0.016 sec	^ E ,;;
COP 4710: Dat	abase Sy	vstems (Chapt	er 5)	F	Page 6	1	Dr. M	lark Lle	ewellyn ©	,	S

2

x

SELECT Statement

- Used for queries on single or multiple tables.
- Clauses of the SELECT statement:
 - SELECT
 - List the columns (and expressions) that should be returned from the query
 - FROM
 - Indicate the table(s) or view(s) from which data will be obtained
 - WHERE
 - Indicate the conditions under which a row will be included in the result
 - GROUP BY
 - Indicate categorization of results
 - HAVING
 - Indicate the conditions under which a category (group) will be included
 - ORDER BY
 - Sorts the result according to specified criteria



SQL statement processing order



COP 4710: Database Systems (Chapter 5)

SELECT Example



SELECT Examples

- Using an instance of the database shown on the previous page, the following pages illustrate some basic SELECT operations and their results using MySQL.
- The syntax for the basic SELECT command is:

SELECT	columnlist	
FROM	tablelist	
[WHERE	conditionlist];





Local instance MySQL56 ×	MySQL Workbench Query: List all attribut Local instance MySQL56 x This is the current inst Edit View Database Server Edit View Database Server Tools										es of all products.		
File Edit View Query Databa	ase (0 []	<u>S</u> erver <u>T</u> ools	s <u>S</u> cripting <u>H</u> elp			ta	ble.				Basic query	Ű	
Navigator	Qu	uery 1 cha	pter5script SQL File 3*	SQL File 4*	SQL File	5* SQL	File 6* \times				SQLAdditions		
SCHEMAS 🛪 🕯		🗅 日 🗲 🗴	7 🕵 🕐 🔀 🖽 ⊘ 😣	🔞 🕑 🔍	1 7						🗢 🍨 SELECT 🔹		
Q Filter objects		1 • SEL	ECT *								Topic: SELECT	~	
▶ 📄 test	<	2 FRO	M product;							>			
Vendors				A			1 🕮 w c-1				Syntax: SELECT		
v customer	Result Set Filter:										[ALL DISTINCT DISTINCTROW [HIGH PRIORITY]		
Columns		P_CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	100.00	P_DISCOUN	V_CODE		[STRAIGHT_JOIN]		
Foreign Keys	•	12 02/02	7 25 in part and blade	2011-11-03	0 22	5 15	14 00	0.00	20000		RESULT]		
Triggers	Ŀ	14.01/13	9.00 in pwr. saw blade	2011-12-13	18	12	17.49	0.00	21344		select_expr [, select_expr		
employee	Ŀ	1546-002	Hrd cloth 1/4-in 2x50	2012-01-15	15	8	39.95	0.00	23119		[FROM table_references [PARTITION partition_list]		
invoice	Ŀ	1558-QW1	Hrd cloth 1/2-in 3x50	2012-01-15	23	5	43.99	0.00	23119		[WHERE where_condition] [GROUP BY {col name expr		
V inte V inte Columns		2232/QTY	B&D iiosaw, 12-in, blade	2011-11-03	8	5	109.92	0.05	24288		[ASC DESC], [WITH ROL [HAVING where condition]		
► ♦ INV_NUMBEF		2232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288		[ORDER BY {col_name expr		
LINE_NUMBE P CODE		2238/QPD	B&D cordless drill, 1/2-in.	2012-01-20	12	5	38.95	0.05	25595		[LIMIT {[offset,] row_count		
► ♦ LINE_UNITS		23109-HB	Claw hammer	2012-01-20	23	10	9.95	0.10	21225		[PROCEDURE procedure_name(arg		
► ♦ LINE_PRICE ✓	'	23114-AA	Sledge hammer, 12 lb.	2012-01-02	8	5	14.40	0.05	NULL		[INTO OUTFILE 'file_name' [CHARACTER SET charset_na		
Management Schemas		54778-2T	Rat-tail file, 1/8-in. fine	2011-01-15	43	20	4.99	0.00	21344		export_options INTO DUMPFILE 'file name'		
Information		89-WRE-Q	Hicut chain saw, 16 in.	2013-02-07	11	5	256.99	0.05	24288		INTO var_name [, var_name [FOR UPDATE] LOCK IN SHARE N		
Schema: vendors		PVC23DRT	PVC pipe, 3.5-in., 8-ft	2012-02-20	188	75	5.87	0.00	NULL		[
		SM-18277	1.25-in. metal screw, 25	2012-03-01	172	75	6.99	0.00	21225		SELECT is used to retrieve rows select tables, and can include UNION stateme		
		SW-23116	2.5-in. wd. screw, 50	2012-02-24	237	100	8.45	0.00	21231		UNION, and Online help subqueries .		
		WR3/TT3	Steel matting, 4'x8'x1/6", .5"	2012-01-17	18	5	119.95	0.10	25595	v	The most commonly used clauses of	v	
	<	1							>		< >		
	pro	oduct I X						Apply	Cancel		Context Help Snippets		
Object Info Session	0.	utput			*******							000	



D	MySQL Workbench Query: List the product	description, date,
File Edit View Query Databas	e Server Tools Scripting Help 21244	ith a vendor code of
Navigator	Query 1 × chapter5script SQL File 3* SQL File 4* SQL File 5*	Basic query with conditional
SCHEMAS 🛪 🏷	🖮 🖬 🗲 🛣 🧶 🕑 🔀 🖽 📀 😒 😹 🛫 🔍 🕦 🖃	restriction
 Filter objects test vendors Tables customer Columns Indexes Foreign Keys Triggers emp emp emp 	<pre>1 • SELECT p_descript, p_indate,p_price,v_code 2 FROM product 3 WHERE v_code=21344; </pre>	Syntax: SELECT [ALL DISTINCT DISTINCTROV [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIG RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [DADIIION position list]]
Invoice Ine Columns INV_NUMBEF LINE_NUMBE P_CODE LINE_UNITS LINE_PRICE Management Schemas Information	Result Set Filter: Image:	<pre>[PARITION partItion_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_name export_options INTO DUMPFILE 'file_name' [INTO Var_name [, var_namev]</pre>
Schema: vendors	product 5 × Read Only 9	Context Help Snippets
	Output Action Output Image Action Message Action Message 19 row(s) returned Action SELECT p_descript, p_indate,p_price,v_code FROM product WHER 3 row(s) returned	Duration / Fetch 0.015 sec / 0.000 sec 0.000 sec / 0.000 sec
Object Info Session		v
COP 4710: Data	abase Systems (Chapter 5) Page 67 Dr. Mark Lle	ewellyn ©

Local instance MySQL56 × File Edit View Query Databas	se <u>S</u> erver <u>T</u> ools <u>S</u> cripting	M <u>y</u> <u>H</u> elp	ySQL Workbench	Query: List the product and price of products v which is not equal to 2 v_code values are not	ct descrip with a ver 1344. Ro included	tion, date, ndor code ows with null in the result.
Navigator SCHEMAS Q Filter objects ► ● test ♥ vendors ♥ Tables ♥ ↓	Query 1 × chapter5script	SQLFile3* SQLFile SQLFILE S	s 4* SQL File 5*		Basic CO re Syntax: , Not equa	e query with nditional estriction
 Columns Indexes Foreign Keys Triggers emp employee invoice line Columns NV_NUMBEF LINE_NUMBE P_CODE LINE_UNITS LINE_PRICE Management Schemas 	Result Set Filter: p_descript Power painter, 15 psi., 3-nozzle Hrd. cloth, 1/4-in., 2x50 Hrd. cloth, 1/2-in., 3x50 B&D jigsaw, 12-in. blade B&D jigsaw, 8-in. blade B&D jigsaw, 8-in. blade B&D cordless drill, 1/2-in. Claw hammer Hicut chain saw, 16 in. 1.25-in. metal screw, 25 2.5-in. wd. screw, 50	Image: bit with the sector withe sector with the sector with the sector with the sector	t i v_code 25595 23119 23119 24288 24288 24288 24288 24288 24288 24288 21225 21225 21225		See also compariso	: <u>Online help</u> on-operators
Information Schema: vendors Object Info Session	Steel matting, 4x8x1/6", .5" product 6 × Output Image: Action Output Time Action 744 17:08:11 SELECT p_des 745 17:13:52 SELECT p_des	2012-01-17 119.95 cript, p_indate,p_price,v_coo cript, p_indate,p_price,v_coo	25595 de FROM product WHER de FROM product WHER	Read Only Message 3 row(s) returned 11 row(s) returned	y 9 Context He	P Snippets Duration / Fetch 0.000 sec / 0.000 sec v

Local instance MySQL56 × File Edit View Query Databas Entry File Content of the second seco	MySQL Workbench e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp Query 1 ×	Query: List the product and price of products wi which is equal to 21344 \$10.00. Rows with null not included in the result	th a vendor code and p_price >= v_code values are t.
SCHEMAS # ♣ Q Filter objects Image: Solution of the second seco	<pre></pre>		Basic query with compound conditional restriction [SQL_SMALL_RESULT] [SQL_BIC RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [PARTITION partition_list] [WHERE where_condition]
Management Schemas	Result Set Filter:		<pre>GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na export_options INTO DUMPFILE 'file_name' INTO OWPFILE 'file_name [FOR UPDATE LOCK IN SHARE M </pre>
Information	product 1 × Output Action Output • Time Action	Read Only Message	SELECT is used to retrieve rows selectables, and can include UNION statemetables, and continue help subqueries. The most commonly used clauses of Context Help Snippets Duration / Fetch
Object Info Session	1 16:45:44 select p_descript, p_indate, p_price, V_CODE from product where v_code: abase Systems (Chapter 5) Page	69 Dr. Mark Lie	0.015 sec / 0.000 sec

Local instance MySQL56 × File Edit View Query Database Solution Navigator SCHEMAS ** * SCHEMAS ** * Schemas Schem	e : Qu	Server Tools Scripti	ng <u>H</u> elp So me (escript, p_ t rice < 50 A	MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ MySQ	L Workbench ♥ Q ¶ ∓ p_price, v_co ate >'2012-01	Query: List the prod and price of products which is equal to 242 and p_indate is after Rows with null v_coo included in the result de	uct descript with a ven 88 or p_pri January 15 le values m Basic c com	ion, date, dor code ce < \$50.00 5, 2012. ay be juery with pound ditional	×
mailinglist							rest	riction	уь
project2	<						>		
project4	Resu	lt Set Filter		•	Export Wran	o Cell Content: TA	STRAI	GHT_JOIN] MALL_RESULT] [SQL_BI	
▶ 📄 test						<u></u>	RESULT]		
Vendors	<u> </u>	p_descript	p_indate	p_price	V_code		select_e	xpr [, select_expr .	
		B&D Jigsaw, 12-In. blade	2011-11-03	109.92	24288		[FROM ta [PARTI	ble_reterences TION partition list]	
		B&D jigsaw, 8-in. blade	2011-12-24	99.87	24288		WHERE W	here_condition]	
		B&D cordless drill, 1/2-in.	2012-01-20	38.95	25595		[ASC]	DESC], [WITH RC)L
		Claw hammer	2012-01-20	9.95	21225		[HAVING [ORDER B	where_condition] Y {col name expr	
		Hicut chain saw, 16 in.	2013-02-07	256.99	24288		[ASC	DESC],]	
		PVC pipe, 3.5-in., 8-ft	2012-02-20	5.87	NULL		offset}]	[offset,] row_count	1
Management Schemas		1.25-in. metal screw, 25	2012-03-01	6.99	21225		[PROCEDU	RE procedure_name(ar TETLE 'file name'	E
Information		2.5-in. wd. screw, 50	2012-02-24	8.45	21231		[CHA	RACTER SET charset_n	51
No object selected		1					INTO	DUMPFILE 'file_name	e -
							INTO	var_name [, var_nam	ie ·
	pro	duct 4 ×				Read Only	Context Help	Snippets	
	Out	tput concentration							
	J	Action Output	•						
		Time Action				Message		Duration / Fetch	^
	0	3 16:51:14 select p_de	escript, p_indate	e, p_price, v	_code from product	3 row(s) returned		0.000 sec / 0.000 sec	:
Object Info Session	0	4 16:51:40 select p_de	escript, p_indate	e, p_price, v	_code from product	8 row(s) returned		0.000 sec / 0.000 sec	2
COP 4710: Databa	ase	Systems (C	hapter :	5)	Page	70 Dr. Mark	Llewellyn	© S	

Local instance MySQL56 × <u>File</u> <u>E</u> dit <u>Vi</u> ew <u>Q</u> uery <u>D</u> atabas	se <u>S</u> erver <u>T</u> ools <u>S</u> crip	ting <u>H</u> elp	MyS	QL Workbench	Query: List the pro price of products w dates occur on or a	oduct de here th after Ja	escription, date, and ne inventory stock nuary 20, 2012.
Navigator	Query 1 chapter5scri	pt SQL File 3*	SQL File 4*	SQL File 5*	SQL File 6* ×	Ba	sic query using an
SCHEMAS ** ↔ ♀ Filter objects ▶ ☺ test	1 • SELECT p.d FROM produ	lescript, p_qoh,) 🛞 🛫 🔍 p_min, p_pr	¶ 🗊 ice, P_indate		oper	Topic: SELECT
▼	Result Set Filter:	uate >- 2014-0	Export	Wrap Cell Content:	Ā	>	Syntax: SELECT [ALL DISTINCT DISTINCTROV [HIGH_PRIORITY] [STRATGHT_JOIN]
 Indexes Foreign Keys Foreign Keys Triggers emp employee invoice invoice invoice Inv Columns INV_NUMBEF LINE_NUMBEF LINE_NUMBE P_CODE LINE_UNITS LINE_PRICE Xanagement Schemas 	p_descript ▶ B&D cordless drill, 1/2-in Claw hammer Hicut chain saw, 16 in. PVC pipe, 3.5-in., 8-ft 1.25-in. metal screw, 25 2.5-in. wd. screw, 50	p_qoh p_min 12 5 23 10 11 5 188 75 172 75 237 100	p_price 38.95 9.95 256.99 5.87 6.99 8.45	P_indate 2012-01-20 2012-01-20 2013-02-07 2012-02-20 2012-03-01 2012-02-24	R	ead Only 🚯	[SQL_SMALL_RESULT] [SQL_BIG RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LINIT {[Offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na Context Help Snippets
Information	Output Action Output Time Action 746 17:18:06 SELECT	 FROM products LIMI 	T 0, 1000		Message Error Code: 1146. Table 'vendors.produ	cts' doesn't exi	st 0.000 sec
Object Info Session	 747 17:18:26 SELECT 748 17:22:10 SELECT 749 17:22:17 SELECT 750 17:22:31 SELECT 	PROM product LIMII p_descript, p_qoh, p_r p_descript, p_qoh, p_r p_descript, p_qoh, p_r	u, 1000 nin, p_price, P_ind nin, p_price, P_ind nin, p_price, P_ind	date FROM product date FROM product date FROM product	16 row(s) returned 1 row(s) returned 6 row(s) returned 6 row(s) returned		0.000 sec / 0.000 sec 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec

Page 71



n				M	ySQL Work	bench				_ 🗆 🗙
Local instance MySQL56 × <u>File</u> <u>E</u> dit <u>Vi</u> ew <u>Q</u> uery <u>D</u> atabas	se	<u>S</u> erver <u>T</u> ool	ls <u>S</u> cripting <u>H</u> elp				Query: produc	List all at t that do n	tributes c ot have v	of products for v_code = 21344.
🖥 🖺 🖓 🛲 🗛 🔞 🕡 🗔 🦑 Basic query using a										query using a logical
Navigator	Qu	iery 1 SC	∖L File 1* ×							NOT operator.
SCHEMAS 📲 🚯	C	- 🛛 🗲 🖠	F 👰 🕑 🔀 🖽 📀 😒	👸 🕩 🍳	17					🔄 🔿 SELECT 🔹
R Filter objects		1 • sel	lect *							Topic: SELECT
bikedb	3 where not(v_code = 21344);									
 mailinglist 	<			SELECT						
 project2 project3 	Resu	It Set Filter:			[ALL DISTINCT DISTINCTROW [HIGH_PRIORITY] [STRAIGHT JOIN]					
project4		P_CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE	[SQL_SMALL_RESULT] [SQL_BIC
vendors	•	11QER/31	Power painter, 15 psi., 3-nozzle	2011-11-03	8	5	109.99	0.00	25595	[SQL_CACHE SQL_NO_CACHE]
		1546-QQ2	Hrd. cloth, 1/4-in., 2x50	2012-01-15	15	8	39.95	0.00	23119	[FROM table_references
		1558-QW1	Hrd. cloth, 1/2-in., 3x50	2012-01-15	23	5	43.99	0.00	23119	[PARTITION partition_list] [WHERE where_condition]
		2232/QTY	B&D jigsaw, 12-in. blade	2011-11-03	8	5	109.92	0.05	24288	[GROUP BY {col_name expr [ASC DESC], [WITH ROL
		2232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288	[HAVING where_condition] [ORDER_BY_{col_name_l_expr_]
		2238/QPD	B&D cordless drill, 1/2-in.	2012-01-20	12	5	38.95	0.05	25595	[ASC DESC],]
		23109-HB	Claw hammer	2012-01-20	23	10	9.95	0.10	21225	offset}]
Management Schemas	-	89-WRE-Q	Hicut chain saw, 16 in.	2013-02-07	11	5	256.99	0.05	24288	[PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name'
Information		SM-18277	1.25-in. metal screw, 25	2012-03-01	172	75	6.99	0.00	21225	[CHARACTER SET charset_na export options
No object selected	-	SW-23116	2.5-in. wd. screw, 50	2012-02-24	237	100	8.45	0.00	21231	INTO DUMPFILE 'file_name'
	L	WR3/113	Steel matting, 4x8x1/6", .5"	2012-01-17	18 NULL	5 NULL	119.95 NULL	0.10	25595 NULL	[FOR UPDATE LOCK IN SHARE N
	*	oduct 1 ×						Apply	Cancel	SELECT is used to retrieve rows select tables, and can include UNION stateme UNION, and Online help subqueries . Context Help Snippets
Object Info Session		Action Output	+ -							
		Action Outpu								


				MyS	QL Workbe	nch				- • ×
Local instance MySQL56 ×						(Query: L	ist all attri	butes o	of products for
<u>File Edit View Q</u> uery <u>D</u> atabas	e <u>s</u>	<u>S</u> erver <u>T</u> ool	s <u>S</u> cripting <u>H</u> elp			p	product tl	nat do not	have v	/_code = 21344.
	Q								Sam	ne querv as previous
Navigator	Que	ery1 SQ	L File 1* SQL File 2* ×						page	e but using not equal
SCHEMAS ** *	r-	I 🖪 🔗 🐐	7 Q O S 🗏 O O	📓 i 🛷 Q	1 7				P~9	operator.
Q Filter objects		1 • sel	ect *							No Context Help
▶ 📑 bikedb ▶ 🚍 colorsurvev		2 fro 3 whe	m product re v_code <> 21344;							
▶ ■ mailinglist	<								>	
 project2 project3 	Result	t Set Filter:		🚷 🛛 Edit: 🔏	💼 🔜 Expo	rt/Import	🔓 🐻 🛛 Wrap Cel	Content 1		
project4		P_CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE	
vendors	•	11QER/31	Power painter, 15 psi., 3-nozzle	2011-11-03	8	5	109.99	0.00	25595	
		1546-QQ2	Hrd. cloth, 1/4-in., 2x50	2012-01-15	15	8	39.95	0.00	23119	
		1558-QW1	Hrd. cloth, 1/2-in., 3x50	2012-01-15	23	5	43.99	0.00	23119	
		2232/QTY	B&D jigsaw, 12-in. blade	2011-11-03	8	5	109.92	0.05	24288	
		2232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288	
		2238/QPD	B&D cordless drill, 1/2-in.	2012-01-20	12	5	38.95	0.05	25595	
		23109-HB	Claw hammer	2012-01-20	23	10	9.95	0.10	21225	
Management Schemas		89-WRE-Q	Hicut chain saw, 16 in.	2013-02-07	11	5	256.99	0.05	24288	
Information		SM-18277	1.25-in. metal screw, 25	2012-03-01	172	75	6.99	0.00	21225	
No object selected		SW-23116	2.5-in. wd. screw, 50	2012-02-24	237	100	8.45	0.00	21231	
-		WR3/TT3	Steel matting, 4'x8'x1/6", .5"	2012-01-17	18	5	119.95	0.10	25595	
	*	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	
	<								>	
	proc	duct 1 ×						Apply	Cancel	Context Help Snippets
	Out	put sessesses								
Object Info Session	đ	Action Output	•							
	_									
COP 4710: Data	aba	ase Sys	stems (Chapte	r 5)	Pa	ge 73		Dr. Mai	rk Llen	vellyn ©



Page 74

Local instance MySQL56 × File Edit View Query Databas	MySQL Workbench Query: List the product de and price of products alor se Server Tools Scripting Help value of the products curr	escription, date, ng with the total rently in inventory.
Navigator SCHEMAS R Filter objects	Query 1 chapter5script SQL File 3* SQL File 4* SQL File 5* Same query as previous Image: SQL File 3* SQL File 4* SQL File 5* an alias for the comp Image: SELECT p descript, p goh, p price, p goh * p price as total value	s page but adding buted column.
 ► test ► vendors ▼ Tables ▼ customer ► Columns 	2 FROM product; 3 Kesult Set Filter: Image: Set Filt	Topic: - UNARY Syntax: - Unary minus. This operator changes the sign of the operand.
 Indexes Foreign Keys Triggers emp employee invoice line Columns INV_NUMBEF LINE_NUMBE P_CODE LINE_UNITS LINE_PRICE * 	p_descript p_qoh p_price total_value Power painter, 15 psi., 3-nozzle 8 109.99 879.92 7.25-in. pwr. saw blade 32 14.99 479.68 9.00-in. pwr. saw blade 18 17.49 314.82 Hrd. cloth, 1/4-in., 2x50 15 39.95 599.25 Hrd. cloth, 1/2-in., 3x50 23 43.99 1011.77 B&D jigsaw, 12-in. blade 8 109.92 879.36 B&D jigsaw, 8-in. blade 6 99.87 599.22 B&D jigsaw, 8-in. blade 6 99.87 599.22 Claw hammer 23 9.95 228.85	See also: Online help arithmetic-functions
Management Schemas	Read Only U	Context Help Shippets
Schema: vendors	Action Output	
Object Info Session	Time Action Message 748 17:22:10 SELECT p_descript, p_qoh, p_min, p_price, P_indate FROM product 1 row(s) returned 749 749 17:22:17 SELECT p_descript, p_qoh, p_min, p_price, P_indate FROM product 6 row(s) returned 750 17:22:31 SELECT p_descript, p_qoh, p_min, p_price, P_indate FROM product 6 row(s) returned 751 17:28:51 SELECT p_descript, p_qoh, p_price, p_qoh * p_price FROM product Ll 16 row(s) returned 752 17:36:20 SELECT p_descript, p_qoh, p_price, p_qoh * p_price as total_value FR 16 row(s) returned	Duration / Fetch ▲ 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec 0.001 sec / 0.000 sec 0.031 sec / 0.000 sec 0.000 sec / 0.000 sec
COP 4710: Data	abase Systems (Chapter 5) Page 75 Dr. Mark Llew	vellyn ©

Special Operators

- ANSI-standard SLQ allows the use of special operators in conjunction with the WHERE clause.
- These special operators include:
 - BETWEEN: used to check whether an attribute value is within a range.
 - IS NULL: used to check whether an attribute value is null.
 - LIKE: used to check whether an attribute value matches a given string pattern.
 - IN: used to check whether an attribute value matches any value within a value list.
 - EXISTS: used to check whether a sub-query returns any rows.
- The examples on the following few pages illustrate these special operators.

COP 4710: Database Systems (Chapter 5)



Local instance MySQL56 ×				I	MySQL Wo	orkbench	Query prices	: List the between	details of \$30.00 ar	products nd \$100.	s which have 00.	е
File Edit View Query Databas	se	<u>S</u> erver <u>T</u> oo	ols <u>S</u> cripting <u>H</u> elp					Que	ery using t BE	he spec TWEEN	al operator	
Navigator	Q	uery 1 S	QL File 1* $ imes$							SQLAdditions		
SCHEMAS 📲 🚸		- 8 🗲	🖌 👰 🕐 🔀 🖽 🔇) 🔞 🐻 📝	0.17)				🗢 🔿 🛛 Jum;	o to 🔹	
Q Filter objects		1 • se	lect *							T . DE		
🕨 📄 bikedb		2 fr	om product	30 00 and 1	00.00.					TODIC: RE	IWEEN AND	
colorsurvey		5 WI	ere p_price between	50.00 diu 1	.00.005					Syntax: expr	BETWEEN min AND may	¢ 🗌
mailinglist project2	<								>	If expr is gre	ater than or equal to m	iin
project3	Res	ult Set Filter:		🚷 🛛 Edit	⊿ 🖶 🖶	Export/Impo	t 🗓 🐻 W	rap Cell Content 🚺		BETWEEN retu 0. This is equ	ss than or equal to max irns 1, otherwise it retu ivalent to the expression	(, Irns
e est		P_CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE	(min <= expr	AND expr <= max) if a	li l
vendors	Þ	1546-QQ2	Hrd. cloth, 1/4-in., 2x50	2012-01-15	15	8	39.95	0.00	23119	Otherwise typ	s are of the same type e conversion takes pla	ce
		1558-QW1	Hrd. cloth, 1/2-in., 3x50	2012-01-15	23	5	43.99	0.00	23119	according to t	he rules described in	
		2232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288	applied to all	the three arguments.	
		2238/QPD	B&D cordless drill, 1/2-in.	2012-01-20	12	5	38.95	0.05	25595	See also: O	line help	
	*	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	comparison-o	perators	
Management Schemas	pr	oduct 4 ×						Apply	Cancel	Context Help	Snippets	
Tefereneties	0	utput										
No object selected	Ō	Action Outp	ut 🔹									
		Time	Action				Message				Duration / Fetch	^
	0	4 16:51:40	select p_descript, p_indate	, p_price, v_code	from product	where (p_pric.	. 8 row(s) retur	ned			0.000 sec / 0.000 se	ec
	0	5 16:53:40	select * from product where	e not(v_code = 21	1344) LIMIT 0,	1000	11 row(s) retu	umed			0.000 sec / 0.000 se	ec
	0	6 16:55:41	select * from product where	v_code <> 2134	14 LIMIT 0, 10	00	11 row(s) retu	umed			0.000 sec / 0.000 se	ec
	0	7 16:57:42	select * from product where	e p_price between	n 50.00 and 10	00.00 LIMIT 0	. 1 row(s) retur	ned			0.000 sec / 0.000 se	ec
Object Info	0	8 16:57:53	select * from product where	p_price between	n 30.00 and 10	0.00 LIMIT 0	. 4 row(s) return	ned			0.000 sec / 0.000 se	ec 🛛
Object INFO Session												×

Special Operators – IS NULL

- Note that SQL uses the special IS NULL operator to test for nulls.
- You cannot simply enter a condition such as "v-code = null". The reason being that technically, null is not a "value" the way the number 0 or the blank space is, instead, a NULL is a special property of an attribute that represents precisely the absence of any value.







Special Operators - LIKE

- The LIKE special operator is used in conjunction with wildcards to find patterns within string attributes.
- ANSI-standard SQL allows you to use the percent sign (%), and underscore (_) wildcard characters to make matches when the entire string is not known.
- Examples:
 - % means any and all following or preceding characters are eligible. For example:
 - "M%" includes: Mark, Mary, Month, May, March, M1234, and M
 - "Ma%" includes Mark, Mary, March, Mall
 - "%k" includes Mark, ark, dark, mark
 - _ means any one character may be substituted for the underscore. For example:
 - "_07-823-2369" includes: 407-823-2369, 507,823-2369, a07-823-2369
 - "_07-_23-123_" includes: 407-823-1234, a07-b23-123r, 007-023-1239

COP 4710: Database Systems (Chapter 5)



Local instance MySQL56 ×	MySQL Workbench	Query: List the details of products which contain the term "saw blade".
File Edit View Query Database	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	Query using the special operator LIKE.
Navigator	Query 1 SQL File 1* SQL File 2* ×	SQLAdditions
SCHEMAS 📲 🚸	🗀 🖬 🗲 🕂 👰 🕐 🔀 📰 ⊘ ⊗ 쮢 🕩 🔍 🕦 🖃	🗢 🔿 SELECT 🗸
 Filter objects bikedb colorsurvey mailinglist project2 project3 	<pre>1 • select p_code, p_descript, v_code 2 from product 3 where p_descript LIKE '%saw blade%'; 4</pre>	Topic: SELECT Syntax: SELECT [ALL DISTINCT DISTINCTROV [HIGH_PRIORITY]
project4	Result Set Filter: 😯 Export: 🏭 Wrap Cell Content: 🏗	[STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BI(
 test vendors 	p_code p_descript v_code 13-Q2/P2 7.25-in. pwr. saw blade 21344 14-Q1/L3 9.00-in. pwr. saw blade 21344	RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [PARTITION partition_list] [WHERE where_condition]
Management Schemas Information No object selected		[GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_name export_options INTO DUMPFILE 'file_name'
	product 5 ×	Read Only Context Help Snippets
	Output	
	T Action Output	
	Time Action	Message Duration / Fetch
	13 11:29:12 select p_code, p_descript, p_indate from product where p_indate is null (0 row(s) returned 0.000 sec / 0.000 sec
Object Info Session	14 11:31:21 select p_code, p_descript, v_code from product where p_descript LIKE 2	2 row(s) returned 0.000 sec / 0.000 sec
	hase Systems (Chapter 5) Page 8	Dr. Mark Llewellyn @

-, -

.900

Local instance MySQL56 ×	MySQL Workbench	Query: List the details of products which contain the term "saw blade".
File Edit View Query Databas	se <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	Query using the special operator LIKE.
Navigator	Query 1 SQL File 1* SQL File 2* ×	SOI Additions
SCHEMAS n ^µ Q Filter objects Image: Distribution of the state of the stat	Image: Select p_code, p_descript, v_code 1 select p_code, p_descript, v_code 2 from product 3 where p_descript LIKE '%SAW BLADE%'; 4 where p_descript V_code P_code p_descript 13:Q2/P2 7.25in. pwr. saw blade 21344 14:Q1/L3 9.00in. pwr. saw blade 21344	Note: MySQL does not use case sensitivity with the LIKE operator. However, Oracle systems do and provide a special UPPER operator to convert both table and query character entries to upper case. The conversion does not affect the actual data in the tables, only the processing. The syntax of the WHERE clause would then be: UPPER(p_descript) LIKE '%saw blade%';.
Management Schemas Information	product 6 × Output Time Action	Message Duration / Fetch Message Duration / Fetch
	14 11:31:21 select p_code, p_descript, v_code from product where p_descript LIKE	2 row(s) returned 0.000 sec / 0.000 sec
Object Info Session	15 11:32:34 select p_code, p_descript, v_code from product where p_descript LIKE	2 row(s) returned 0.000 sec / 0.000 sec
COP 4710: Data	abase Systems (Chapter 5) Page	83 Dr. Mark Llewellyn ©

Special Operators - IN

- Many queries that would require the use of the logical OR operator can be more easily handled with the use of the special operator IN.
- Consider the following case:

SELECT*FROMPRODUCTWHERE V CODE = 21344 OR V CODE = 24288;

• Using the IN operator this query becomes:

SELECT * FROM PRODUCT WHERE V CODE IN (21344, 24288);

• The IN operator uses a value list. All of the values in the list must be of the same data type. Each of the values in the value list is compared to the attribute. If any of the values match the attribute, the row is selected.





Local instance MySQL56 ×					MySQL W	orkbench	Query vendo	r: List the of	e details of f 21344 or	products which have a 24288.
File Edit View Query Databas	se	<u>S</u> erver <u>T</u> ool	s <u>S</u> cripting <u>H</u> elp					Qu	iery using t	the special operator IN.
Navigator	Qu	iery 1 SQ	L File 1* SQL File 2	* × 1						SQLAdditions
SCHEMAS 📲 🎨	C	- 🖪 🔗 🕯	7 🔕 🕐 🚳 🖽 🖉	0 🛛 🕅 🖌	0.115	ม				⇔ ⇒ SELECT
Q Filter objects		1 • SEL	FCT * FROM PRODUC	T		2				
▶ 🖻 bikadb		2	WHERE V_CODE IN (21344, 2428	8);					Topic: SELECT
		3								Svotav:
🕨 📄 mailinglist										SELECT
project2	<								>	[ALL DISTINCT DISTINCTROV
project3		h Car Char			. <u> </u>	5	. 🕮 🕮 🛄		-	[STRAIGHT_JOIN]
E test	Kesu	lit Set Filter:			c 📶 🖽 🖽	= Export/Impo	nc 🖷 🗗 w	Irap Cell Content: 1	<u><u></u></u>	[SQL_SMALL_RESULT] [SQL_BIC RESULT]
vendors		P_CODE	P_DESCRIPT	P_INDATE	P_QOH	P_MIN	P_PRICE	P_DISCOUNT	V_CODE	[SQL_CACHE SQL_NO_CACHE]
		13-Q2/P2	7.25-in. pwr. saw blade	2011-12-13	32	15	14.99	0.05	21344	[FROM table_references
		14-Q1/L3	9.00-in. pwr. saw blade	2011-11-16	18	12	17.49	0.00	21344	[PARTITION partition_list]
		2232/QTY	B&D jigsaw, 12-in. blade	2011-11-03	8	5	109.92	0.05	24288	[GROUP BY {col_name expr
		2232/QWE	B&D jigsaw, 8-in. blade	2011-12-24	6	5	99.87	0.05	24288	[ASC DESC], [WITH ROL [HAVING where condition]
		54778-2T	Rat-tail file, 1/8-in, fine	2011-01-15	43	20	4.99	0.00	21344	[ORDER BY {col_name expr
	E	89-WRE-0	Hight chain saw 16 in	2013-02-07	11	5	256.99	0.05	24288	[LIMIT {[offset,] row_count
		NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	offset}]
Management Schemas	*									[INTO OUTFILE 'file_name'
Information										[CHARACTER SET charset_na export options
No object selected										INTO DUMPFILE 'file_name'
-	PR	ODUCT 7 ×						Apply	Cancel	Context Help Snippets
	Ou	tout processes								
	1									
	יים	Action Output	t 🔻							
		Time	Action				Message			Duration / Fetch
	0	15 11:32:34	select p_code, p_descript	v_code from pro	oduct where p	descript LIKE	2 row(s) retur	med		0.000 sec / 0.000 sec
Object Info Session	0	16 11:36:57	SELECT * FROM PRODU	JCT WHERE V_	CODE IN (213	14, 24288) LI	6 row(s) retu	med		0.000 sec / 0.000 sec
	_									
		-				_		_		

Page 85



Special Operators - EXISTS

- The EXISTS special operator can be used whenever there is a requirement to execute a command based on the result of another query.
- The EXISTS special operator is used almost exclusive with subqueries, so we will examine it in more detail later (as is also true with the special IN operator we just saw).
- If a subquery returns any rows, run the main query; otherwise, do not.
- Consider the following case:

SELECT * FROM VENDOR WHERE EXISTS (SELECT * FROM PRODUCT

WHERE P_QOH <= P_MIN);

• In this case the EXISTS operator is used to list all the vendors, but only if there are products with the quantity on hand is less that the threshold value p_min.

COP 4710: Database Systems (Chapter 5)



Local instance MySQL56 ×	MySQL Workbench	Query: List the details of v those products with QOH	vendors but only for < P_MIN.
Eile Edit View Query Databas	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	Query using th E>	e special operator
Navigator	Query 1 SQL File 1 SQL File 2* ×		SQLAdditions
SCHEMAS 🛪 🏶	🗀 🗑 🗲 蕵 👰 🔘 🔀 📰 📀 🛞 🕱 🕩 Q, 🖺 🖃		
 Filter objects bikedb colorsurvey mailinglist project2 project3 project4 test wordeer 	<pre>1 • select * 2 from vendor 3 where exists (select * 4 from product 5 where p_qoh <= p_min); <</pre>	>	Syntax: SELECT [ALL DISTINCT DISTINCTROW [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SOL CACHE SOL NO CACHE]
Vendors	Result Set Filter.	Wrap Cell Content 1	select_expr [, select_expr
Management Schemas	V_CODE V_NAME V_CONTACT V_AREACODE V_PHONE	V_STATE V_ORDER	[PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[Offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na export_options] INTO DUMPFILE 'file_name'
No object selected			INTO Var_name [, var_name
	vendor 1 🗙	Apply Cancel	Context Help Snippets
	Output		
	Action Output		
	Time Action	Message	Duration / Fetch
	⊘ 1 11:39:44 select * from vendor where exists (select * from product where p_q	0 row(s) returned	0.000 sec / 0.000 sec
Object Info Session	2 11:40:10 select * from product LIMIT 0, 1000	16 row(s) returned	0.000 sec / 0.000 sec
COP 4710: Dot	abaaa Suatama (Chantar E) Bara 9		

Dr. Mark Llewellyn ©

Local instance MySQL56 ×					MySQL V	/orkbench	Query: those p	: Lis prod	t the de ucts wi	etails of th QOH	vendors but only for >= P_MIN.
File Edit View Query Databas	se) [(<u>S</u> erver <u>T</u> oo	ls <u>S</u> cripting	<u>H</u> elp					Query	[,] using t E	the special operator
Navigator	Qu	iery 1 SC	QL File 1 SQ	L File 2* × SQ	File 3*						SQLAdditions
SCHEMAS n ^k ↔ Q Filter objects > bikedb > colorsurvey		1 • sei 2 fro 3 Ewho 4	Icct * om vendor ere exists (s f	elect *) 🖉 Q. (1) P		Result has all minimu	lists proc um.	all ver ducts w	idors sii ⁄ith qoh	nce current instance >= threshold
 project2 project3 project4 test 	<	5	W	where p_qoh >=	p_min);	I 5	n n lw c			>	SELECT [ALL DISTINCT DISTINCTROW [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIG RESULT]
vendors	Kesu					Export/Import		ell Content	- <u>+A</u>		[SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr
	Ŀ	V_CODE	V_NAME	V_CONTACT	V_AREACODE	V_PHONE	V_STATE	V_OR	DER	^	[FROM table_references
		21220	Bryson, Inc.	Smithson	004	223-3234		T			[WHERE where_condition]
	Ŀ	21226	SuperLoo, Inc.	Flushing	904	210-8990	FL TN	N			[GROUP BY {COI_name expr [ASC DESC], [WITH ROL
	F	21231	Comos Pres	Ortage	010	220-3240		T N			[HAVING where_condition] [ORDER BY {col_name expr
	F	21344	Dome Supply	Cmith	901	679,1/19	GA	N			[ASC DESC],] [LIMIT {[offset,] row count
	F	22307	Bandeete Itd	Anderson	901	678-3998	GA	Y			offset}] [PROCEDURE procedure name(are
Management Schemas	F	24004	Brackman Bros	Browning	615	228-1410	TN	N			[INTO OUTFILE 'file_name'
Information		24288	ORDVA Inc	Hakford	615	898-1234	TN	Y			export_options
No object selected	-	25443	B&K. Inc.	Smith	904	227-0093	FL	N			INTO var_name [, var_name
	F	25501	Damal Supplies	Smythe	615	890-3529	TN	N			[FOR UPDATE LOCK IN SHARE N
	F	25595	Rubicon Syst	Orton	904	456-0092	FL	Y			SELECT is used to retrieve rows selec
	32	NULL	NULL	NULL	NULL	NULL	NULL	NULL		~	UNTON, and Online help subqueries .
	ve	ndor 5 ×							Apply	Cancel	Context Help Snippets
	Ou	tput concentration									
Object Tafe Consider	đ	Action Output	t 🔹								
Object Info Session		Time	Action				Message				Duration / Fetch
COP 4710: Dat	tab	ase Sy	vstems	(Chapter	· 5)	Page	88		Dr. Ma	ark Llev	wellyn ©

Additional Select Query Keywords

- One of the most important advantages of SQL is its ability to produce complex free-form queries.
- The logical operators introduced earlier to update table contents work just as well in the query environment. In addition, SQL provides useful functions that count, find minimum and maximum values, calculate averages, and so on.
- Better yet, SQL allows the user to limit queries to only those entries that have no duplicates, or entries whose duplicates can be grouped together.
- ANSI-SQL also includes additional clauses for the SELECT command that, while provide no additional expressive power, allow the user to format query results in useful ways.

COP 4710: Database Systems (Chapter 5)



ORDER BY Clause

- The ORDER BY clause is especially useful when the listing order of the results is important to you.
- The syntax is:

SELECT	columnlist
FROM	tablelist
[WHERE	conditionlist]
[ORDER BY	columnlist [ASC DESC]];



COP 4710: Database Systems (Chapter 5)

Page 90

Local instance MySQL56 × Eile Edit View Query Databa	se <u>S</u> erver <u>T</u> ools <u>S</u> crip	ting <u>H</u> elp		MySQL	Workbench	Query price of the pro output	: List the product of products along v oducts currently in t in ascending orde	descriptic with the to inventory er of p_pr	on, date, a otal value / and sort ice	and of t the	
Navigator SCHEMAS Q Filter objects ▶ ▶ bikedb ▶ ■	SQL File 4* SQL File 4 SQL FIL 4 S	5* SQL Fil SQL Fil S	e 6' × ch	apter5script-vers	sion2 SQLFile ૱ * p_price as to	9 SQL otal_value Sa	ame query as prev	SQLAdditions	ELECT BLECT but addi	• ng	~
 project3 project4 test vendors 	< Result Set Filter:		()	Export	ap Cell Content 👬	ar	NORDER BY clau	Se to sort	The outpu _small_result] [cache sol no	Ut. SQL_BIC CACHE]	
Management Schemas Information No object selected	p_descript ▶ Rat+tail file, 1/8in. fine PVC pipe, 3.5in., 8ft 1.25in. metal screw, 25 2.5in. wd. screw, 50 Claw hammer Sledge hammer, 12 lb. 7.25in. pwr. saw blade 9.00in. pwr. saw blade B&D cordless drill, 1/2in Hrd. cloth, 1/4in., 2x50 B&D jigsaw, 8in. blade B&D jigsaw, 12in. blade Result 8 ×	p_qoh 43 4 188 5 172 6 237 8 23 5 8 1 32 1 18 1 18 1 12 3 23 4 6 5 8 1	p_price 1.99 5.87 5.99 3.45 0.95 14.40 14.99 17.49 38.95 39.95 13.99 39.87 109.92	total_value 214.57 1103.56 1202.28 2002.65 228.85 115.20 479.68 314.82 467.40 599.25 1011.77 599.22 879.36			Read Only	<pre>select [FROM f [PAR] [PAR] [WHERE [GROUP [ASC [HAVING [ORDER [ASC [LIMIT offset]] [PROCEI [INTO ([CI exp [INTO ([INTO (</pre>	expr [, select_ table_references IITION partition where_condition BY {col_name DESC], [W s where_conditio BY {col_name DESC],] {[offset,] row_ DURE procedure_n DUTFILE 'file_na HARACTER SET cha DONT_OPTIONS TO DUMPFILE 'file TO var_name [, v PDATE LOCK IN sed to retrieve row can include UNION Online help subque Snippets	expr _list]] expr ITH ROL n] expr count ame(arg me' rset_na e_name' ar_name SHARE N vs selec statements user of	
	Output Action Output Time Action 2968 16:29:52 COMM	▼ T				Message O row(s) affect	cted		Duration / Feto 0.000 sec	:h	
Object Info Session Query Completed	⊘ 2969 16:30:05 set sql_	safe_updates=0				0 row(s) affec	cted		0.000 sec	=	
COP 4710: Dat	tabase Systen	ns (Cha	apter	5)	Page 9)1	Dr. Mark Lle	ewellyn ©	>	S	

Local instance MySQL56 × File Edit View Query Databas	se <u>S</u> erver <u>T</u> ools <u>S</u> cr	ipting <u>H</u> elp		MySQL Workt	bench	Query: List price of pro the product output in de	t the product de ducts along wit s currently in ir escending orde	escription, date, and th the total value of nventory and sort th r of p_price	d Ie
Navigator	SQL File 4" SQL File	e 5* SQL File 6*	× chapter5	iscript-version2	SQL File	5 SQLFIIE IU	SQLFIIe II 👎 🖗	SQLAdditions	00000000
CHEMAS # **		U 189 🖽 I 🗠 🛛) 🚳 🗹					🔄 👳 SELECT 🔹	
	2 FROM proc	_aescript, p_qon, duct	p_price,	p_qon * p_pr	ice as to	tal_value		Topic: SELECT	^
colorsurvey	3 ORDER BY	p_price DESC;							
▶ 📄 mailinglist	4					Same c	luery as previo	us page but adding	
project3 project4	<					an ORI	DER BY clause	e to sort the output.	
▶ test	Result Set Filter:		🚯 Export	t 🛄 Wrap Cell Co	ntent IA			[SQL_SMALL_RESULT] [SQL_	BIC
	p descript	p aoh	p price	total value			^	[SQL_CACHE SQL_NO_CACH	E]
	Hicut chain saw, 16 in	. 11	256.99	2826.89	_			[FROM table_references	
	Steel matting, 4'x8'x1/	6", .5" mesh 18	119.95	2159.10				[WHERE where_condition]	U
	Power painter, 15 psi.,	3-nozzle 8	109.99	879.92				[GROUP BY {col_name expr [ASC DESC], [WITH	ROL
	B&D jigsaw, 12-in. blad	le 8	109.92	879.36				[HAVING where_condition] [ORDER BY {col_name expr	
	B&D jigsaw, 8-in. blade	e 6	99.87	599.22				[ASC DESC],]	tl
	Hrd. cloth, 1/2-in., 3x5	i0 23	43.99	1011.77				offset}]	and
	Hrd. cloth, 1/4-in., 2x5	0 15	39.95	599.25				[INTO OUTFILE 'file_name'	01 E
	B&D cordless drill, 1/2	in. 12	38.95	467.40				export_options	_na
	9.00-in. pwr. saw blade	e 18	17.49	314.82				INTO DUMPFILE 'file_na INTO var_name [, var_n	ame'
Management Schemas	7.25-in. pwr. saw blade	e 32	14.99	479.68				[FOR UPDATE LOCK IN SHAR	EN
Information	Sledge hammer, 12 lb.	8	14.40	115.20				SELECT is used to retrieve rows se	led
No object selected	Claw hammer	23	9.95	228.85				tables, and can include UNION state UNION, and Online help subqueries	eme
	2.5-in. wd. screw, 50	237	8.45	2002.65			×	The most commonly used clauses	of
	Result 7 ×						Read Only 🔒	Context Help Snippets	
	Output ·····								
	Action Output	•							
	Time Actio	n				Message		Duration / Fetch	^
	2967 16:29:52 INSE	RT INTO EMPLOYEE V	ALUES(116,'I	Mr.','Smith','Geon	'ge','A','1	1 row(s) affected		0.032 sec	
Object Into Session	2968 16:29:52 COM	MH				U row(s) affected		0.000 sec	
Query Completed									E .::
COP 4710: Dat	abase Syste	ms (Chapt	er 5)	P	age 9	2	Dr. Mark Llew	rellyn ©	>

Local instance MySQL56 × <u>File</u> Edit <u>Vi</u> ew <u>Q</u> uery <u>D</u> atabas	se	Server Tools	<u>S</u> cripting <u>H</u> e	elp	MySQL V	Vorkbench	Query: F employed name, th	Produce a phone es ordered by las en initial.	directory for tname, then first
Image: Construction of the second	Qu	ery 1 SQL SQL SQL SQL SQL SQL SQL SQL	File 1 SQL	File 2 SQL I I I I I I I I I I I I I I I I I I I	File3 [*] × emp_initial, e e, emp_initial;	emp_areacode,	emp_phone	Query using clause. Ca seq	the ORDER BY scading order uence.
 mailinglist project2 project2 	Resu	ult Set Filter:		\$	Export 📳 Wrap	Cell Content			SELECT [ALL DISTINCT DISTINCTROV [HIGH_PRIORITY]
 project3 project4 test vendors 		emp_Iname Brandon Diante Genkazi Johnson Jones Kolmycz Lange Lewis Saranda Smith Smith	emp_fname Marie Jorge Leighla Edward Anne George John Rhonda Hermine George George	emp_initial G D W E E M D D P C G C R C A K	emp_areacode 901 615 901 615 615 615 901 615 615 615 615 615 615 901	emp_phone 882-0845 890-4567 569-0093 898-4387 898-3456 324-5456 504-4430 324-5456 504-4472 324-5505 890-2984 504-3339			[STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIC RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_name export_options INTO DUMPFILE 'file_name'] INTO OUTPFILE 'file_name'
Management Schemas Information No object selected		Smith Smythe Vandam Washington Wiesenbach	Jeanine Melanie Rhett Rupert Paul Robert	K P E R	615 615 901 615 615 615	324-7883 324-9006 675-8993 890-4925 897-4358 890-3220			SELECT is used to retrieve rows select tables, and can include UNION stateme UNION, and Online help subqueries. The most commonly used clauses of these:
Object Info Session		Action Output Time A 1 11:51:10 s	Action elect emp Iname,	emp fname, emp	initial from employee	order by emp Ina.	Message 17 row(s) returned	Read Only 0	Context Help Snippets Duration / Fetch 0.015 sec / 0.000 sec
COP 4710: Dat	ab	ase Sys	stems (Chapter	· 5)	Page 9	93	Dr. Mark Llew	/ellyn ©

Dr. Mark Liewellyn ©

S

Listing Unique Values

- By default, SQL lists all values as the result of a SELECT command.
- While this is normally the result that you would desire, there may be cases where the output listing would contain many duplicate values, which would tend to obscure the true result.
- To remove duplicate values from the results of a SELECT command, the DISTINCT clause will remove duplicate values from the results.
- The syntax is:

SELECT [DISTINCT] columnname

COP 4710: Database Systems (Chapter 5)

Page 94



Local instance MySQL56 ×	MySQL Workbench	Query: List all the vendor codes currently present in the product table.
File Edit View Query Databas	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	Query using the DISTINCT clause.
Navigator	Query 1 SQL File 1 SQL File 2 SQL File 3 ×	
Q Filter objects Image: Solution of the second se	1 select distinct v_code 2 from product; Result Set Filter: Image: Select distinct v_code 25595 21244	✓ ✓ JELECI Topic: SELECT Syntax: SELECT Il Content: ፲A Syntax: SELECT [ALL DISTINCT DISTINCTROW [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIC RESULT] [SQL_CACHE SQL_NO_CACHE]
▶ 🥃 vendors	21344 23119 24288 21225 NULL 21231	select_expr[, select_expr [FROM table_references [PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na
Management Schemas Information No object selected		INTO DUMPFILE 'file_name' INTO DUMPFILE 'file_name' INTO VAr_name [, var_name [FOR UPDATE LOCK IN SHARE N SELECT is used to retrieve rows select tables, and can include UNION stateme UNION, and Online help subqueries .
	product 5 ×	Read Only Context Help Snippets
	Output	
	Action Output	
Object Info Session	Action 4 15:11:40 select v code from product LIMIT 0, 1000	Message Duration / Fetch 16 row(s) returned 0.000 sec / 0.000 sec
COP 4710: Datab	ase Systems (Chapter 5) Page !	96 Dr. Mark Llewellyn ©

Aggregate Functions In SQL

- SQL can perform various mathematical summaries for you, such as counting the number of rows that contain a specified condition, finding the minimum or maximum values for a specified attributes, summing the values in a specified columns, and averaging the values in a specified column.
- The following slide illustrates the basic SQL aggregate functions.

NOTE: SQL aggregate operators can only be used in the column list of a SELECT or HAVING clause. It is not possible to use an SQL aggregate operator on the right side of a comparison operator in the WHERE clause. See the example on page 103.





Aggregate Functions In SQL

Function	Output
COUNT	The number of rows containing non-null values.
MIN	The minimum attribute value encountered in the specified column.
MAX	The maximum attribute value encountered in the specified column.
SUM	The sum of all values for the specified column.
AVG	The arithmetic mean (average) for the specified column.



Dr. Mark Llewellyn ©

COP 4710: Database Systems (Chapter 5)



Local instance MySQL56 ×	MySQL Workbench se Server Tools Scripting Help	Query: Count the numb codes currently present supply a product that co	er of unique vendor in the product table who osts less than \$10.
		Query us aggre	sing the COUNT
SCHEMAS #* *	Query I SQL File I SQL File 2 SQL File 3 X Image: Square structure Image		
 bikedb colorsurvey mailinglist project2 	<pre>2 from product 3 where p_price <= 10.00; <</pre>	>	Syntax: SELECT [ALL DISTINCT DISTINCTROP
 project3 project4 test vendors 	Result Set Filter: Image: Count(distinct v_code) Image: Count(distinct v_code) Image: Count(distinct v_code)	Content 🚻	[HIGH_FRIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIG RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references
Management Schemen			[WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[Offset,] row_count
Information No object selected			offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na export_options INTO DUMPFILE 'file_name'
	Result 7 ×	Read Only 🏮	Context Help Snippets
	Output		
	Action Output -		
Object Info Session	Time Action Image: 6 16:28:31 select count(distinct v code) from product LIMIT 0, 1000	Message 1 row(s) returned	Duration / Fetch 0.015 sec / 0.000 sec
COP 4710: Datab	ase Systems (Chapter 5) Page 1	00 Dr. Mark L	lewellyn ©

Local instance MySQL56 ×	MySQL Workbench	Query: Co less than	ount the numb \$10.	er of products that cost
File Edit View Query Databas	se <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp		Query u aggre	using the COUNT
Navigator SCHEMAS #* * Q Filter objects	Query 1SQL File 1SQL File 2SQL File 3* \times Image: Square structureImage: Square structureImage: Square structureImage: Square structure1Image: Square structureImage: Square structureImage: Square structure1Image: Square structureImage: Square structure	This use of rows in condition.	of count(*) sim the specified	nply counts the number table that satisfy the
 bikedb colorsurvey mailinglist project2 project3 	2 from product 3 where p_price <= 10.00; < Result Set Filter. Wrap Cell	I Content: 1A	>	Syntax: SELECT [ALL DISTINCT DISTINCTROW [HIGH_PRIORITY]
 project4 test vendors 	count(*) 5			[SQL_SMALLAREJOIN] [SQL_SMALL_RESULT] [SQL_BIG RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count
Information				Offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na export_options INTO DUMPFILE 'file_name'
	Result 8 ×		Read Only 🏮	Context Help Snippets
	Output			
	Action Output -			
Object Info Session	Time Action Image: Constraint of the second s	Message 1 row(s) returned		Duration / Fetch 0.000 sec / 0.000 sec
COP 4710: Database Systems (Chapter 5) Page 101 Dr. Mark Llewellyn ©				



D		MySQL Workbench	Query: Which product h	as the highest price?
Local instance MySQL56 × <u>File Edit View Query D</u> atabas	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp		Query using	g the MAX aggregate function.
Navigator SCHEMAS Filter objects bikedb colorsurvey mailinglist project2 project3 project4 test vendors	Query 1 SQL File 1 SQL File 2 Query 1 SQL File 1 SQL File 2 Select p_code, p_descr from product where p_price = MAX(p)	SQL File 3' × SQL File 3' × Pript, p_price price);	NOTE: This is an incorre aggregate function. The the next slide.	ect use of an SQL e correct use is shown in Topic: SELECT Syntax: SELECT [ALL DISTINCT DISTINCTROW [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIC RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROU Context Help Snippets
Management Schemas	Action Output			
Information	Time Action		Message	Duration / Fetch
No object selected	 5 15:12:30 select distinct v_code from 	product LIMIT 0, 1000	7 row(s) returned	0.000 sec / 0.000 sec
	6 16:28:31 select count(distinct v_cod)	e) from product LIMIT 0, 1000	1 row(s) returned	0.015 sec / 0.000 sec
	7 16:29:57 select count(distinct v_cod)	e) from product where p_price <=	1 row(s) returned	0.000 sec / 0.000 sec
	8 16:32:30 select count(*) from produce	t where p_price <= 10.00 LIMIT 0,	1 row(s) returned	0.000 sec / 0.000 sec
_	9 16:33:56 select count(*) from produce	zt LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
Object Info Session	8 10 16:39:37 select p_code, p_descript,	p_price from product where p_pric	Error Code: 1111. Invalid use of group functio	on 0.000 sec

Page 103





	MySQL Workbench	Query: Which product h	nas the lowest price?
Local instance MySQL56 × <u>File Edit View Query D</u> atabas	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	Query usir	ng the MIN aggregate
			() ()
Navigator	Query 1 SQL File 1 SQL File 2 SQL File 3* ×		SQLAdditions
SCHEMAS 📲 🎨	🗀 🖬 🗲 ዥ 👰 🕐 🔀 🖽 📀 📀 🗐 🛫 🔍 🕦 🖃		🔄 🔿 🛛 Jump to 🕞
Filter objects bikedb colorsurvey	1 • select min(p price) 2 Execute the selected portion of the script or everything, if	there is no selection	Topic: MAX Syntax: MAX([DISTINCT] expr)
mailinglist project2	<	>	Returns the maximum value of expr.
project3	Result Set Filter: 🚷 Kaport: 🏭 Wrap Ce	ell Content IA	such cases, it returns the maximum
 project4 test vendors 	min(p_price) 4.99		string value. See <u>Online help</u> <u>mysql-indexes</u> . The DISTINCT keyword can be used to find the maximum of the distinct values of expr, however, this produces the same result as omitting DISTINCT. MAX() returns NULL if there were no matching rows.
	Result 11 ×	Read Only 🏮	Context Help Snippets
	Output		
Management Schemas	Action Output		
Information	Time Action	Message	Duration / Fetch
No object selected	7 16:29:57 select count(distinct v_code) from product where p_price <= 9 10:22:20 select count(f) from product where p_price <= 10.00 LIMIT.0	1 row(s) returned	0.000 sec / 0.000 sec
	 9 16:32:50 select count() from product UMIT 0 1000 	1 row(s) returned	0.000 sec / 0.000 sec
	 10.33.37 select p code p descript p price from product where p price 	From Code: 1111 Invalid use of group funct	ion 0.000 sec
	11 16:41:49 select max(p_price) from product LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
	12 16:43:08 select min(p_price) from product LIMIT 0, 1000	1 row(s) returned	0.000 sec / 0.000 sec
Object Info Session			×



Local instance MySQL56 ×	MySQL Workbench	Query: What is the total to the company by all c	l amount currently owed ustomers?	
File Edit View Query Databas	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	Query using	g the SUM aggregate function.	
Navigator	Query 1 SQL File 1 SQL File 2 SQL File 3* ×		SQLAdditions	
SCHEMAS 🛪 🏶	🗀 🖬 🗲 ዥ 👰 🔘 🔀 🖽 🕥 📀 🔞 🛫 🔍 🕦 🖃		🔄 🔿 SELECT 🔹	
 Q Filter objects ▶	<pre>select sum(cus_balance) as totalbalance from customer;</pre>		Topic: SELECT	
 colorsurvey mailinglist project2 project3 project4 			Syntax: SELECT [ALL DISTINCT DISTINCTROW [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIC PESULT]	
vendors			[SQL_CACHE SQL_NO_CACHE]	
Management Schemas Information No object selected	Result 12 ×	Read Only	<pre>select_expr [, select_expr [FROM table_references [PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na export_options INTO DUMPFILE 'file_name' INTO DUMPFILE 'file_name' INTO DUMPFILE 'file_name' Context Help Snippets</pre>	
		nead only of	context risip	
	Action Output ▼			
Object Info Session	Time Action 0 10:00:00	Message	Duration / Fetch	
COP 4710: Database Systems (Chapter 5) Page 106 Dr. Mark Llewellyn ©				

Local instance MySQL56 ×	MySQL Workbench	Query: What is the total inventory (cost of all iter	l value of the current ms currently on hand)?
File Edit View Query Databas	e <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	Query using	g the SUM aggregate function.
Navigator SCHEMAS n ^k (*	Query 1 SQL File 1 SQL File 2 SQL File 3* × □ □ ✓	NOTE: This query illust functions can also be a	rates that the aggregate pplied to expressions.
Filter objects bikedb colorsurvey mailinglist project2 project3 project4 test vendors	<pre>1 • select sum(p_qoh * p_price) as totalvalue 2 from product; </pre> Result Set Filter: totalvalue 15084.52	> Content <u>∓A</u>	Syntax: SELECT [ALL DISTINCT DISTINCTROW [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIC RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [PARTITION partition_list] [MHERE where_condition] [GROUP BY {col_name expr [ASC DESC],] [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_name export_options
	Result 13 ×	Read Only 🏮	Context Help Snippets
	Output		
	□ Action Output •		
Object Info Session	Time Action 14 10:40:30	Message	Duration / Fetch
COP 4710: Database Systems (Chapter 5) Page 107 Dr. Mark Llewellyn ©			

Local instance MySQL56 ×	MySQL Workbenc	Query: What is the curr products?	ent average price of all					
File Edit View Query Databas	se <u>S</u> erver <u>T</u> ools <u>S</u> cripting <u>H</u> elp	Query usin	g the AVG aggregate function.					
Navigator	Query 1 SQL File 1 SQL File 2 SQL File 3* ×		SQLAdditions					
SCHEMAS 🛪 🏶	ि 🖿 🖶 🗲 爱 🖗 🔀 🖽 🕥 🛇 🔞 🕑 🔍 🕦 🖃		🔄 🔿 SELECT 🔹					
 Filter objects bikedb colorsurvey mailinglist project2 project3 project4 test vendors 	<pre>1 • select avg(p_price) 2 from product; </pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre> <pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre></pre>	> Cell Content IA	Syntax: SELECT [ALL DISTINCT DISTINCTROW [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIC RESULT] [SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [PARTITION partition_list] [MHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],]					
Management Schemas			offset}]					
Information			[PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na export_options INTO DUMPFILE 'file_name'					
	Result 14 ×	Read Only 🔋	Context Help Snippets					
	Output							
	Action Output -							
Object Info Session	Time Action 15 10.40.52	Message T 1/-1	Duration / Fetch					
COP 4710: Database Systems (Chapter 5) Page 108 Dr. Mark Llewellyn ©								
Local instance MySQL56 ×			I	MySQL V	Vorkbench	Query: Lis more than	at details of the the average	ose products which cost price of a product.
--	------------	--	--	--	--	---	-------------------------------	--
File Edit View Query Databas	e] [C	<u>S</u> erver <u>T</u> oo ¶	ols <u>S</u> cripting <u>H</u> elp				Query usin	g the AVG aggregate function.
Navigator	Qu	ery 1 SC	QL File 1 SQL File 2 SO	QL File 3* 🔅	×			SQLAdditions
SCHEMAS 🛪 🏶	Ĉ	B 🗲 🖞	f 👰 🕐 1 🔀 🖽 🛛 🖉 🕅	8 😻	Q. ¶ Ŧ			🗢 👳 SELECT 🔹
 Filter objects bikedb colorsurvey mailinglist project2 project3 project4 test 	<	1 • se 2 3 4 5 or	<pre>lect p_code, p_descript, eccute the selected portion of the from product of from product der der by p_price desc;</pre>	p_qoh, p escript or e s(p_pr icc	o_price, v_ everything, if th	code here is no selection)	Topic: SELECT Syntax: SELECT [ALL DISTINCT DISTINCTROW [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQL_BIC RESULT] [SQL_SMALL_RESULT] [SQL_BIC
vendors	Resu	It Set Filter:		Export:	Wrap Cell	Content TA		[SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr
Management Schemas Information No object selected	pro Out	p_code 89-WRE-Q WR3/TT3 11QER/31 2232/QTY 2232/QWE duct 15 × tput	p_descript Hicut chain saw, 16 in. Steel matting, 4x8'x1/6", .5" mesh Power painter, 15 psi., 3-nozzle B&D jigsaw, 12-in. blade B&D jigsaw, 8-in. blade	p_qoh 11 18 8 8 6	p_price 256.99 119.95 109.99 109.92 99.87	v_code 24288 25595 25595 24288 24288	Read Only 9	<pre>[FROM table_references [PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na export_options INTO DUMPFILE 'file_name' INTO DUMPFILE 'file_name' INTO DUMPFILE 'file_name' INTO var_name [, var_name Context Help Snippets</pre>
		Time	Action			Message		Duration / Fetch
Object Info Session	•	10 10.40.10		MIT 0 100/	۱ 	1 4		0 000 / 0 000
COP 4710: Databa	ase	e Syste	ms (Chapter 5)		Page 1	09	Dr. Mark L	lewellyn ©

Grouping Data

- In the previous few examples, the aggregate functions summarized data across all rows in the given tables. Sometimes, however, you do not want to treat the entire table as a single collection of data for summarizing. Rows can be grouped into smaller collections quickly and easily using the GROUP BY clause within the SELECT command.
- The aggregate functions will then summarize the data within each smaller collection. The syntax is:

COP 4710: Database	Systems (Chapter 5) Page 110 Dr. Mark Llewellyn ©
[ORDER BY	Columnlist [ASC DESC]];
[HAVING	conditionlist]
[GROUP BY	columnlist]
[WHERE	conditionlist]
FROM	tablelist
SELECT	columnlist

Grouping Data

- The GROUP BY clause is only valid when used in conjunction with one of the SQL aggregate functions. You generate a "not a GROUP BY expression" error otherwise. (Note that not all DBMSs support this, for example, MySQL will allow a GROUP BY clause without an aggregate function, but this is not standard SQL).
- The GROUP BY clause is generally used when you have attribute columns combined with aggregate functions in the SELECT statement.
- For example, you might want to determine minimum price for each of the different sales codes that you have, rather than the minimum price for all products. You would need to group the data by sales code, then determine the minimum price within each sales code (smaller grouping).
- This is illustrated in the next slide.



Dr. Mark Llewellyn ©

Local instance MySQL56 ×			MySQL Workbench	Query: Lis each venc	st the minimur lor.	n price for products from
File Edit View Query Databas	e <u>S</u> erver	<u>T</u> ools <u>S</u> cripting <u>H</u> elp			Query us	ing the GROUP BY
Navigator	Query 1	SQL File 1 SQL File 2* \times	SQL File 3*			SQLAdditions
SCHEMAS 🛪 🏶	🗀 🛛 🖢	7 🙀 🔕 🔘 1 🔀 🗐 🛛 🛇) 🗑 🕑 🖉 🛐 🗐			🗢 🔿 SELECT 🔹
 Filter objects bikedb colorsurvey mailinglist project2 project3 	1 • 2 3 4	<pre>select v_code, min(p_prid from product group by v_code order by v_code;</pre>	>	Topic: SELECT Syntax: SELECT [ALL DISTINCT DISTINCTROV [HIGH_PRIORITY] [STRATCHT_JOIN]		
project4 test	Result Set Filter:			[SQL_SMALL_RESULT] [SQL_BIC RESULT]		
Management Schemas Information No object selected	v_code v_code	min(p_price) 5.87 6.99 8.45 4.99 39.95 99.87 38.95			Read Only 9	<pre>[SQL_CACHE SQL_NO_CACHE] select_expr [, select_expr [FROM table_references [PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTFILE 'file_name' [CHARACTER SET charset_na export_options INTO DUMPFILE 'file_name' Context Help Snippets</pre>
	0					
	Action O	utput •	Duration / Estab			
Object Info Session	 19 16:57 	:09 select * from product LIMIT 0, 1	000	16 row(s) returned		0.000 sec / 0.000 sec
COP 4710: Databa	ase Sys	tems (Chapter 5)	Page 1	12	Dr. Mark L	lewellyn ©

Local instance MySQL56 ×					MySQL Workbe	nch	Query: Ho each vend	ow many proc dor?	lucts are	supplied by	
File Edit View Query Databas	e C	Server	<u>T</u> ools <u>S</u> cripting	<u>H</u> elp				Query us	ing the G clause.	ROUP BY	
Navigator	Qu	ery 1	SQL File 1	SQL File 2*	× SQL File 3*				SQLAdditions		
SCHEMAS 🗚 🚸	C	8	7 🙀 🖗 🔘	86 🖽 I 📀) 🛯 😽 💐 🔍 🖪 (J)			🗢 🔿 🛛 SEL	ECT -	
Q Filter objects		1 •	select v_cod	e, count(d	istinct p_code)				T	LEAT	^
🕨 📄 bikedb		2	from product	ada .					Topic: SE	ELECI	
Colorsurvey		3	group by v_co	Juej					Syntax:		
mailinglist									ALL 1	DISTINCT DISTINCTR	OV
project3	<							>	[HIGH	_PRIORITY]	
project4	Resu	It Set Filter:			Export 🛄 Wr	ap Cel	I Content 1A		[SQL_	SMALL_RESULT] [SQL_B	IC
test vendors		v code	count/disting	t n. code)			_		[SQL_	CACHE SQL_NO_CACHE	1
	L	NULL	2	.p_0000/					select_ [FROM t	expr [, select_expr able_references	
	Ľ	21225	2						[PART	ITION partition_list	1
	F	21231	- 1						GROUP	BY {col_name expr	
	-	21344	3						[HAVING	where_condition]	
	-	23119	2						[ORDER [ASC	BY {col_name expr DESC],]	
	-	24288	3	3					[LIMIT {[offset,] row_count offset}]		I
	-	25595	3						[PROCEDURE_procedure_name(ar)		ne -
Management Schemas	-	20000	Ŭ						[INTO 0	ARACTER SET charset_	na
Information	Re	sult 6 🗙						Read Only 🏮	Context Help	Snippets	
No object selected	Out	tout seesee									
		Action O	tout.								
	- LII'	Action Of	Action	•			Marrage			Duration / Estab	
	0	23 17:03	49 select v code	e n code n d	lescript p price from product	arou	7 row(s) returned			0.000 sec / 0.000 se	_ ^
	24 17:06:49 select v code count/distinct v code) from product group by 7 mw(s) returned								0.000 sec / 0.000 se	с	
	25 17:07:07 select v code count(distinct n code) from product group by 7 now(s) returned								0.000 sec / 0.000 se	с с	
Object Info Session	Ĩ			., see a queen to		1					
esject and beaution	_										Ť
COP 4710: Databa	ase	e Syst	tems (Cł	napter {	5) Pag	e 1	13	Dr. Mark L	lewellyn	© (\\	5

Grouping Data – The HAVING Clause

- A particularly useful feature of the GROUP BY clause is the HAVING clause.
- The HAVING clause operates very much list the WHERE clause in the SELECT clause. However, the WHERE clause applies to columns and expressions for individual rows, while the HAVING clause is applied only to the output of the GROUP BY clause.
- The HAVING clause can only be used in conjunction with the GROUP BY clause. It cannot stand alone.
- For example, suppose that you want to generate a listing of the number of products inventory supplied by each vendor. However, this time you want to limit the listing to products whose prices average less than \$10. The first part of this queries requirements will be satisfied using the GROUP BY clause (as shown on the next slide), but to completely satisfy this query, the HAVING clause will also be required to restrict the results from the GROUP BY clause, this final result is shown in the slide on page 116.



COP 4710: Database Systems (Chapter 5)

Page 114

Local instance MySQL56 ×				MySQL Work	pench	Query: Lis supplied b	t the number y each vendo	of products in inventory or.	
File Edit View Query Databa	se	<u>S</u> erver <u>To</u>	ools <u>S</u> cripting <u>H</u> elp				Query us	ing the GROUP BY clause.	0
Navigator	Qu	ery 1 S	SQL File 1 SQL File 2*	× SQL File 3*				SQLAdditions	x
SCHEMAS 📲 🎨	C	- 🖬 🕖	🖌 👰 🔘 1 🔀 🖽 🛛) 🛛 🕱 💆 🔍 🛽	F			🗢 🔿 SELECT 🔹	
 Filter objects bikedb colorsurvey mailinglist project2 		1 • s 2 f 3 g	elect v_code, count(rom product roup by v_code;	<pre>distinct p_code),</pre>	avg(p_p	price)		Topic: SELECT Syntax: SELECT [ALL DISTINCT DISTINCTROV	
project3	<						>	[STRAIGHT_JOIN]	
project4 test	Resu	It Set Filter:		🚷 Export 🏣 Wrap Cell Content 🚹				[SQL_SMALL_RESULT] [SQL_BIC RESULT]	
vendors		v_code	count(distinct p_code)	avg(p_price)				[SQL_CACHE SQL_NO_CACHE] select expr [, select expr	
	•	NULL	2	10.135000				[FROM table_references	t]
		21225	2	8.470000				[WHERE where_condition]	
		21231	1	8.450000				[ASC DESC], [WITH ROL	
		21344	3	12.490000				[HAVING where_condition] [ORDER BY {col_name expr	
		23119	2	41.970000				[ASC DESC],] [LIMIT {[offset,] row count	
		24288	3	155.593333				offset}] [PROCEDURE_procedure_name(ars	
Management Schemas		25595	3	89.630000				[INTO OUTFILE 'file_name'	
Information	Re	sult 7 🗙					Read Only	evont ontions Context Help Snippets	
No object selected	0						near only a		
	- 00	tput							<u>5</u>
	יינ	Action Out	out •					Duration / Estab	
	0	24 17:06:4	9 select v code, count(distin	ct v code) from product a	roup by	7 row(s) returned		0.000 sec / 0.000 sec	
	0	25 17:07:0	7 select v code, count(distin	0.000 sec / 0.000 sec					
	26 17:16:03 select v code, count(distinct p code) ava(o price) from prod 7 row(s) returned							0.000 sec / 0.000 sec	
Object Info Session									,
COP 4710: Datab	ase	e Syste	ems (Chapter	5) Pa	ige 1	15	Dr. Mark L	lewellyn © 🛛 🥯	

Local instance MySQL56 × <u>File Edit View Query D</u> atabas	se <u>S</u> e	rver <u>T</u> o	ols <u>S</u> cripting	g <u>H</u> elp	MySQL \	Vorkbench	Query: Lis supplied b products v	t the number y each vendo vhich average	of products in inver or but only list the e less than \$10.	itory
Navigator	Query	(1 S	QL File 1		× SQL File 3*			Query us clause with	ing the GROUP BY the HAVING clause	e s
SCHEMAS ** *			🖌 🔕 🕐 I	86 🖽 🖉	884	0.117				_
 Filter objects bikedb colorsurvey mailinglist project2 project3 project4 	<	1 • se 2 fr 3 gr 4 ha	elect v_cod com product coup by v_c aving avg(p	e, count(d ode _price) <	listinct p_co	de), avg(p_	price)	>	Topic: SELECT Syntax: SELECT [ALL DISTINCT DISTIN [HIGH_PRIORITY] [STRAIGHT_JOIN] [SQL_SMALL_RESULT] [SQ	
test	Kesuit Set Filter.			t	txport		Content: IA		RESULT] [SQL_CACHE SQL_NO_CA	CHE]
Management Schemen	22	/_code 1225 1231	2 1	t p_code)	avg(p_price) 8.470000 8.450000				<pre>select_expr [, select_ex [FROM table_references [PARTITION partition_] [WHERE where_condition] [GROUP BY {col_name ex [ASC DESC], [WIT [HAVING where_condition] [ORDER BY {col_name ex [ASC DESC],] [LIMIT {[offset,] row_coc offset}] [PROCEDURE procedure_nam [INTO OUTFILE 'file name]</pre>	pr ist] pr H ROL pr punt he(arg
Management Schemas									[CHARACTER SET chars export options	et_na
Information	Resu	t8 ×						Read Only 🏮	Context Help Snippets	
no object selected	Output									
	j l	Action Outp	out	•						
		Time	Action				Message		Duration / Fetch	^
	 25 17.07.07 select v_code, count(distinct p_code) from product group by 7 row(s) returned 26 17:16:03 select v_code, count(distinct p_code) avg(p_price) from product 7 mw(s) returned 								0.000 sec / 0.00	U sec
	20 17:10:03 select v_code, count(distinct p_code), avg(p_price) from prod / row(s) returned							0.000 sec / 0.00	0 sec	
Object Info Session		17.10.04	- 30/001 ¥_000	o, ooant(diatilit	x p_0000), avg(p_	photy non prod.			0.000 366 7 0.00	v 300
COP 4710: Databa	ase	Syste	ems (Cl	hapter :	5)	Page 1	16	Dr. Mark L	lewellyn ©	S

Local instance MySQL56 × File Edit View Query Database	<u>S</u> erver <u>T</u> o	ools <u>S</u> cripting	My <u>H</u> elp	/SQL Workbench	Query: Lis v_code for than \$500 descendir	t the total cos those produc and arrange g order of tota	at of products grouped by cts with total cost greater the results in al cost.
Navigator SCHEMAS x ^µ Q Filter objects > ⇒ bikedb ⇒ colorsurvey ⇒ ⇒ mailinglist	Query 1 5	SQL File 1	Query usi clause with and an ag	ing the GROUP BY the HAVING clause ggregate functions.			
 project2 project3 project4 test vendors 	< Cesult Set Filter: V_code 2/1209	totalcost		Export 🔚 Wrap Cell C	Content IA Content IA Conte		
	 24288 25595 21231 23119 21225 NULL 21344 	4305.47 3506.42 2002.65 1611.02 1431.13 1218.76 1009.07					[PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg
Management Schemas	Result 9 ×	1000.07				Read Only 🏮	[CHARACTER SET charset_na export_options Context Help Snippets
No object selected	Output	put	•				
	 Time 26 17:16:0 27 17:18:0 28 17:20:1 	Action 3 select v_code, 4 select v_code, 5 select v_code,	count(distinct p_code) count(distinct p_code) sum(p_qoh * p_price) a	, avg(p_price) from prod , avg(p_price) from prod as totalcost from produc	Message 7 row(s) returned 2 row(s) returned 7 row(s) returned		Duration / Fetch 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec
Object Info Session	se Svst	ems (Ch	apter 5)	Page 11	17	Dr. Mark I	v Iewellvn ©

SY

Local instance MySQL56 × <u>File Edit View Query Databas</u>	e	Gerver	<u>T</u> ools <u>S</u> cripting	<u>H</u> elp	MySQL Work	bench	Query: Lis v_code fo than \$500 descendir	at the total cos r those product and arrange ng order of tota	at of products grouped by cts with total cost greate the results in al cost.	y ⊧r	
Navigator SCHEMAS #* * Q Filter objects bikedb colorsurvey colorsurvey	Query 1 SQL File 1 SQL File 2* × SQL File 1 SQL File 2* × SQL Fi				SQL File 3* ፼ ♥ Q ¶ ₪ * p_price) as totalcost			t Query using the GROUP BY clause with the HAVING clause and an aggregate functions using the column alias.			
 mailinglist project2 project3 project4 test vendors 	< Resu	5 t Set Filter: v_code	order by tota	🔥 Export 🔚	Wrap C	NOTE: Not all DBMS will allow a column alia be used in the HAVING and ORDER BY clauses. Instead the column expression must be used as shown in the previous slide.					
	•	24288 25595 21231 23119 21225 RUUL 21344	4305.47 3506.42 2002.65 1611.02 1431.13 1218.76 1009.07			•			<pre>[FROM table_references [PARTITION partition_list] [WHERE where_condition] [GROUP BY {col_name expr [ASC DESC], [WITH ROL [HAVING where_condition] [ORDER BY {col_name expr [ASC DESC],] [LIMIT {[offset,] row_count offset}] [PROCEDURE procedure_name(arg [INTO OUTELLS 'file name']</pre>		
Information No object selected	Rea	ult 10 🗙						Read Only 🌖	[CHARACTER SET charset_na export ontions Context Help Snippets	×	
Object Info Session	0 0 0	Action O Time 27 17:18 28 17:20 29 17:23	Action Action CO4 select v_code Select v_code Select v_code Action Actio	count(distinct p_e, sum(p_qoh * p_p, sum(p_qoh * p_p))	code), avg(p_price) rice) as totalcost fro rice) as totalcost fro	from produc om produc om produc	Message d 2 row(s) returned c 7 row(s) returned c 7 row(s) returned		Duration / Fetch / 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec 0.000 sec / 0.000 sec	^	
COP 4710: Databa	ase	Syst	tems (Ch	apter 5)	Pa	age 1	118	Dr. Mark L	lewellyn ©		