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MySQL Intermediate Overview

Open Source SQL Database

Currently Using MariaDB (MySQL5.5 Fork)

Required to complete intermediate.sql

Learning Objectives

1) Joining Tables using sub-queries
2) Joining Tables by intersection

3) Become Familiar w order by limit
4) Become Familiar w Insert, and Delete

5) MySQL Internal Functions aka Intrinsics
6) PHPMyAdmin History Mechanism
7) SQL Programming Languages Interfaces

Background Outline

- Video 1 Details
  - SQL Command Review (Introduce History)
  - Schematic Fruit Relational Database
  - Advance Query Combining Tables & Apply Function
- Video 2 Insert/Delete
  - Insert
  - PHPMyAdmin Bookmarks
  - Delete Command
  - Order by with 2nd field, comma separator
  - Table Summary SQL Commands

Study Skills – Due Diligence

- Lost Art?
- In Era of 5 Minutes



- Videos 50 minutes → 15 Minutes
- Secrets Studious HS Freshmen – Due Diligence
  - Watch, Listen, Take Notes, Review
  - Then do Homework – Quizzes
- Not Be Penny-wise Pound Foolish
  - Basics Matter

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Video 1
Intro Functions & Joining Tables

Review SQL Select Commands
Basic table Intersection and Subquery
Show Power of Joining Tables

SQL Command Review

Intermediate.sql

- Data Manipulation Language (DML)
  - Manipulating/Modifying the Data
  - insert, delete, & update
  - Best Handled w PHPMyAdmin
- Data Definition Language: create, drop
- Internal Functions – (aka Intrinsics)
  - sum(quantity) would Sum Quantity, now()
- Select – Query for Displaying Data
- For Meaningful Display Your must
  - Combine Tables and Apply Functions

Fruit Relational Database order by fruitID

Intermediate.sql

fruit		
fruitID	name	price
1	apple	2.50
2	pear	3.00
3	banana	1.00
4	grpe	.75
5	peach	1.25
6	plum	1.25
8	pluot	4.50

inventory	
fruitID	quantity
1	**100**
1	**250**
2	200
2	100
3	500
5	10

Fruit Relational Database order by fruitID

Intermediate.sql

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fruitID	name	price
1	apple	2.50
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fruitID	quantity
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2	200
2	100
3	500
5	10

Fruit Relational Database order by fruitID

Intermediate.sql

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inventory	
fruitID	quantity
1	**100**
1	**250**
2	200
2	100
3	500
5	10

❶ #i1 display inventory rows for name apple

❷ #i2 display name, sum(quantity) for name apple

#i1 Display Inventory Rows for name apple

Intermediate.sql

1. Best Practices Not Assume Apple fruitID 1
2. subQuery
   Select fruitID from fruit where name="apple";
3. Use Subquery Display Inventory Rows
4. #i1 Display Inventory Rows name Apple
   Select * from inventory
   where fruitID = (above subQuery)

#i2 Sum Apples inventory

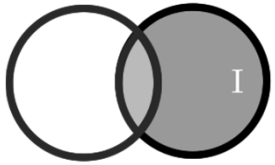
Intermediate.sql

name	sum(quantity)
apple	350 = 100 + 250

- Use #i1 (sub Query and Query)
- Add Aggregate Sum to Quantity
- Can use Sub Query or Table Join
  Repeat w Join Table

#i2 join tables display total quantity # apples as name, sum(quantity)

Intermediate.sql



fruit		
	name	price
1	apple	2.50
2	pear	3.00
3	banana	1.00
4	grpe	.75
5	peach	1.25
6	plum	1.25
8	pluot	4.50

inventory	
	quantity
1	**100**
1	**250**
2	100
2	200
3	500
5	10
99*	100
* Not in Current inventory Table	

- Additional Caveat w name = "apple";
- Select sum(quantity) from fruit F, inventory I
  Where F.fruitID = I.fruitID
  and name = "apple";

Complete Viewgraph –#i1 #i2

Intermediate.sql

#i1 Display Inventory Rows for name apple
#requires a table:fruit subQuery

#i2 join tables display total quantity apples
as name, sum(quantity)

Video 2 Insert/Delete

Review SQL Data Manipulation Language
PMA Console Bookmarks

Insert, update and delete

Look at intermediate.sql

Delete peach – fruitID 5

Insert/Delete

- #i3 Delete fruit row with name peach
  - SQL Tab: **Delete from fruit where name = "peach"**
  - Where can be either name like "peach" or fruitID=5
  - or
  - PHPMyAdmin: Browse Click Delete Icon "Key in Place"
- Insert, delete, update, select all use same where, order by and limit clause
  - delete from fruit where price > 1 order by price desc limit 1;
- **Verify peach is gone (name="peach")**
- **#i4 display all rows in table fruit fruitID ASC**

Insert peach – fruitID 5

Insert/Delete

- Check for Peach fruitID=5;
  - PHPMyAdmin: Browse table or Search Tab
- #i5 Insert into fruit Values(5, "peach", 1.25);
  - PHPMyAdmin Insert Tab, or Insert Row at Browse or SQL
- PHPMyAdmin: Browse Table or Search Tab
  - Select * from fruit where fruitID=5;
- PHPMyAdmin Console History Tab
  - Add Bookmark #i5 insert peach
  - Can Add Bookmark in Console Window or When 1st Enter Query

Sorting by 2nd Field, When we have tie for 1st

Insert/Delete

- Order by Column
  - Sort by Column
  - default Ascending aka dictionary/phonebook
- Sort by one column, on ties use other column
  - Order by price, name ascending

- #i6 Display name, price from table:fruit
- #order by price asc, ties sort lexicographically

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Complete Viewgraph #i3 to #i6

Insert/Delete

#i3 delete peach from fruit table
make sure delete peach, if not i4 will fail;

#i4 Display contents of table fruit, ascending fruitID

#i5 insert peach fruitID 5, name peach & price $1.25

#i6 display fruit name and price sorted by price ascending
then by name lexicographically

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submit intermediate.sql #i1 - #i6

Insert/Delete

- Universal Hotkey Reminders
  Ctrl^A select All; Ctrl^C Copy; Ctrl^V Paste
- Submit HotKey Ctrl^G grade

1. Login to Submit
2. Paste All Comments from Previous Viewgraph (PDF) or Use Assignment Link for Detailed Comments
3. Use Hand Written "Complete Viewgraph" Notes*
4. If you fail,
   use Console History in PHPMyAdmin or
   refer to your notes or
   do them again in PHPMyAdmin first

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SQL Command Summary where order by limit (wol)

show tables; show databases;	describe tableName;
Use dbName; #Uses specified Databases	
Select * from tblName; #Display all rows	
Select * from tblName [where | order by | limit];	
Where conditional; Order by fieldName [asc default | desc]; limit offset #rows #1st row is 1	
Insert into table values('tom'),('dawn');	
delete from table [where | order by | limit];	
update tblName set name='tom' [where|o|limit];	
Create table tblName (fieldNames fieldTypes[,]);	

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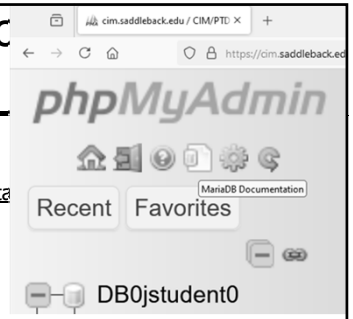
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MySQL Internal Functions aka Intrinsic

Getting Help (Finding Function Definitions)
String
Date
Aggregate

MySQL Functic Help

- MySQL or MariaDB Web-site
  https://dev.mysql.com/doc
  https://mariadb.com/kb/en/documenta
  - Reference Manuals Online
  - CHM Files, PDF, Eclipse Plugins
  - PHPMyAdmin top left navbar top



- http://dev.mysql.com/doc/refman/8.0/en/functions.html
- Case Insensitive length === LeNGth
  - We will always use lower case function names
- Group by MySQL Aggregate Functions Similar to MS Excel
  - max, sum, avg, count, etc.
- MySQL Command `help functionName`
  - Help concat; # +Options Full Text
  - Also rollover in PMA after a Go (non edit mode)

Concat String Function

INTRINSICS

- String Array of Characters
  - Enclosed inside of Double Quotes
- Select concat("mickey", "disney.com") --> mickeydisney.com
- Select concat_ws("@", "mickey", "disney.com");
  - Concatenate with Separator
  - mickey@disney.com
- #i7 display fruit Table but prefix price w $
  # sort by fruitID ascending

String Functions Continued

INTRINSICS

- Select ucase("Tomato") → TOMATO
- Select lcase("tomATo") → tomato
- length(String)
  - Returns string length
  - Select length("12345") → 5;
  - Select length(name) from fruit;
    - Kick Back the Length of Each Fruit Name

locate(needle, haystack, [Offset]);

INTRINSICS

- Returns starting index of needle in haystack
  Search Starts at Specified Offset, Default is 1
  Returns 0 on Failed Search
- select locate("mat", "tomatoe");
- select locate("t", "tomatoe", 2);
- select locate('a', name) from fruit;
- Kick Back starting Location of A in fruit.name

Date – Time Functions

INTRINSICS

- select now();
  - returns Current Date;
- dayofmonth(now()); → returns day of month
- date_add(now(), interval value type)
  - date_add(now(), interval 21 day)
  - date_sub(date, interval value type)
- dayofweek(now()); 1 for Sunday

Aggregate Functions

INTRINSICS

- Aggregate : combine element into a group
- Function: returns a Single value
- Aggregate Function: combines elements returns single value
- avg(fields) - Average of Field/Column Values
- count(fields) - Number of Fields/Columns
- max(price) - Maximum Price, of column price
- sum(fields) - Sum of Fields, Value of Each Fruit

  #i8 display average price of Table:fruit

  #i9 display name, price for fruit above #average price, use i8 a subquery

Complete Viewgraph #intermediate7 - #i11

INTRINSICS

#i7 display fruit table, as fruitID, name, price
#but prefix each price with $, sort by fruitID ASC

#i8 display average price of Table:fruit

#i9 display name, price for fruit priced > average price, hint make i8 subquery

#i10 display the total number of pieces of fruit in inventory

#i11 display fruitID, and total inventory quantity for each fruit #in inventory with a total quantity greater than 300.

Group by Aggregate

- SELECT expr [FROM table_references
- [WHERE where_condition]
- [GROUP BY col_name] #organize for aggregrate
- [HAVING where_condition] #correspond to aggregrate
- [ORDER BY col_name [ASC | DESC], ...]
- [limit offset];
- Select * from inventory
  group by fruitID having sum(quantity) > 300
- In PMA Run query click select Link & group by
- #i10 display the total number of pieces of fruit in inventory
- #i11 display fruitID, and total inventory quantity for each #fruit in inventory, with a total quantity greater than 300

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SQL New Skill Summary

1) Subquery returns one value for where
2) Like String comparison Operator
3) Insert into table "drop peach?"
4) concat function, concat("$", price)
5) Aggregates
   - avg, max, count
   - Group by ColumnName; -- set aggregate
   - Having (where used with group by first)

- And, or Compound Operators
- On ties Sort on 2nd field

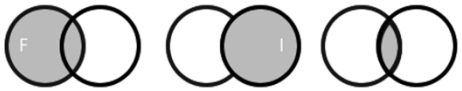
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Combining Tables

Combining Tables
For Meaningful Output

Combining Tables

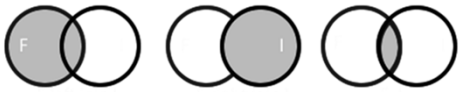
- Can always use a sub-query inside parenthesis
  - #i12 display each inventory row as fruitID, value where value is quantity * price, w prefix $



- Select * from f left join i on f.fruitID = i.fruitID;
  #join uses on
- Select * from f right join i on f.fruitID = i.fruitID; #i12
- Select * from f, i where f.fruitID = i.fruitID
  - Inner join, intersection null items not matched

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#i13 join all fruit #i14 intersection



- #i13 display name, price and sum quantity
  # for all fruit, even ones with quantity null
  - fruit left join inventory
- #i14 display name & value for all fruit in inventory
  # value is sum(quantity) * price prefix w $
  - fruit , inventory - intersection
- Nota bene usually avoid group by situations

Combining Two Tables…

- Select fields from table1, table2, …
  where | order by limit
- Each Row of Table 1 is matched
  to each Row of Table 2;
  - #rows = count Table1 * count Table 2
- Trick Write Conditional to Combine Tables
  - Conditional specify how tables relate…
    where fruit.fruitID = inventory.fruitID
  - One Table has multiple Rows group by Clause

Combine Tables w Special Conditional

- List all Fruit with Single Inventory
  Line with Quantity over 400
- Combine Tables Matching fruitID
- And Conjunction for Quantity > 400

#i15 display name, price and quantity for all fruit that have
#inventory quantity line greater than 400 sort fruitID ASC

And & Or Operator

- Logical Operators ‘And’, & ‘or’
- And Both True; Or Only One True

- select * from fruit
where price >= 1.0 and price <= 4.0;

#i16 display name, price and quantity for all fruit that have
inventory quantity line greater than 200 or price greater
than 2.50 sort fruitID ascending, then quantity asc

Combining Multiple Tables

- select * from tbl1, tbl2, tbl3 where
  tbl1.id = tbl2.id and tbl2.part = tbl3.part
  and xxx = tbl.xxx;
- Sub-Query (Query Statement within a Query)
- Select * from table1, table2
  where table1.id = table2.id
  and xxx = (select xxx from table3 where condition);
- Select * from inventory where
  fruitID =
  (select fruitID from fruit where name ="apple");

intermediate.sql Summary

- Videos Complete Queries 1..16,
  You need to do the Last 4
- If you don't get 20/20
  - Check to Make Sure Syntax is Right
    - Make Sure Delete and Insert Syntax is Correct
  - All SQL Commands end with semicolon ;
  - Verify all SQL Commands on phpMyAdmin
  - Click Red or Black Tabs to See Errors

I15, and I16

- #i15 display name, price and quantity for all fruit
- #that have inventory quantity line greater than 400
- #i16 looking at only fruit in inventory,
  # display name, price and quantity for all fruit that have
- # inventory quantity line greater than 200 or have a price
- # greater than 2.50
- #if you use , to join you will need both
  #and & or in your where clause
  #sort fruitID ascending, then by quantity asc
- # this is just order by fruit.fruitID asc, quantity asc;

Complete Viewgraphs #i12 - #i15

#i12 display each inventory row as fruitID,
#value where value is quantity * price, w prefix $

#i13 display name, price and sum quantity, # for all fruit,
#even ones w quantity null

#i14 display name & value for all fruit in inventory
value is sum(quantity) * price prefix w $

#i15 display name, price and quantity for all fruit that have
#inventory quantity line greater than 400 sort fruitID ASC

Complete Viewgraph #i16-#i17

#i16 looking at only fruit in inventory, display name, price and quantity for all fruit that have inventory quantity line greater than 200 or have a pric greater than 2.50

write the last 4 own your own as an exercise
#i17 display name and price for all fruit with prices $1.00 to
$2.50 inclusive order by name lexicographically
inclusive implies 1.0 and 2.5 are included

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Complete Viewgraph #i18-#i20

#i18 display name and price for the 3 least expensive fruit item,
#(aka cheapest 3 fruit items) order by name lexicographically

#i19 display only the price of the highest priced item, display
should have column header "Max Price" and prefix price w $
you must use an aggregate function

#i20 write a query to display the number of lines in inventory
column header is "inventory rows"

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SQL Programming Languages Interfaces

Programming Languages
PHP/MySQL Web Schematic
Server-Side Scripting Languages
cim.saddleback.edu Web Appliaction Server
LAMP & J2EE/Tomcat

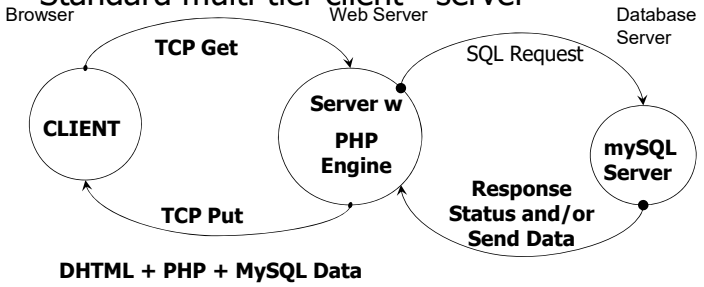
Programming Languages

- All Major Languages Can Interface to RDBMS
- Similar Mechanisms
  - Connect to RDBMS using host,user,password
- Send SQL Commands as String thru Connection
- Process Response from RDBMS

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PHP/MySQL Web Schematic

- Standard multi-tier client - server



Top Three Server-Side Scripting

Web Enabled	ASP	JSP	PHP
Framework	.net	Java/J2EE	5.0/PeCL/Pear? PHP Collaboration?
Main DB Interface	ADO/ODBC	JDBC	MySQL
IDE	Visual Studio	Eclipse, Oracle Studio, NetBeans	Eclipse w PHPEclipse or PDT, NetBeans

JDBC SQL Data Wrapper – ADO is SQL Based

CIM Web Application Servers

- CIM LAMP Server
  - Linux Apache MySQL PHP
  - https://cim.saddleback.edu/~jstudent0/php/fruit
    - Full Set of PHP Examples Interfacing to Fruit
- CIM is also J2EE Server (Not active)
  - Tomcat (Spring CS4B Java Web Programming)
  - https://cim.saddleback.edu/~tdedonno/fruit
    - Java Applet (no Tomcat – Support Programs Running)
  - https://cim.saddleback.edu/tomcat/jstudent
    - Tomcat is currently not active on CIM
    - JSP with JDBC Calls (JSP Engine)