



## CS 415 Database Management Systems Exam #2 Review – Fall 2025

- Review chapters 8, 9, 15, and 16 in Watt
- You should be able to answer questions related to the topics and terms below
- You may use a 1 page help-guide on the exam (front/back, 8.5" by 11")
- You should be able to create and interpret SQL queries using MySQL/MariaDB syntax
  
- Note: Re-takes for DB-01, DB-02, SQL-01, SQL-02, and SQL-03 will be online via Moodle Tuesday, October 14<sup>th</sup> (8 am) to Tuesday October 21<sup>st</sup> (11:55 pm)

### SQL-04 Joins:

- Cross Joins (also called Cross Product Join or Cartesian product)
- INNER join
- OUTER joins (Left Outer, Right Outer, Full Outer)
- UNION, UNION ALL
- table aliases

### SQL-05 Data Manipulation:

- Insert Row – naming fields, not naming fields
- Insert Rows - multiple rows with a single statement
- Insert Rows - with a select query from another table
- Update Rows - values for one or more fields
- Delete Rows - one, more, or all rows
- transactions (begin, commit, rollback)
- ACID, concurrency problems

### SQL-06 Data Definition:

- Create Table - constraints null/not null, primary key, unique, default
- Create Table - foreign key, on update/delete, cascade/restrict
- Data Types - Size (in bytes) and Approximate Range (ie,  $2^{\wedge}$  number of bits)
  - int (4 bytes), tinyInt (1 byte), smallInt (2 bytes), mediumInt (3 bytes), BigInt (8 bytes)
  - unsigned vs signed
    - (signed uses one bit for sign, reducing the number range  $2^{\wedge} (\# \text{ bits}-1)$ )
    - double (8 bytes)
    - varChar(M) (size varies 1 byte length + M bytes or 2 bytes for length if M >= 256)
    - char(M) (size constant always M bytes)
    - Date (3 bytes), Time (3 bytes), DateTime (8 bytes)
- MariaDB - show create table, desc/describe table
- Alter Table - add, modify, drop a column
- Alter Table - add/drop primary key
- Alter Table - add/drop constraints, unique, and default
- Create/Drop index
- Views – create, select, drop

## Sample Exam Questions (SQL-05, SQL-06)

Crop Walk is sponsored by Church World Service is an event designed to raise money to fight local and international hunger. People volunteer as walkers and collect donations from sponsors. Each walker will have multiple sponsors.

#1- Write the create statement for the **walker** table (shown below) with appropriate data types. Do not include any constraints in your create table statement. You can assume there will be no more than 30,000 walkers.

<b>walkerId</b>	<b>name</b>	<b>phone</b>
2	Jane Adams	(219) 359-1212
3	Brad Gordon	(219) 356-4343
7	Emma Thompson	(330) 356-8921

#2-Using Alter Table, make walkerId the primary key for the walker table.

#3-Using Alter Table, add a column called years of type integer to the walker table.

#4-Using Alter Table, change the column years in the walker table to be of type tinyInt.

#5-Using Alter Table, make the default value 1 for the column years in the walker table.

#6-Using Alter Table, drop the column years in the walker table

#7-Create an index on the field walkerID for the walker table.

#8-The area code (219) has recently changed to (260). Update the phone column in the walker table to reflect this change. You can assume the data shown above is in the table.

#9 – Sample data for the **sponsor** table is shown on the following page. Using a single create statement:

- ➔ Create the sponsor table with appropriate data types. You can assume that there will be no more than 30,000 sponsors in our database. Amounts donated will be \$1,000.00 or less.
- ➔ The id field must be set as the primary key
- ➔ The id field must be an auto generated sequence
- ➔ All fields must not be Null except for the name field (to allow anonymous donations)
- ➔ The default amount must be \$20.00
- ➔ Create a foreign key constraint from sponsor to the walker table on the walkerId field. Sponsor records should not be automatically deleted when corresponding walker records are deleted.

<i>id</i>	<i>name</i>	<i>amount</i>	<i>date</i>	<i>walkerId</i>
1	Bob Smith	\$20.00	10/2/2005	2
2	Betty Anderson	\$100.00	10/2/2005	2
3	Jose Rodriguez	\$50.00	10/3/2005	3
4	Joel Rogers	\$22.50	10/9/2005	3
5	Paul Whitman	\$10	10/9/2005	7

#10 - Insert the record for Bob Smith without specifying the amount (thus relying on the default value).

#11 - Insert the record for Betty Anderson by listing the fields in reverse order  
ie. walkerId, date, amount, & name

#12-Insert the records for Jose Rodriguez and Joel Rogers using a single insert statement.

#13-Walker Brad Gordon will not be able to participate this year as planned. He has asked that his sponsors be transferred to Jane Adams. Update the sponsors table accordingly.

#14-Delete Brad Gordon from the walker table

#15-Jane Adams has decided to sponsor herself with an amount of \$25.00. Add the appropriate record to the sponsor table. Use the current date. Don't hand code the name which can be looked up in the walker table.

#16 – Describe a situation when the constraint UNIQUE should be used rather than PK? (1 paragraph)

#17 – When should the data type char be used rather than the datatype varChar? (1 paragraph)

#18-What is a script file? What MySQL command is used to “run” a script file? (1 paragraph)

#19-A foreign key can have the “ON DELETE CASCADE ” option. Describe the effects of this option (1 paragraph)

#20-Write an SQL transaction to (1) Delete all fields from table x (2) Delete all fields from table y (3) rollback the delete.

#21-Write an SQL transaction to (1) Delete all fields from table x where field y is equal to 7. (2) Select all records from table x to verify the delete (3) Commit the transaction.

#22-What is meant by a concurrency problem? How are locks used to address these problems?  
(1 Paragraph)

#23-The acronym ACID is used to describe the four major properties of a transaction. List the word associated with each letter and briefly (1 sentence each) describe what each word represents. (6 points)

#24-For what two features did we use the MySQL Innodb table type? (1 sentence or less)

#25-How much space is saved by making making a field tinyint rather than int? (1 sentence or less)

### **Sample Exam Questions (SQL-04)**

#26-How many rows are returned by a cross product of walker and sponsor tables?

#26-Display all walkers that have at least one sponsor (using cross product ie. table, table)

#27-Display all walkers that have at least one sponsor (using keywords inner join)

#28-What is the difference between a left and right join?

#29-Display all walkers that do not have at least one sponsor

#30-How are full outer joins implemented in MySQL/MariaDB?

#31- Display a list of walkers and sponsors removing the duplicate names.