Assignments

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Introduction to MySQL as an Open Source Database

Sr. No.

| 1. | **Zodiac Data Solutions Ltd.** is a popular company based in **Chicago**, **Illinois** providing database solutions to its clients. The company is in the process of conducting recruitment interviews in different technical institutes for upcoming projects. The candidates interested in database development can attend the campus interviews. Based on their performance, the candidates are provided short-term training in any DBMS of their choice and recruited for database development in the company.

Consider yourself as a student of second year Computer Science who has participated in the campus interview. You have been provided with a set of interview questions as follows and need to find the solutions:

1. Explain in brief the meaning of database.
2. List the two licensing schemes available for MySQL.
3. Explain the features of a MYSQL.
4. List the advantages that MYSQL offers over other RDBMS.
5. Explain the RDBMS model in brief and differentiate between DBMS and RDBMS. |

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Installing and Configuring MySQL

Sr. No.	Assignment Question
1.	**St. Peter Technical Institute** is a famous institute located in **New Jersey**, **USA**. The institute provides training in subjects of Computer Science such as database, programming languages, networking, and so on. The institute also organizes technical competitions to test the aptitude of its students. The winner is provided a certain amount as scholarship to learn additional courses in the institute. You, as a student, have participated in the database development competition. You have to perform the following tasks: 1. Download the MySQL executable file in a temporary folder named temp. 2. Install MySQL on Microsoft Windows XP platform. 3. Configure the installation of MySQL using the --prefix option. 4. Configure the installation of MySQL using the --with-charset option.

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Using MySQL

Sr. No.	Assignment Question
1.	**Alexia Technologies** is an IT-based organization that provides various IT-related services ranging from Web designing to Web application development.

Business intelligence services are a requirement that most clients of **Alexia Technologies** are asking for. Hence, the organization plans to revamp its database to a new model that can support business intelligence services. Also, the company plans to release a Web site that would have client's data. This also needs to be taken into consideration.

You, as a database developer, have to perform the following tasks:

1. Create a database for a client.
2. Create a table to store client's data having the structure as listed in table 4.1 using different data types.

Field Name	Type
CCode	INT(4)
Client_Name	CHAR(15)
Address	INT(4)
Mobile_Number	INT(10)
DOB	DATE
Email	TEXT

Table 4.1: Client's Table

Implementing SQL Queries Using MySQL- I

Sr. No.	Assignment Question
1.	**Hereto Systems** is a technology-based organization that creates computer applications. The organization uses MySQL for database storage. Now, they want to modify the database and perform some data operations on the database. The organization plans to develop Web applications that would be connected to a back-end database. The database contains all information about the organization. These applications would be used in different locations across the globe. As a database developer, you need to perform the following tasks: 1. Modify the database. 2. Use the SELECT command to retrieve the details. 3. Use the WHERE clause with the SELECT command. 4. Modify the table structure. 5. Delete a table from the database.

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Implementing SQL Queries Using MySQL- II

Sr. No.	Assignment Question
1.	**Kings Travel and Tours** operator wants to store information of all the important flights in the world. The operator wants to provide flight information at the earliest to the customers. Table 6.1 creates a **Flights** table that will store all the flight details.

Field Name	Type
AircraftCode	Char(10)
FType	Char(10)
Source	Char(20)
Destination	Char(20)
DepTime	DATE
JourneyHrs	INT(8)

Table 6.1: Structure of Flights Table

Table 6.2 contains the data of the flights table.

AircraftCode	FType	Source	Destination	DepTime	Hours
UA01	Boeing	Los Angeles	London	15.30	6
UA02	Boeing	California	New York	09.30	8
SA01	Boeing	Istanbul	Ankara	10.45	8
SA02	Airbus	London	Moscow	11.15	9
SQ01	Airbus	Sydney	Ankara	01.45	15
SQ02	Boeing	Perth	Aden	13.30	10
SQ03	Airbus	San Francisco	Nairobi	15.45	15

Table 6.1: Data of Flights Table

Use the appropriate commands to perform the following tasks:

1. Display all the records from the **Flights** table.
2. Display AircraftCode, Source, Destination, and DepTime from the Flights table.
3. Display the records of Flights table with the increased journey hour using the ORDER BY command.
4. Organize the output using the GROUP BY command.

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Using Joins

Sr. No.	Assignment Question
1.	**Stephens Training Institute** is a training institute located in **Los Angeles, USA**. The institute provides training in various courses in different fields such as science, mathematics, and so on. Recently, the institute started using a primitive database system in which it stores the student and staff details. In the current database, there is only one table to store the student details and another to store the staff details. However, the users are finding it very difficult to trace student and staff records since, all the details are in the same table. (**Assumption**: Database is already created.) You as a database developer have to accomplish the following tasks: 1. Create separate tables to store student details, marks details, employee details, salary details, and course details. 2. Create required columns in each table to store the relevant details. 3. Use appropriate data types for the columns to store the different type of data such as name, phone, email, salary, fees, and so on as per requirement. 4. Join the student details table and staff details table with the help of common field. 5. Display the records by using a SELECT query within another SELECT query (**Hint**: Use sub query)

Using Basic Functions in MySQL - I

Sr. No.	Assignment Question
1.	**Cosmos Electronics Ltd.** employs more than 1,000 workers in its units. Some of these are at junior level while some are at senior level depending upon their expertise and years of experience. Each employee is given annual leave based on the designation. The management at **Cosmos Electronics Ltd.** is planning to computerize their human resources department and all the data pertaining to employees will now be stored in MySQL database. The structure for **EmpDetails** and **LeaveDetails** are shown in tables 12.1 and 12.2 respectively.

➢   **EmpDetails Table**

Field Name	Data Type
Emp_Id	char(5)
FirstName	char(30)
LastName	char(30)
Address	char(60)
Dept_Id	char(4)
Designation	char(30)
Salary	Int
Join_date	date
Performance_Rating	int

Table 12.1: EmpDetails Table

➢   **LeaveDetails Table**

Field Name	Data Type
Emp_Id	char(5)
LeaveTaken	int
FromDate	Date
ToDate	Date
Reason	Text

Table 12.2: LeaveDetails Table

1. Using MySQL create the tables in a database named **Cosmos**. Add at least five records to each table.
2. Create a query to retrieve the number of leaves taken by employees having designation as Manager.
3. Create a query to retrieve details of all employees who have taken leave for more than five days.
4. From the EmpDetails table, display all the records having maximum Performance_Rating.

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Using Basic Functions in MySQL - II

Sr. No.	Assignment Question
1.	**BookParadise** is an online library management system used by a library in **Seattle**. The software makes use of MySQL database. Information about thousands of books are maintained and updated regularly. In the recent years, **BookParadise** has grown in size after receiving international funding and the number of books has increased tremendously. This increase in the number of books has made searching for books very difficult. Also, **BookParadise** needs to now allow searches to be made by users displaying only selective information to them. The entire content of the tables are not to be displayed to the users. Towards this end, views will be created to enable the readers to display information about books, in a fast and efficient manner. The **Books** table in the **BookParadise** database has the structure shown in table 14.1. ➢ **Books**:

Field Name	Data Type
BookCode	char(5)
Title	char(30)
Author	char(30)
Edition	int
RatePurchased	int
PurchaseDate	date
VendorName	char(30)
BookStatus	char(15)

Table 14.1: Books Table

1. Using MySQL, create the above table in a database named **BookParadise**. Add at least seven records to the table.
2. Display the current date and the updated BookStatus.
3. Display the current time and the book purchased on that date.
4. Display the microseconds from 09:15:45.123456.
5. Display the minute part from 05:30:45.
6. Display the month from the date 2010-12-05.

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Controlling and Managing MySQL Database

Sr. No.
1.	**Book On Air Pvt. Ltd.** is an airline ticket-booking firm in **Chicago**, **Illinois**. The company books tickets for its customers for various airlines. However, to maintain the records of the number of tickets booked, customer details, flight details, payment details, and so on, the company uses the traditional file system. With growing business needs, it has become difficult to maintain such huge data. Therefore, the management has decided to develop a database to store the company transactions related data. You as a database developer have been assigned the task to provide a solution. 1. Create a user account having the name as Stallone with the help of GRANT command and assign it into localhost instance. 2. Assign all privileges to the user. 3. Create the same user with the help of GRANT command and assign it any host. 4. Add a new user Helen in the user table of mysql database. Assign the user in server.domain host. 5. Assign SELECT, PROCESS, and DROP privileges to the user Barbara using GRANT command. 6. Create a new user Katherine in localhost host and assign only the Update and the Create privileges to the user. 7. Assign the INSERT and DROP privileges to 'Katherine' user for Transactions table using the GRANT command.

An Overview of MySQL 5.7

Assignment Question

MakeMyRide Technologies Inc. is a multinational transportation network company headquartered in **San Francisco**, **California**. It offers cab services to its customers. Recently, it is developing a MakeMyRide mobile app, which will allow consumers to make a trip request. This request would then be routed to MakeMyRide drivers who shall pick and drop customers through a pre-approved car. The company will first need to create a database for managing data from this mobile app.

Assume that you have been hired as a Database Developer and that current database system is MySQL 5.1. Perform following task:

1. Identify the steps needed to migrate from MySQL 5.1 to MySQL 5.7.

Then, in MySQL 5.7, perform following tasks:

2. Create a suitable database that will store all data coming from the mobile app.

3. Create a table for storing all details of customers sending requests from the app.

4. Create a master table for storing location-related details, such as pick-up and drop points in different cities of different countries (**Hint**: Create a master table for both cities and countries).

5. Create a customer request table that will store all request details such as pick-up point, destination, cost, distance, time of pick-up, and time of reaching the destination for each customer. It should show which request is active and which is fulfilled.

6. Find out the pick-up places in San Francisco for which maximum requests are made.

7. Create a list of distant places for which travelling time is more than 30 minutes in San Francisco.

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Transaction Management and Globalization

Assignment Question
Scholar's Library is a library in Queens, New York City, which is planning to automate to a Library Management System (LMS). The objective of LMS is to handle the entire functioning of the library. The software must maintain all the information about the books in the library, their cost, their complete details, and total number of books available in the library. Finding books is easier using this user-friendly and error free system rather than the manual writing system. The system contains a database where all the information will be stored safely. The LMS will have two types of users: the admin and the receptionist. The first step is to register users who come to the library. The **receptionist** has the privilege to enter the name, addresses, and contact number of the users along with the name of the book they want to read. A library card will be provided to everyday users. Their entry time and exit time will also be noted down thus, allowing to calculate the total time spent in the library. Details about borrowed books will be maintained in the system. If a user does not return the book within the due date, a fine will be levied and the same information will be sent to that user. The **admin** has the privilege to add, delete, or modify the details of the book available to/from the system. An admin provides the username and password for the receptionist and can also add the details of the book purchased from shops along with the shop name. Details such as monthly expense report, books purchased reports, and cash collected for fee can be viewed. Considering the LMS scenario just described, perform the following tasks: 1. Build a table to include details such as user, books, and user_books_details. 2. Write a stored procedure to calculate the fine for a particular user on a particular book. 3. Write a query to fetch all the books borrowed by a particular user and the fine on each book, if any. 4. Write a query to fetch the user details and the fine for all the books. 5. Write a set of queries in a transaction that has to be executed when a particular user pays a fine to the receptionist.

Performance Optimization and Scalability

Assignment Question
Horizon Technologies is a leading company that specializes in designing, developing, and selling consumer electronics, computer software, and online services. It manufactures a large number of products, which include desktops, laptops, handbooks, tablets, and mobile phones. All these products are into markets with different technology and connectors, which would be specific to devices and have a separate protocol. If a third-party manufacture wants to develop a supporting hardware like an earphone or game controllers then they have to meet **Horizon** officials and signs an agreement over sharing the protocol details. After the protocol is shared, the third-party company manufactures the products and submits the product to **Horizon**. **Horizon** performs certain tests to check the compatibility of the product with its devices. Based on the result, **Horizon** issues a certificate to the product, which is a complete review of the product. If the product causes any issues like consuming more power, then it is recorded in the certificate. This data will also be available over the Web. Users can view these results on the packaging or over the Web and decide about buying the product. Following are the details of the database maintained by **Horizon**: • **Product_Horizon**: Master table that holds the list of product manufacturers by Horizon. • **Third_Party_Manuf**: This table stores the data of the manufactures. • **Product_Thirdparty**: This table stores the third-party product details. • **Product_Support**: This table maps Horizon's products that are supported by third-party products such as Zemo, a game controller product that supports only desktops, and laptops but not others. So testing will include only these devices and not other devices of Horizon. • **Product_Tests**: Master table that stores the testing details for particular features such as bluetoothTest and wifiTest. • **Product_Tests_Results**: This table stores the mapping between third-party products, the testing required, and results (**Hint**: Admin maps the testing based on the features). Considering the scenario just described, perform the following tasks: 1. Write a query to obtain the details of third-party manufacturers based on the date they were added to the system. 2. Write a query to fetch the list of third-party products, its manufacture details, and the test results of the product that supports a specific product of **Horizon** and order by test details. (For example, if a user wants to find all the products that are supported by laptops or desktops.) 3. Write a query to fetch all the details of third-party products, its manufacture details and **Horizon** products that it supports. Ordering should be in the chronological order of the third-party products.

Assignment Question
Note: All the queries should be optimized. Create indexes, change the order, or use different mapping criteria but the performance of these queries should be the best. This is a Web application and performance of the application on querying matters.

Replication, Data Backup, Partitioning, and Storage Systems

Assignment Question

OfficeMark is an Information Technology (IT) company based in **Orlando**, **Florida**. It specializes in creating software applications for office use. Recently, it created the **Mail-Source** application, which is a personal information manager available as a part of the OfficeMark Office suite. While designed mainly as an email application, the application also offer utilities such as calendar, notes, task manager, contact manager, journal, and Web browsing. It can be used even on a network so that several users can use it simultaneously.

Before launching the application in the market, the company has decided to test it by installing it on its Wide Area Network. This network connects its four branches namely, in London, Singapore, Sydney, and Paris.

Assume that you have been hired as a Database Designer. Perform the following tasks:

1. Create a suitable database to store details related to the application.

2. Create a table to store the data of different departments using the application and split it into eight partitions branch wise.

3. Create a table to store details of its employees using the application. Every user must be mapped to one department. Partition the table department branch wise.

4. Create a table to store email related data. Every email is mapped to a particular user that sends it. Partition the table using RANGE partition.

5. Take a backup of this database in the compressed form.

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-   *End of Assignments -*