**SIT 103 – DATA AND INFORMATION MANAGEMENT**

**ASSESSMENT TASK 1**

**DATABASE DESIGN ACTIVITY**

ACTIVITY PERFORMED BY:

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**PART 1: RELATIONAL DATABASE DESIGN [40 MARKS]**

**Question 1.1:** *Your project manager thinks Relational Database (RDB) is good for ABC Fitness and asked you to prepare a draft of justifications to convince the client. In approximately 500 words (+/-100 words), prepare a justification discussing benefits and challenges/limitations of relational database. You are expected to do your own research to answer this question.* [5 Marks]

A **relational database model** is basically an assembly of large quantities of data and information that is efficiently organized in a row-table structure for better usage and understanding. This model would be the most suitable choice while designing a database system for ABC Fitness because of its wide range of features that would help in successful management of such a large, multi-user, and versatile organization’s database. The **table format** of storing data in a relational database helps in managing huge data by categorizing it and saving it in a way that the allowed users can easily extract or filter out a piece of desired information *(Deborah Lee Soltesz).* It becomes handy to most users quickly because of its **simplicity** that helps them to easily understand the **functionality** of the system. Moreover, **SQL (Structured query language)**, the main language used by the relational database, would enable the usage of complex queries for common users or employees, making it easier for them to **retrieve any data** from thousands of records in trouble-free way, thus, improving customer service *(Ben Lutkevich, 2021)*. Furthermore, for the privacy of the customers of ABC Fitness**, data security** can also be ensured because the direct access to data can be restricted and limited to only some specific users, which would include staff and management. In addition to this, as ABC Fitness has four centres in Melbourne suburbs, this relational database system would allow **multiple users** to use the system and access the same database, simultaneously. Another useful feature is the **relationships** that can be used to link various fields and attributes. That means to say, various tables can be linked to each other to avoid repeated storage of the same information that would avoid **data redundancy**, which is a necessary component for such huge set of data so that the system can work with good processing speed. The system ensures the **accurate** storage of data but is also **feasible for any modifications** that the organization may want to make in some data with the passage of time or in order to rectify things. Any changes made to a particular data does not affect the whole database because of **data independency**, therefore, it will aid in easy incorporation of member’s data into the system with recent updates. Another essential feature is **data integrity**, which helps enforce primary key and foreign key **constraints** to various attributes so that fields like membership id, centre code, or several other unique, identifying columns can be ensured to have data and no null values. This would reduce incomplete data and emphasize on **data consistency** *(Priya Pedamkar).*

However, everything has its pros and cons, this system carries its own limitations too, such as, the high **cost** for setting up the database, maintaining it, ensuring its security, installing software, and including and updating large quantities of data. Also, it is not so efficient if the information included is complex, like, complex images, numbers, or designs. It **needs physical storage space** for building up rows and columns and can even **respond slowly**, while querying or filtering the data, in case many tables are included *(Mishal Roomi).*

Hence, weighing up the advantages and disadvantages, it would be very useful and effective for ABC Fitness to use the relational database model as they also have been the mainstream databases for so long that most database managers are adapted to it and take it for granted, which may plummet the implementation costs with the use of standard drivers, programming languages and interfaces.

**Question 1.2:** *There are many Relational Database Management Systems (RDBMS) available in the market. The project manager wants you to compare ORACLE and MYSQL for the ABC Fitness’s proposed system and recommend which one is more appropriate for them with convincing justifications on why. You are expected to do your own research on the two RDBMSs. The word limit for this question is 500 (+/-100) words.* [5 Marks]

**Oracle and MySQL** are both very good examples of database management systems. **MySQL** is a **free open-source** and easy to use database management system, released in **1995**, whereas, **Oracle**, released in **1980**, is a **licensed** system that requires some fee but is a better DBMS as compared to MySQL because it provides some additional features that are absent in MySQL. For instance, Oracle supports **data partitioning and distributed databases**, which are not supported by MySQL. Options widen if we use Oracle over MySQL as it is a feature-rich, portable, and programmable system that not only supports two **query languages** SQL and PL/SQL but also has more **storage features** than MySQL, which only supports SQL language. It is obviously beneficial for a big system like ABC Fitness to have more space in their database and some more features. Also, for ABC Fitness, Oracle can ensure better quality of data storage because it does not support **null values** and also include four distinct **characters** – CHAR, VARCHAR2, NCHAR, NVARCHAR2, enabling a broader classification on type of data that can be stored. Although MySQL can work on more **operating systems** than Oracle, that is to say, they both support Windows, Mac OS X, Linux, UNIX, z/OS but only MySQL can function on BSD, Symbian and Amiga OS, Oracle is considered better for large-scale enterprise deployments because it supports both **static as well as dynamic systems**, whereas MySQL supports only static systems .As ABC system also needs to ensure **data security**, so it must use oracle, which asks for username, password, and profile validation in order to access the database *(Abe Dearmer, 2020).*

In addition to this, oracle supports **XML (Extensible Markup Language)** over MySQL, which does not support XML language. Moreover, MySQL only includes table-locking facility as compared to Oracle that has both table-locking as well as row-locking facilities. Another important feature required by every database is the **backup** option, in fact automatic backup is what everyone seeks now. It is even more significant for larger organizations like ABC Fitness, where thousands of records are to be stored and one might need to recover backup files in case of some technical issue or if some unexpected incident happens. Therefore, they must choose Oracle as “mysqlhotcopy” and “mysqldump” are the only two backup systems provided by MySQL, however, Oracle has many backup mechanisms that include backup, hot backup, import, export, etc *(JavaTpoint).*

Oracle is a very reliable database management system as it can quickly manage a large volume of data. Thus, it can be clearly said that Oracle is the more powerful software in comparison to MySQL because Oracle has so many features that it even minimizes the need for a third-party software. Hence, it would be more appropriate and useful to use Oracle instead of MySQL, while designing an efficient and good database management system for ABC Fitness. All the above reasons support this statement.

**Question 1.3:** *Draw a* ***Context Level Data Flow Diagram*** *of the proposed ABC Fitness Business Management System showing data flows (input and outputs) to/from external entities (users or other external systems) to the system. Identifying external entities and data flows is important to understand data requirements of the system. Please see examples discussed in classes.* [10 Marks]

Diagram

Description automatically generated

**Question 1.4:** *Provide a conceptual design of the database as an Entity Relationship Diagram (ERD) using the* ***Crow’s Foot notation*** *of the proposed ABC Fitness Business Management System showing* ***Entities****,* ***Attributes****,* ***Keys*** *(Primary and Foreign where required),* ***Constraints****, and* ***Relationships*** *between entities with* ***Cardinalities*** *(minimum and maximum). For all* ***entities*** *and* ***relationships****, provide a brief description on why you have considered those.* [20 Marks]

Diagram, schematic

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**BUSINESS RULES:**

* A member can visit any centre to receive services or may not visit any centre.
* A centre can be visited by any number of members.
* A member can pay via credit or with debit card only.
* A centre must provide 1 or more services and a service must be provided by 1 or more centres.
* CEO analyses the monthly reports sent by Finance department.
* Sales department maintains the online website and all the orders.
* A supplier may supply numerous products and a single item can be supplied by several suppliers.
* Website keeps record of all the product details as well as customer order details.
* Casual employees can work at any centre and each centre can employ numerous casual employees.
* Each employee has to report to another employee of higher level, his/her manager till the final report reaches the CEO.
* Finance department receives reports from sales department and check membership status every week.

**ASSUMPTIONS AND JUSTIFICATIONS:**

* A member can have for more than one membership, so that the member can enjoy the desired offers and services multiple times or by multiple persons simultaneously.
* All the centres have to send 1 name of the employee of the month for analysis by CEO, so that CEO can know about good employees, and they are satisfied with rewards to create a competition to improve employee performance that would improve customer services.
* CEO also analyses the monthly reports sent by the Sales department so that product sales can be reviewed by him/her and strategies for improvement can be discussed.
* Finance and Sales department can update their reports many times for evaluation by CEO so that errors can be minimized, accurate and efficient data can be stored.
* Sales department updates the product details for numerous items and inventory for an automatic order request to supplier when required.
* Each centre has some full-time employees and may or may not have any casual employees because in case of no casual employees, services must not suffer.
* Finance department can check membership status every week using Membership ID so that it has access to records and details of any member.
* Following associative/ bridge entities have been used for implementation of many-many relationships:
  + Member – Centre between Member and Centre because a member can visit any centre and a centre is visited by many members.
  + Centre – Services between Centre and Services because a centre can provide multiple services and a service might be provided by multiple centres.
  + Casual\_Emp – Centre between Casual subtype of Employee and the Centres entity because a casual employee has the right to work at any centre and a centre can employee several casual employees, who are paid hourly.
  + Product Details has been used between Sales department and Supplier, along with Stock Refill so that details of products and their remaining quantity can be stored and also the details of ordered stock for different products along with order and payment details can be kept in the database records.
* An additional entity Customer and Order details has been used to store details of online orders and customers.
* Reports entity is created to record data of reports from distinct departments in one place so that it can be analysed by the CEO.
* Employee subtypes are created as Full Time and Casual to clarify the differences between two types, their mode of salary, working rights, etc.

**PART 2: STRUCTURED QUERY LANGUAGE [10 MARKS]**

**Question 2.1:** *Write a SQL to list product category names in ascending order.* [2 Marks]

**Query for 2.1:**

SELECT CATEGORY\_NAME FROM product\_categories ORDER BY CATEGORY\_NAME ASC;

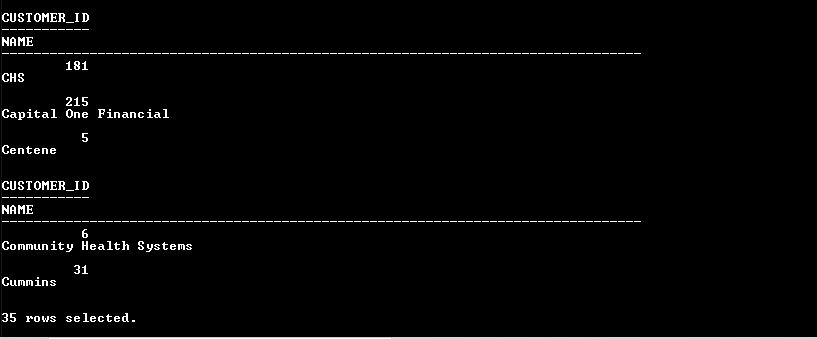
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confidence](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4RD4RXhpZgAATU0AKgAAAAgABAE7AAIAAAAPAAAISodpAAQAAAABAAAIWpydAAEAAAAeAAAQ0uocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAFNhbWJoYXYgQmFuc2FsAAAABZADAAIAAAAUAAAQqJAEAAIAAAAUAAAQvJKRAAIAAAADMTIAAJKSAAIAAAADMTIAAOocAAcAAAgMAAAInAAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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**Question 2.2**: *Write a SQL query to list ID and name of customers whose name start with a ‘C’.* [2 Marks]

**Query for 2.2:**

SELECT CUSTOMER\_ID, NAME FROM customers WHERE NAME LIKE 'C%';



**Question 2.3**: *Write a SQL query to find the average list price of products.* [2 Marks]

**Query for 2.3:**

SELECT AVG(LIST\_PRICE) AS "AVERAGE LIST PRICE" FROM products;

![Text

Description automatically generated](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4RD4RXhpZgAATU0AKgAAAAgABAE7AAIAAAAPAAAISodpAAQAAAABAAAIWpydAAEAAAAeAAAQ0uocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAFNhbWJoYXYgQmFuc2FsAAAABZADAAIAAAAUAAAQqJAEAAIAAAAUAAAQvJKRAAIAAAADOTMAAJKSAAIAAAADOTMAAOocAAcAAAgMAAAInAAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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**Question 2.4**: *Write a SQL statement to list Customer ID and Salesman ID of all orders that are canceled.* Note that when an order is canceled, its status is changed to ‘Canceled’. [2 Marks]

**Query for 2.4:**

SELECT CUSTOMER\_ID, SALESMAN\_ID FROM orders WHERE STATUS = 'Canceled';

![Text

Description automatically 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**Question 2.5:** *Write a SQL statement to list Region ID and the number of countries in the region.* [2 Marks]

**Query for 2.5:**

SELECT REGION\_ID AS "Region ID", COUNT(COUNTRY\_ID) AS "Number of Countries" FROM COUNTRIES GROUP BY REGION\_ID ORDER BY REGION\_ID ASC;



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