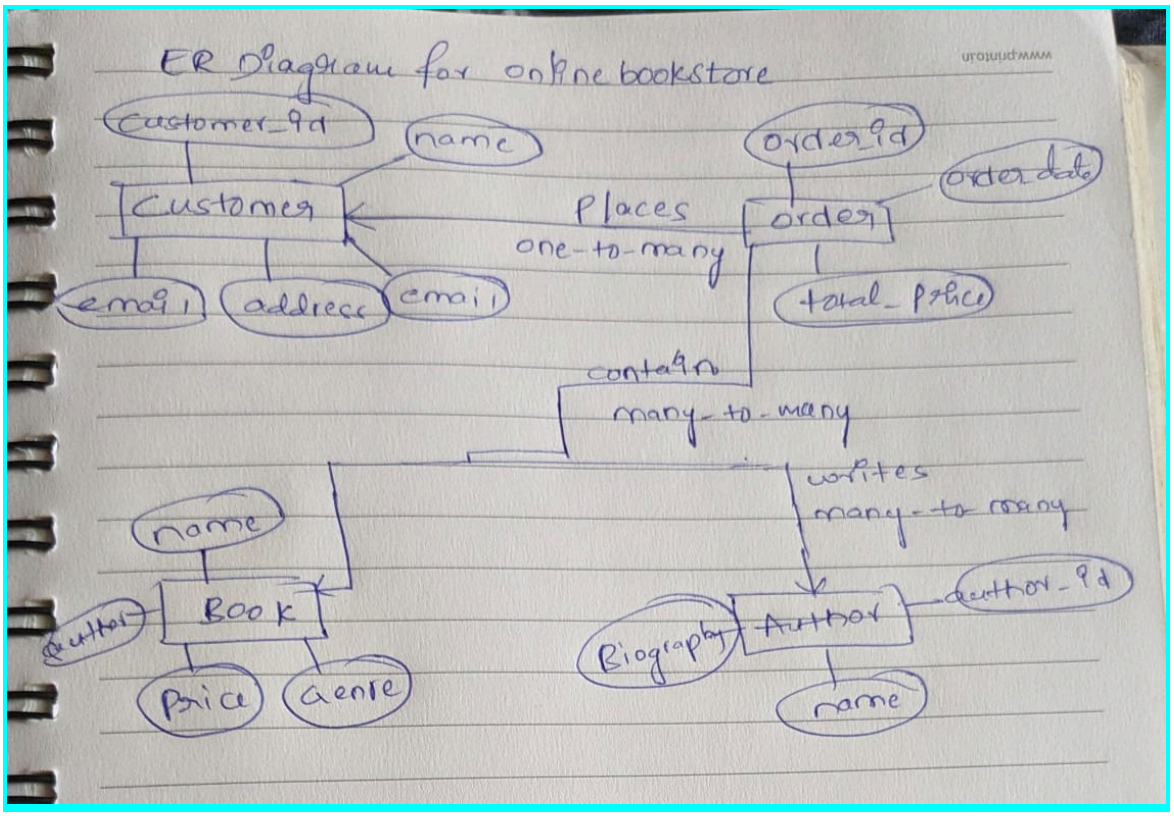
Assignment 1: Analyze a given business scenario and create an ER diagram that includes entities, relationships, attributes, and cardinality. Ensure that the diagram reflects proper normalization up to the third normal form.



Assignment 2: Design a database schema for a library system, including tables, fields, and constraints like NOT NULL, UNIQUE, and CHECK. Include primary and foreign keys to establish relationships between tables.

Answer:

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simple database schema for a library system:-

--> members(memberid int primary key auto_increment, name varchar(100) not null);

--> books(bookid int primary key auto_increment,title varchar(200) not null);

--> loans(loanid int primary key auto_increment, memberid int not null, bookid int not null,loandate date not null, foreign key (memberid) references members(memberid), foreign key (bookid) references books(bookid));
==> Explanations:

Members Table:

Stores basic information about library members
MemberID is the primary key and automatically incremented
Name is the only attribute for member names and is set as NOT NULL

Books Table:

Stores basic information about books in the library
BookID is the primary key and automatically incremented
Title is the only attribute for book titles and is set as NOT NULL

Loans Table:

Stores information about book loans
LoanID is the primary key and automatically incremented
MemberID and BookID are foreign keys referencing Members and Books tables, respectively
LoanDate is set as NOT NULL to record the loan date

Assignment 3: Explain the ACID properties of a transaction in your own words. Write SQL statements to simulate a transaction that includes locking and demonstrate different isolation levels to show concurrency control.

Answer:

1.Atomicity: A transaction is a single unit of work that must either be completed entirely or not at all. It's an "all or nothing" principle. If any part of the transaction fails, the entire transaction is rolled back, leaving the database unchanged.

2.Consistency: A transaction should take the database from one valid state to another valid state. It should never leave the database in an inconsistent or invalid state. For example, if a transaction involves transferring money between two accounts, the total amount of money should remain the same before and after the transaction.

3.Isolation: Transactions should operate independently and not interfere with each other. Changes made by one transaction should not be visible to other transactions until the transaction is completed (committed). This prevents concurrent transactions from seeing intermediate or inconsistent data.

4.Durability: Once a transaction is committed, its changes should persist in the database, even if there's a system failure or power outage. The changes made by a committed transaction should be permanently stored and never lost.

Example:-

--> create table accounts (accountid int primary key,balance decimal(10, 2) not null);
--> insert into accounts (accountid, balance) values (1, 1000.00), (2, 2000.00);
--> start transaction;
--> update accounts set balance = balance - 500.00 where accountid = 1;
--> commit;

Assignment 4: Write SQL statements to CREATE a new database and tables that reflect the library schema you designed earlier. Use ALTER statements to modify the table structures and DROP statements to remove a redundant table.

Answer:

--> create table student(id number primary key, name varchar(10), email varchar(20), branch varchar(20));
--> insert into student values(1,'sudheer','sudheer@wipro.com','computer science');
--> alter table student add attendance number(2);
--> alter table student modify attendance number(34);
--> update student set attendance=84 where id=1;
--> drop table student;

Assignment 5: Demonstrate the creation of an index on a table and discuss how it improves query performance. Use a DROP INDEX statement to remove the index and analyze the impact on query execution.

Answer:

--> create index nameindex on student(name);
==> Indexes are used to retrieve data from the database more quickly than otherwise. The users cannot see the indexes, they are just used to speed up searches/queries.
--> drop index indexname;
==> After completing our task it is better to remove the index using drop for good practise because every attribute having index mean performance will down.

Assignment 6: Create a new database user with specific privileges using the CREATE USER and GRANT commands. Then, write a script to REVOKE certain privileges and DROP the user.

Answer:

Creating a databese user:

Create ‘user1’ identified by ‘user@1’;

GRANT SELECT, INSERT, UPDATE, DELETE ON testdb.* TO 'user1';

REVOKE UPDATE, DELETE ON testdb.* FROM 'user1';

DROP USER 'user1';

Assignment 7: Prepare a series of SQL statements to INSERT new records into the library tables, UPDATE existing records with new information, and DELETE records based on specific criteria. Include BULK INSERT operations to load data from an external source.

Answer:

Inserting new records into the Library table

INSERT:

Insert into Library values(1011,’Atomic habits’,’Sudheer,600);

Insert into Library values(1891,’Be your own sunshine’,’Mary’,300);

UPDATE:

Update table Library where book_num=1891;

DELETE:

Delete from Library where book_Name=’Atomic Habits’;

Inserting BULK records into the table:

Insert into Library values((1088,’Rich dad poor dad’, ’Williams’, 450),(8988, ’The woman in me’ , ’Tracy martin’, 780));