

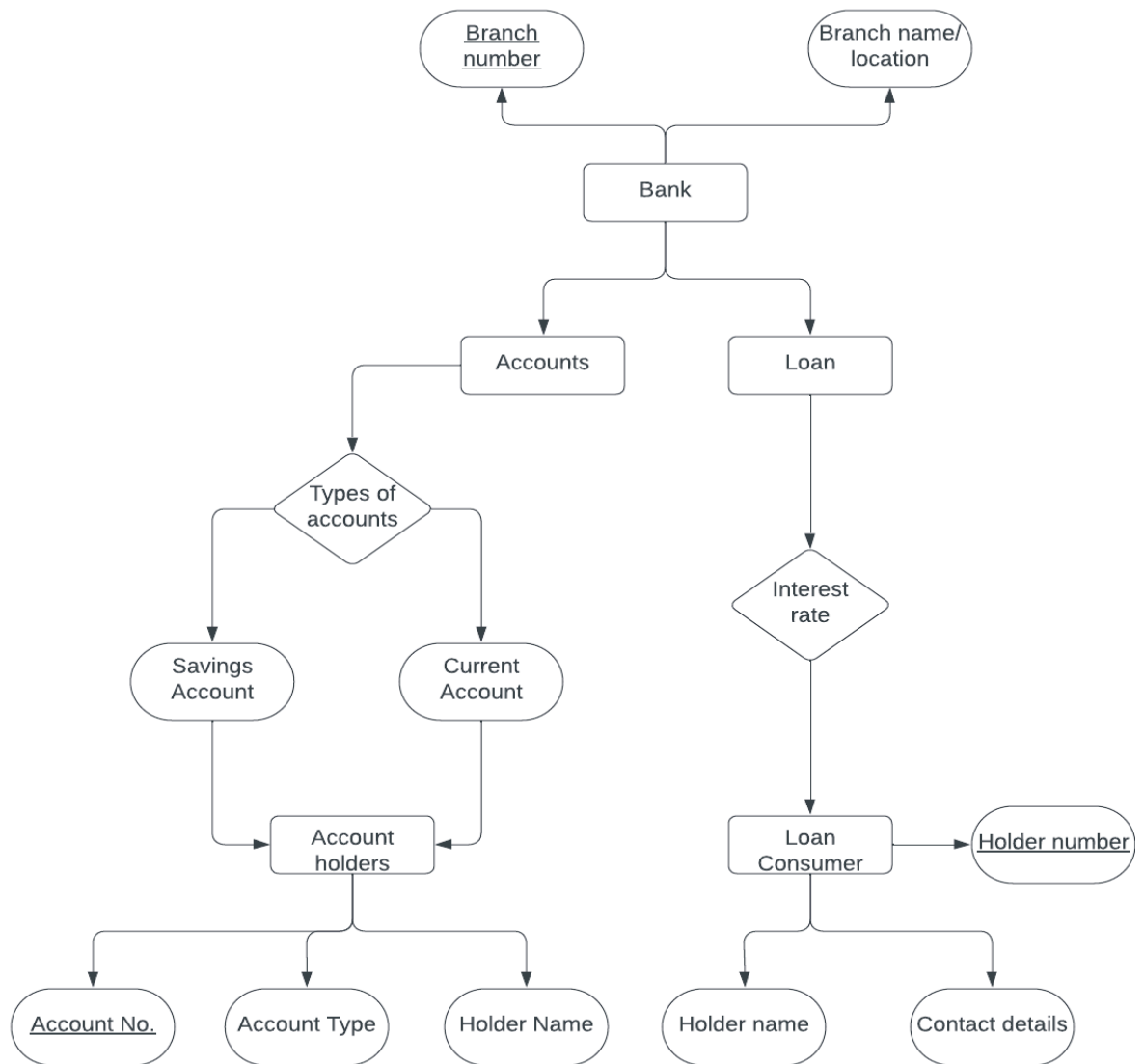
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ASSIGNMENT - 1

PROBLEM STATEMENT: 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.

SOLUTION:

- Consider an example of a bank giving opportunities of accounts opening and managing and loan facility to its consumers
- Total entities:
 - Bank
 - Account
 - Loan
- Relationships:
 - Bank to Account, Loan, Branch number and Location: One To Many
 - Savings and Current account type to Account holder: Many To many
 - Account holder to Account number, Type and Holder name: One to many
 - Bank to Loan: one to one
 - Loan to loan consumer: one to one
 - Loan consumer to holder name, holder number and contact details: one to many
- Key attributes:
 - Branch number is the primary key attribute for Bank entity
 - Account number is the primary key attribute for Account entity
 - Holder number is the primary key attribute for Loan
- Other attributes:
 - Branch name/location
 - Types of accounts
 - Savings and Current account
 - Account type
 - Account holder name
 - Loan interest rate
 - Holder name
 - Loan holder contact details
- Now given below is the ER diagram or the same scenario:



ASSIGNMENT - 2

PROBLEM STATEMENT : 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.

SOLUTION:

- Fields:
 - bid number primary key check (bid<150)
 - bname varchar(20) not null
 - bauthor varchar(20) not null
- Constraints for Table 1:
 - ☐ Book id : 1
 - Book name : Operating Systems
 - Author name : Shivansh kumar
 - ☐ Book id : 2
 - Book name : DBMS
 - Author name : Sanjay sharma
 - ☐ Book id : 3
 - Book name : COA
 - Author name : R Bansal
 - ☐ Book id : 4
 - Book name : OOPS
 - Author name : K. S. Motupally
 - ☐ Book id : 5
 - Book name : Computer Networking
 - Author name : Radhakrishnan K.
- Fields:
 - ☐ stid number primary key check (stid<50)
 - ☐ Snake varchar(20) not null
 - ☐ sissueReturn varchar(20) unique not null
 - ☐ bid references book(bid) not null
- Constraints for Table 2:
 - ☐ Student id : 21
 - Student name : Boss Bhandari
 - Book issue and return : 18 May - 28 May
 - Bid : 2
 - ☐ Student id : 19
 - Student name : Shivesh Pandey

- Book issue and return : 20 May - 30 May
- Bid : 4

☐ Student id : 11

- Student name : Anmol Gupta
- Book issue and return : 15 May - 25 May
- Bid : 1

ASSIGNMENT - 3

PROBLEM STATEMENT : 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.

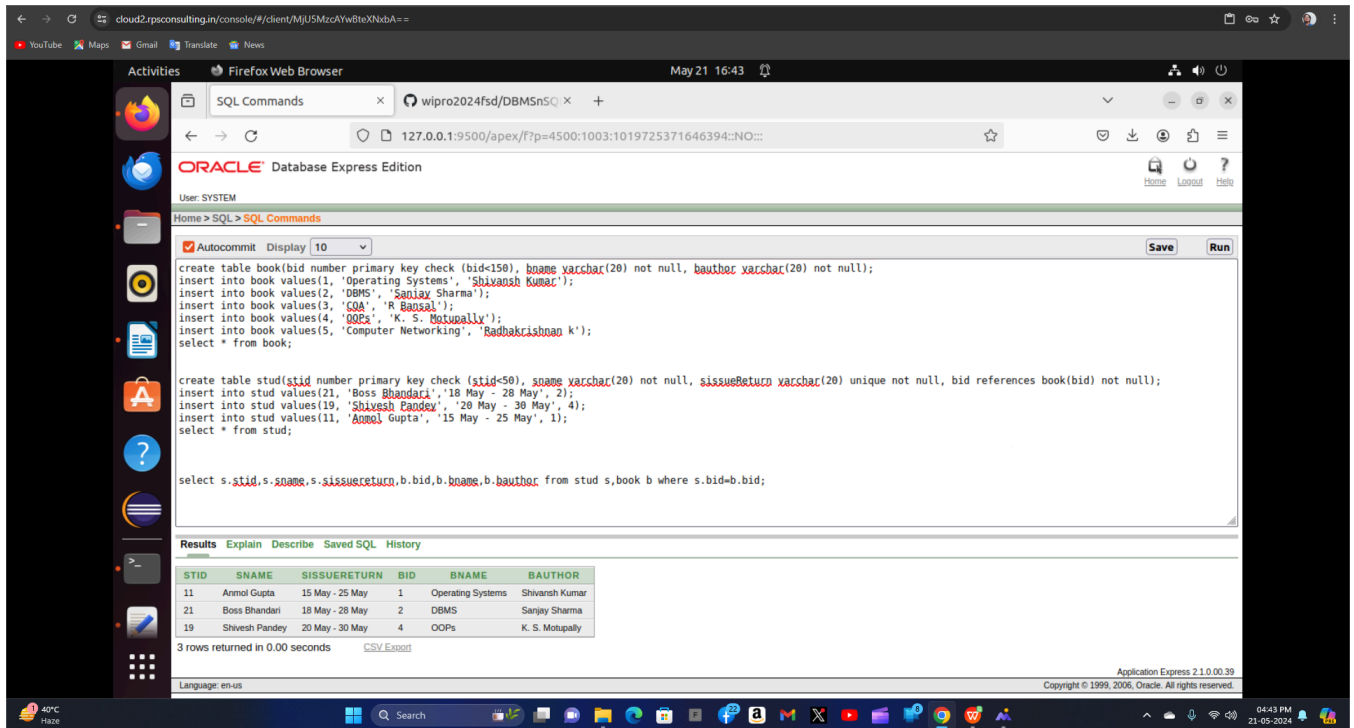
SOLUTION:

- **ACID(Atomicity, Consistency, Isolation and Durability) Properties:**
 - **Atomicity :** This is a property that describes a transaction or an instruction to be done either completed as a whole or not completed at all. No partial completion is involved.
 - **Consistency :** This property can be defined as the ability of the database to remain consistent before and after a transaction being occurred. The database always said to be transitioned from one valid state to the other.
 - **Isolation :** multiple transactions happening at the same time must not interfere within each other and this property is called as isolation. No database is affected by any change in some other databases.
 - **Durability :** we can expect that the databases being changed or modified will not get affected by any kind of failures in the future.

ASSIGNMENT - 4

PROBLEM STATEMENTS : 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.

SOLUTION :



The screenshot shows the Oracle Database Express Edition web interface. The SQL Commands window contains the following code:

```
create table book(bid number primary key check (bid<150), bname varchar(20) not null, bauthor varchar(20) not null);
insert into book values(1, 'Operating Systems', 'Shivaresh Kumar');
insert into book values(2, 'DBMS', 'Sanjay Sharma');
insert into book values(3, 'COA', 'R Bansal');
insert into book values(4, 'OOPs', 'K. S. Motupally');
insert into book values(5, 'Computer Networking', 'Rasoolkrisnao k');
select * from book;

create table stud(stid number primary key check (stid<50), sname varchar(20) not null, sissuereturn varchar(20) unique not null, bid references book(bid) not null);
insert into stud values(21, 'Boss Bhandari', '18 May - 28 May', 2);
insert into stud values(19, 'Shivesh Pandey', '20 May - 30 May', 4);
insert into stud values(11, 'Anmol Gupta', '15 May - 25 May', 1);
select * from stud;

select s.stid, s.sname, s.sissuereturn, b.bid, b.bname, b.bauthor from stud s, book b where s.bid=b.bid;
```

The Results window shows the following data:

| STID | SNAME | SISSUERETURN | BID | BNAME | BAUTHOR |
|------|----------------|-----------------|-----|-------------------|-----------------|
| 11 | Anmol Gupta | 15 May - 25 May | 1 | Operating Systems | Shivansh Kumar |
| 21 | Boss Bhandari | 18 May - 28 May | 2 | DBMS | Sanjay Sharma |
| 19 | Shivesh Pandey | 20 May - 30 May | 4 | OOPs | K. S. Motupally |

3 rows returned in 0.00 seconds

ASSIGNMENT - 5

PROBLEM STATEMENT : 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.

SOLUTION:

☐ Creation and dropping index:

- Consider a student table having attributes sid(Student id), snake(Student name) and sclass(student class)
- We need to create an index for student name column
- To create an index(naming st_index)in a created table we will follow the following commands:

```
create index st_index on student(sname)
```

- After this, an index has been created
- Now to drop this index made we follow:

```
drop index st_index
```

- The index will be deleted successfully

☐ How index improves query performance :

- Faster data item accessing: Using indexing the RDBMS does not have to traverse whole database to find and access a particular item of the data. The database design can quickly get to the location of the data item of which the index has been created and it can be accessed which saves a lot of time and energy.
- Sorting (if involved in the database) also gets easier with the use indexing
- Join functions can also be easily performed with the help of index in RDBMS

☐ After removing the index the following changes will be observed in database :

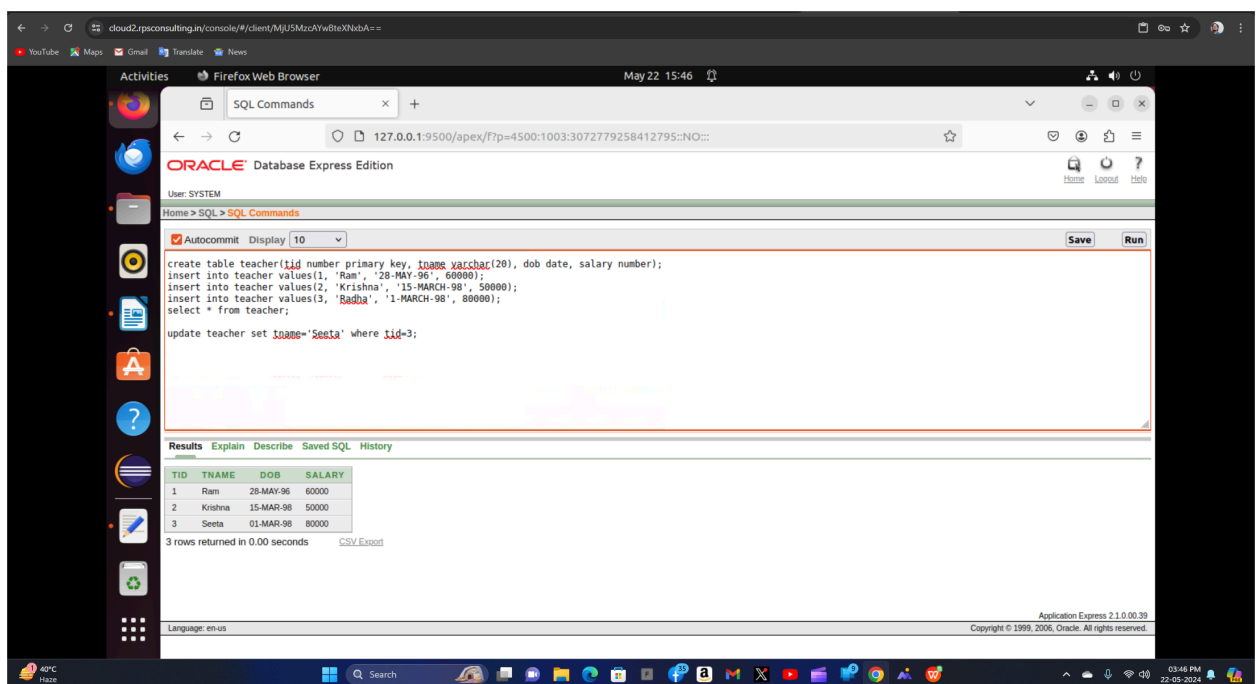
- Slower data item accessing: it becomes a slow process if we want to access any data item in database after the removal of indexing
- Join functions if to be performed will be slower and difficult for the database design to perform
- Will take a lot of time and energy of the system if we need to access anything without indexing

ASSIGNMENT - 7

PROBLEM STATEMENT : 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.

SOLUTION:

- Firstly we created a table with name 'teacher' and included the attributes naming tid(teacher id), tname(teacher name), dob(date of birth) and salary
- Then we added 3 teacher's data with their respective details in to the table using insert
- And update the 3rd data with the new one showing below:



The screenshot shows the Oracle Database Express Edition interface in a web browser. The SQL Commands window contains the following code:

```
create table teacher(tid number primary key, tname varchar(20), dob date, salary number);
insert into teacher values(1, 'Ram', '28-MAY-96', 60000);
insert into teacher values(2, 'Krishna', '15-MARCH-90', 50000);
insert into teacher values(3, 'Radha', '1-MARCH-98', 80000);
select * from teacher;

update teacher set tname='Seeta' where tid=3;
```

The Results window shows the output of the SQL commands:

| TID | TNAME | DOB | SALARY |
|-----|---------|-----------|--------|
| 1 | Ram | 28-MAY-96 | 60000 |
| 2 | Krishna | 15-MAR-98 | 50000 |
| 3 | Seeta | 01-MAR-98 | 80000 |

3 rows returned in 0.00 seconds

- Now we will delete the data items included on tid=2:

cloud2.rpsconsulting.in/console/#/client/MjU5Mzc0YVwBtoXNkbA==

Activities Firefox Web Browser May 22 15:48

SQL Commands x +

127.0.0.1:9500/apex/f?p=4500:1003:3072779258412795::NO::

ORACLE Database Express Edition

User: SYSTEM

Home > SQL > SQL Commands

☒ Autocommit Display 10 Save Run

```
create table teacher(tid number primary key, lname varchar(20), dob date, salary number);
insert into teacher values(1, 'Ram', '28-MAY-96', 60000);
insert into teacher values(2, 'Krishna', '15-MARCH-98', 50000);
insert into teacher values(3, 'Radda', '1-MARCH-98', 80000);
select * from teacher;

update teacher set lname='Seeta' where tid=3;
delete from teacher where tid=2;
```

Results Explain Describe Saved SQL History

| TID | TNAME | DOB | SALARY |
|-----|-------|-----------|--------|
| 1 | Ram | 28-MAY-96 | 60000 |
| 3 | Seeta | 01-MAR-98 | 80000 |

2 rows returned in 0.00 seconds [CSV Export](#)

Language: en-us

Application Express 2.1.0.00.39
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