



**SNS College of Technology, Coimbatore-35.**  
**(Autonomous)**

**B.E/B.Tech- Internal Assessment -III**

**Academic Year 2022-2023(EVEN)**

**Sixth Semester**

**19CST202 – Database Management Systems**

**Answer key**

**Time: 1<sup>1/2</sup> Hours**

**Maximum Marks: 50**

**Answer All Questions**

**PART-A (5 x 2 = 10 Marks)**

1. List the properties of transaction. CO4 Und  
Atomicity, Consistency, Isolation, Durability

2. Compare Shared lock and Exclusive lock. CO4 Und

s.no.	Shared Lock	Exclusive Lock
1.	Lock mode is read only operation.	Lock mode is read as well as write operation.
2.	Prevents others from updating the data.	Prevents others from reading or updating the data.

3. What are the different levels in isolation? CO4 Rem  
Read Committed, Read Uncommitted. Repeatable Reads, Serializable.

4. Differentiate B+ Tree Index Files & B Tree Index Files. CO5 Ana

Basis of Comparison	B tree	B+ tree
Pointers	All internal and leaf nodes have data pointers	Only leaf nodes have data pointers
Search	Since all keys are not available at leaf, search often takes more time.	All keys are at leaf nodes, hence search is faster and more accurate.

5. Define RAID. CO5 Rem  
RAID is a technique that makes use of a combination of multiple disks instead of using a single disk for increased performance

**PART B — (2 x 13 = 26 Marks, 1x 14 = 14 Marks)**

6. (a) Illustrate with a suitable example 13 CO4 Ana

(i) Deadlock Avoidance

When a database is stuck in a deadlock, It is always better to avoid the deadlock rather than restarting or aborting the database.

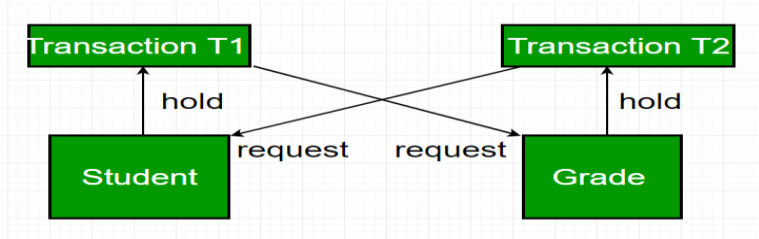
(ii) Deadlock prevention

For a large database, the deadlock prevention method is suitable. A deadlock can be prevented if the resources are allocated in such a way that a deadlock never occurs

(iii) Mutual Exclusion

Each resource can be held by only one transaction at a time, and other transactions must

wait for it to be released



(or)

(b) Analyze, does serial schedule differ from a serializable schedule, Give an example of a serial schedule and a serializable schedule.

13

CO4

Ana

Scheduling is the technique of preserving the order of the operations from one transaction to another while executing such concurrent transactions.

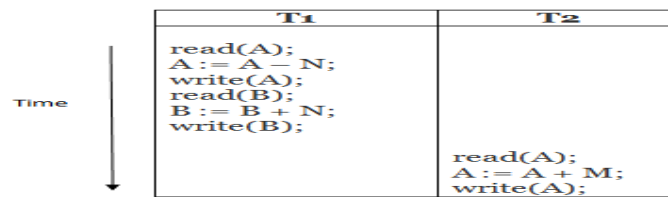
### 1. Serial Schedule

1. Execute all the operations of T1 which was followed by all the operations of T2.
2. Execute all the operations of T2 which was followed by all the operations of T1.

### 3. Serializable schedule

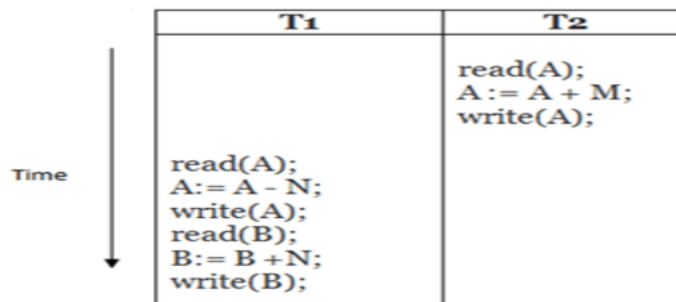
- o The serializability of schedules is used to find non-serial schedules that allow the transaction to execute concurrently without interfering with one another.

(a)



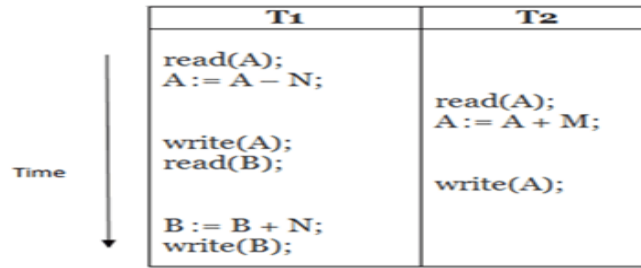
Schedule A

(b)



Schedule B

(c)



Schedule C

Cascading

Schedule &

[Cascadeless Schedule:](#)

7. (a) Examine the step by step procedure for MongoDB installation with necessary diagram.

13

CO5  
App

### **Install MongoDB Community Edition :Procedure**

Follow these steps to install MongoDB Community Edition using the MongoDB Installer wizard. The installation process installs both the MongoDB binaries as well as the default [configuration file](#) <install directory>\bin\mongod.cfg.

1 Download the installer.

Download the MongoDB Community .msi installer from the following link:

➤ [MongoDB Download Center](#)

- In the Version dropdown, select the version of MongoDB to download.
- In the Platform dropdown, select Windows.
- In the Package dropdown, select msi.
- Click Download.

2 Run the MongoDB installer.

For example, from the Windows Explorer/File Explorer:

- Go to the directory where you downloaded the MongoDB installer (.msi file). By default, this is your Downloads directory.
- Double-click the .msi file.

3 Follow the MongoDB Community Edition installation wizard.

The wizard steps you through the installation of MongoDB and MongoDB Compass.

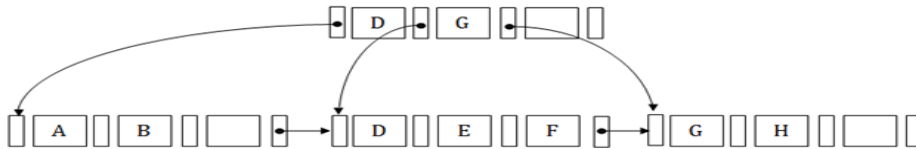
- Choose Setup Type
- Service Configuration

(or)

(b) Describe the structure of B+ tree and give the algorithm for search in the B+ with example. 13

### Structure of B+ Tree

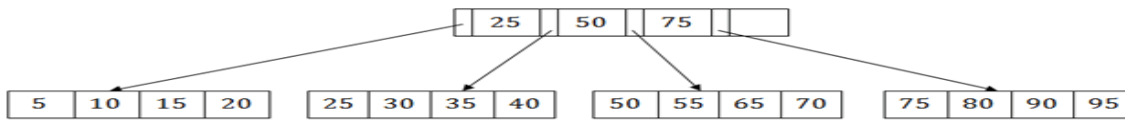
- In the B+ tree, every leaf node is at equal distance from the root node. The B+ tree is of the order n where n is fixed for every B+ tree.
- It contains an internal node and leaf node.



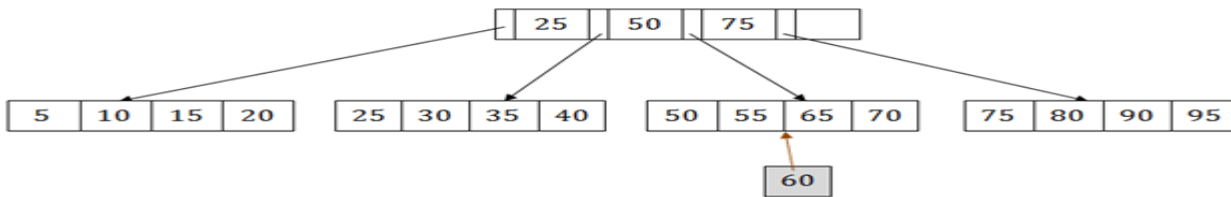
**Internal node:** An internal node of the B+ tree can contain at least  $n/2$  record pointers except the root node.

**Leaf node:** The leaf node of the B+ tree can contain at least  $n/2$  record pointers and  $n/2$  key values.

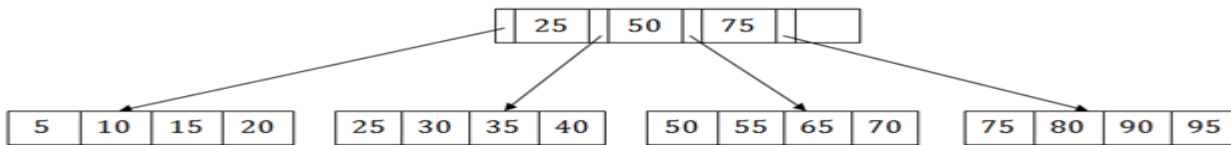
### Searching a record in B+ Tree



### B+ Tree Insertion



### B+ Tree Deletion



8. (a)

Illustrate Online Transaction Processing (OLTP) in ATM Centre.

Following are important characteristics of OLTP:

- OLTP uses transactions that include small amounts of data.
- Indexed data in the database can be accessed easily.
- OLTP has a large number of users.
- It has fast response times

An example of the OLTP system is the ATM center. Assume that a couple has a joint account with a bank. One day both simultaneously reach different ATM centers at precisely the same time and want to withdraw the total amount present in their bank account.

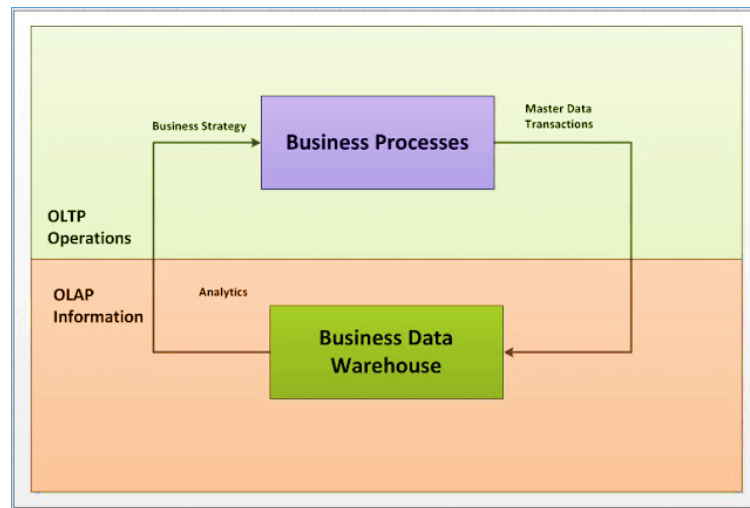
### OLTP for ATM image

However, the person that completes the authentication process first will be able to get money. In this case, the OLTP system makes sure that the withdrawn amount will be never more than the amount present in the bank. The key to note here is that OLTP systems are optimized for transactional superiority instead of data analysis.

Other examples of OLTP system are:

- Online banking
- Online airline ticket booking
- Sending a text message
- Order entry
- Add a book to shopping cart

### **OLTP vs. OLAP**



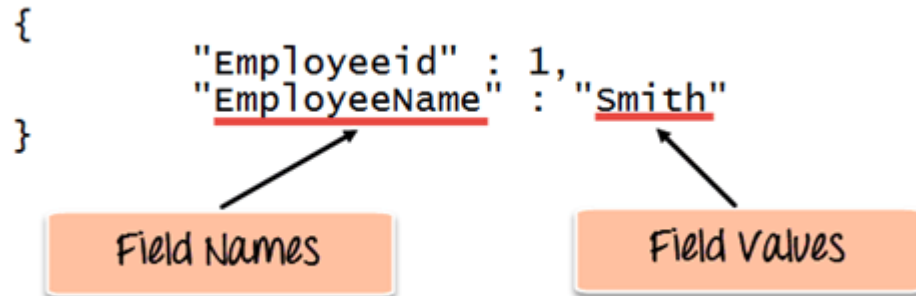
OLTP	OLAP
OLTP is an online transactional system.	OLAP is an online analysis and data retrieving process.
It is characterized by large numbers of short online transactions.	It is characterized by a large volume of data.
OLTP is an online database modifying system.	OLAP is an online database query management system.
OLTP uses traditional DBMS.	OLAP uses the data warehouse.
Insert, Update, and Delete information from the database.	Mostly select operations

(or)

(b) Create a database for employee payroll management system and perform following operations in MangoDB,

In MongoDB, the first basic step is to have a database and collection in place. The database is used to store all of the collections, and the collection in turn is used to store all of the documents. The documents in turn will contain the relevant Field Name and Field values.

The snapshot below shows a basic example of how a document would look like.



(i) Creating a database using “use” command

Creating a database in MongoDB is as simple as issuing the “**using**” command. The following example shows how this can be done.

```
C:\Windows\system32\cmd.exe - mongo.exe
> use EmployeeDB
```

**Code Explanation:**

- The “**use**” command is used to create a database in MongoDB. If the database does not exist a new one will be created.

If the command is executed successfully, the following Output will be shown:

**Output:**

```
C:\Windows\system32\cmd.exe - mongo.exe
> use EmployeeDB
switched to db EmployeeDB
>
```

(ii) Creating a Collection/Table using insert()

he following example shows how this can be done.

```
db.Employee.insert
(
  {
    "Employeeid" : 1,
    "EmployeeName" : "Martin"
  }
)
```

**Code Explanation:**

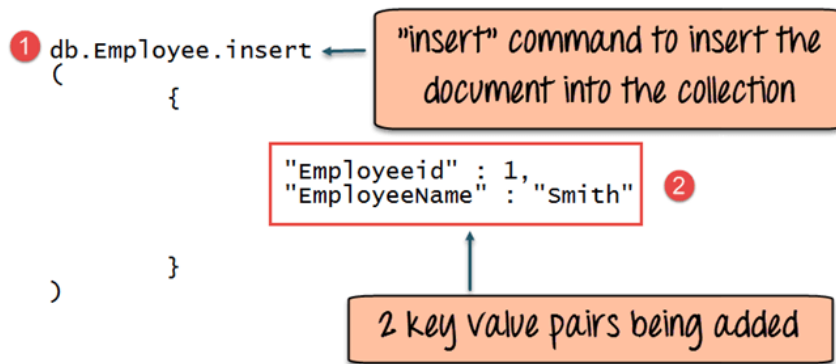
- As seen above, by using the “insert” command the collection will be created.

(iii) Adding documents using insert() command

ongoDB provides the **insert () command** to insert documents into a collection. The following example shows how this can be done.

**Step 1)** Write the “insert” command

**Step 2)** Within the “insert” command, add the required Field Name and Field Value for the document which needs to be created.



**Code Explanation:**

1. The first part of the command is the “insert statement” which is the statement used to insert a document into the collection.
2. The second part of the statement is to add the Field name and the Field value, in other words, what is the document in the collection going to contain.

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(Note: **UND-Understand REM-Remember ANA-Analyze APP-Apply**)