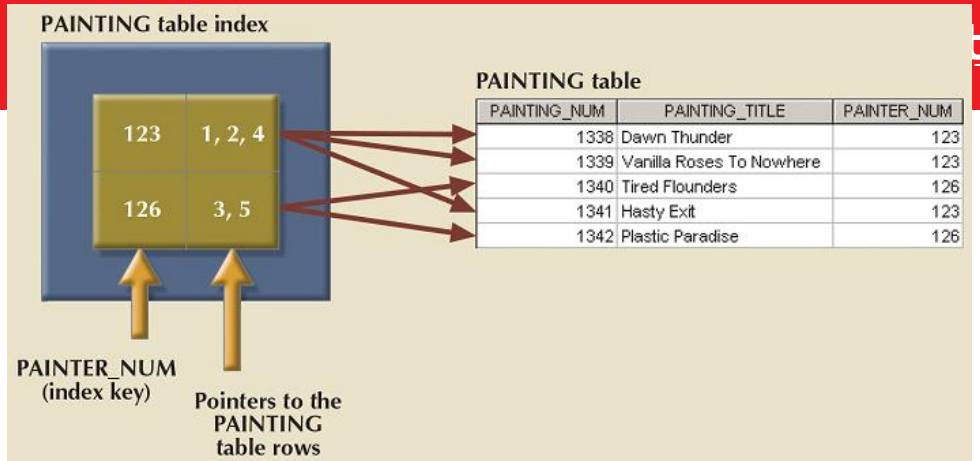
Indexes

Indexes

- Index is the main mechanism for increasing the efficiency to retrieve data from database.
- To find the relevant rows without an index, searching must begin with the first row and then read through the entire table.
- **Example:** finding a book in the library
  - How?
  - PK is by default is a **unique index** that removes duplicate as well
  - We also define **unique** index on a column (attribute) during creation of the table! (See Topic 4.1 lecture slides on “SQL Constraints”!)
  - Yet, we need more indices to make the search in the database faster!
- **Advantage:**
  - Makes certain types of retrieval more efficient
- **Disadvantage:**
  - The index occupies space on disk
  - DBMS must update the index whenever corresponding data in the database is updated

Indexes

- An index has TWO components:
  - Index key
  - Set of pointers



- So, an index is an ordered arrangement of keys and pointers.
- Each key points to the location of the data identified by the key.

- By default, PK is a unique index in a table
- You can define unique index on an attribute when you create table

- Unique index has a single pointer, because each key has only one pointer

- The index above (in figure) has been created on Painter_Num in Painting table
- Painter_Num is the key and each key has more than one pointers: 1, 2, 3, … which are row indices pointing to the corresponding rows in Painting table

Create, Show & Remove Index

- **Syntax:**

  CREATE INDEX IndexName
  ON TableName (attribute-list);

- To see all the indexes of a table:

  SHOW INDEX FROM tableName

- Removing index:

  DROP INDEX IndexName ON TableName;

Create, Show & Remove Index

Example:

- Show current index

```
SHOW INDEX FROM workallocation ;
```

Table	Non_unique	Key_name	Seq_in_index	Column_name
workallocation	0	PRIMARY	1	StaffID
workallocation	0	PRIMARY	2	DepartmentID
workallocation	1	DepartmentID	1	DepartmentID

- Now, create an index

```
CREATE INDEX staffDepartment
ON workallocation (StaffID,departmentID);
```

Table	Non_unique	Key_name	Seq_in_index	Column_name
workallocation	0	PRIMARY	1	StaffID
workallocation	0	PRIMARY	2	DepartmentID
workallocation	1	DepartmentID	1	DepartmentID
workallocation	1	staffDepartment	1	StaffID
workallocation	1	staffDepartment	2	DepartmentID

- After creation, show again

```
SHOW INDEX FROM workallocation ;
```

- Now, remove the created index

```
DROP INDEX StaffDepartment ON workallocation;
```

- After removal, show again

```
SHOW INDEX FROM workallocation ;
```

Table	Non_unique	Key_name	Seq_in_index	Column_name
workallocation	0	PRIMARY	1	StaffID
workallocation	0	PRIMARY	2	DepartmentID
workallocation	1	DepartmentID	1	DepartmentID

Thank you