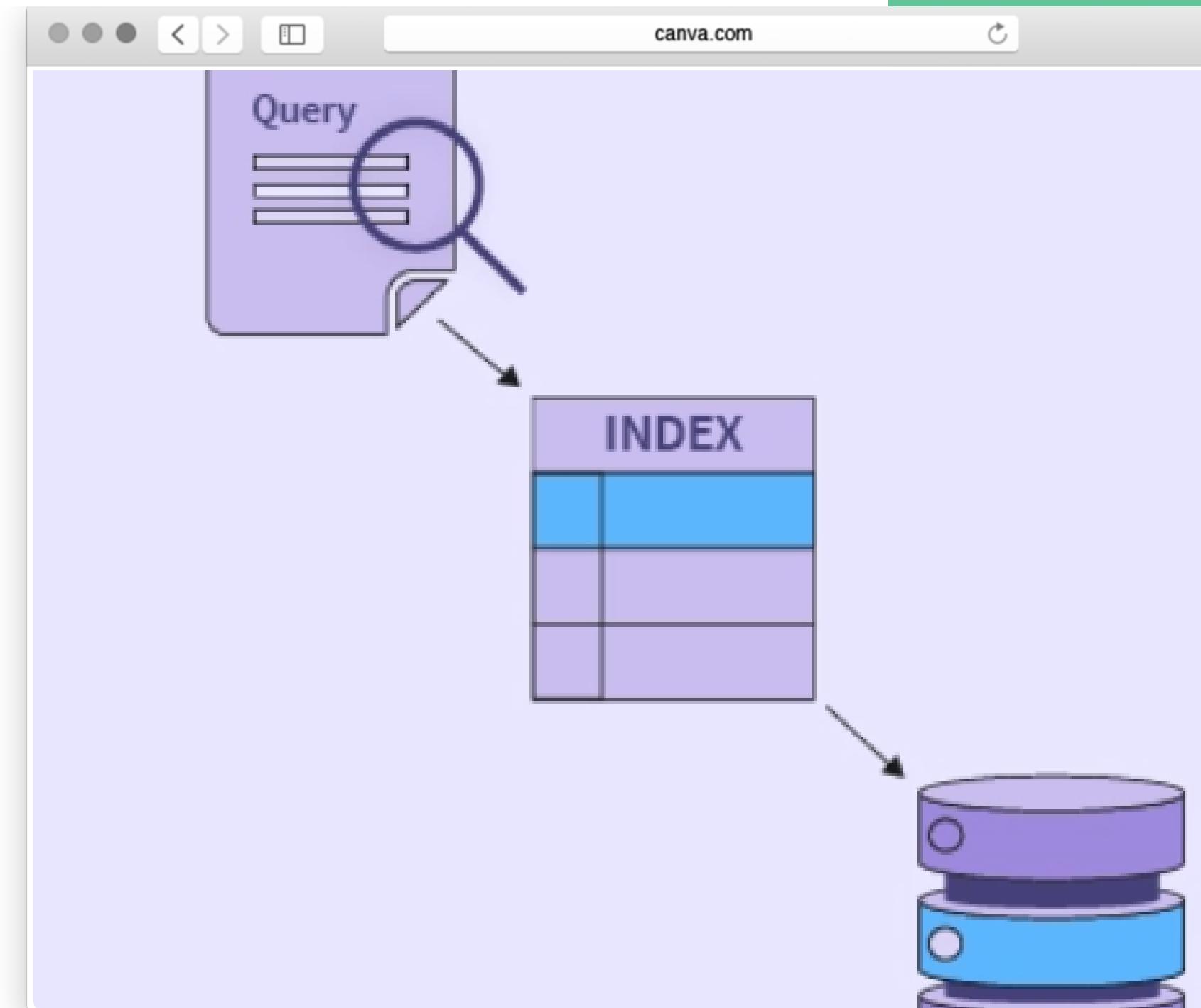


Indexing and its Types



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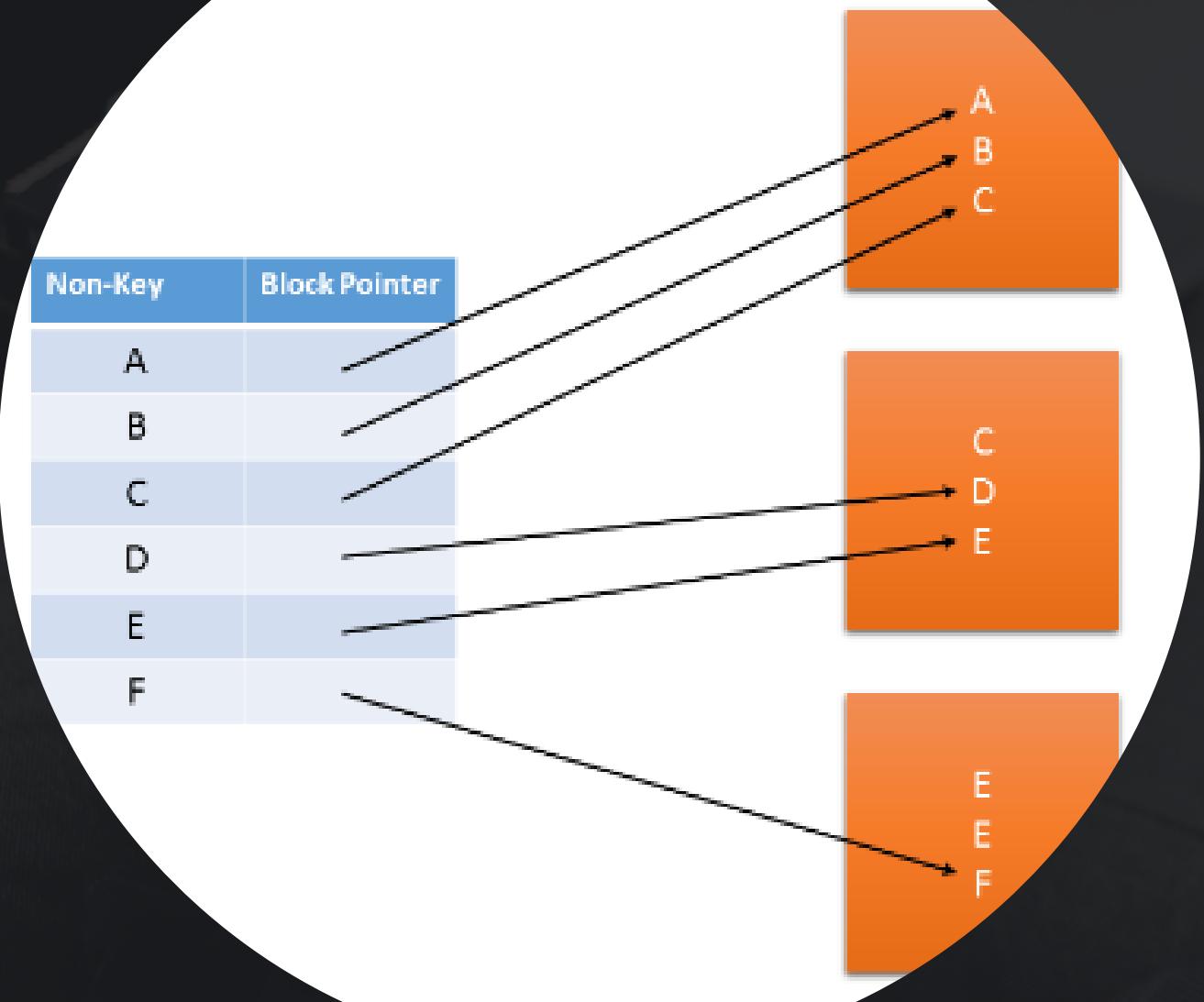
Vanshika Diwan



INDEXING

Definition

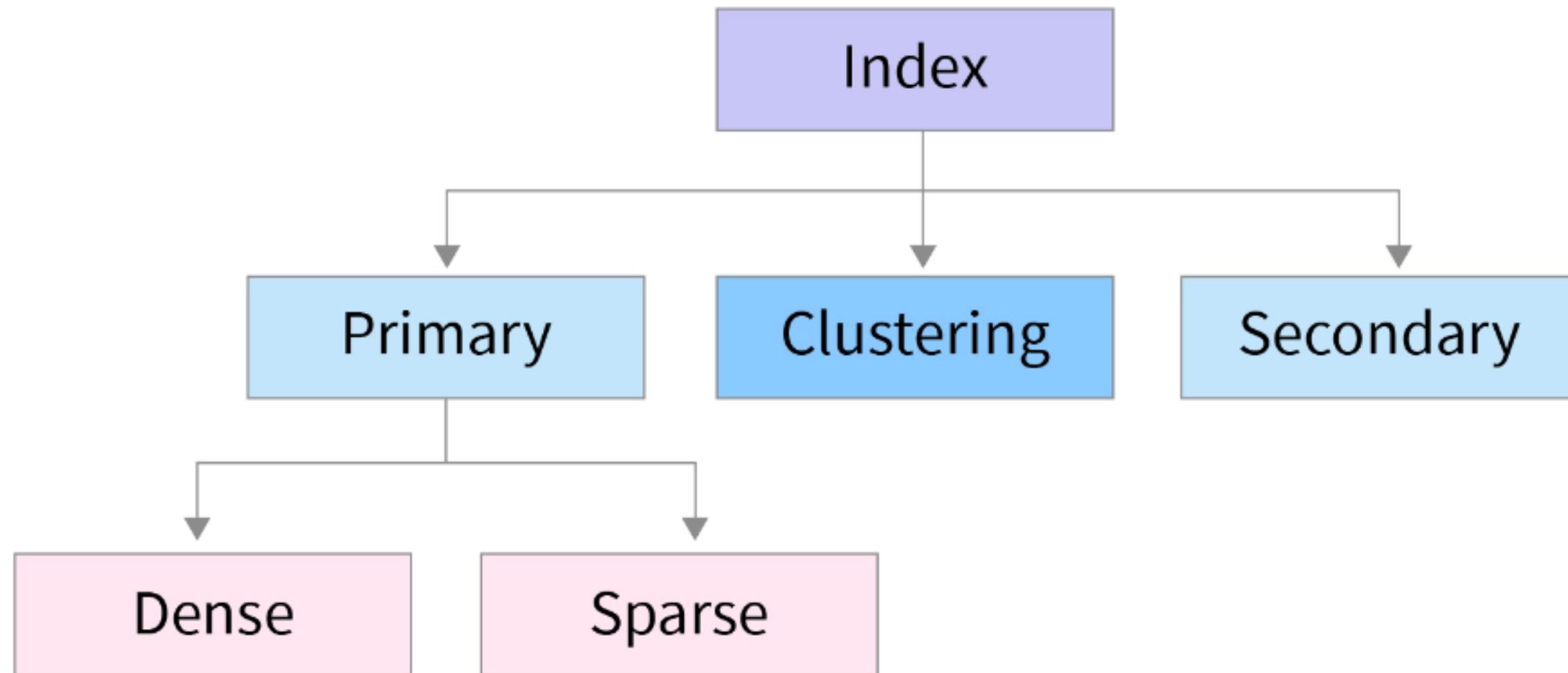
Indexing refers to the process of creating an index or a catalog of data that makes it easier and faster to search, retrieve and access information. In the context of computer science and information retrieval, indexing usually refers to the process of creating an index of the contents of a database, a document collection or a web page



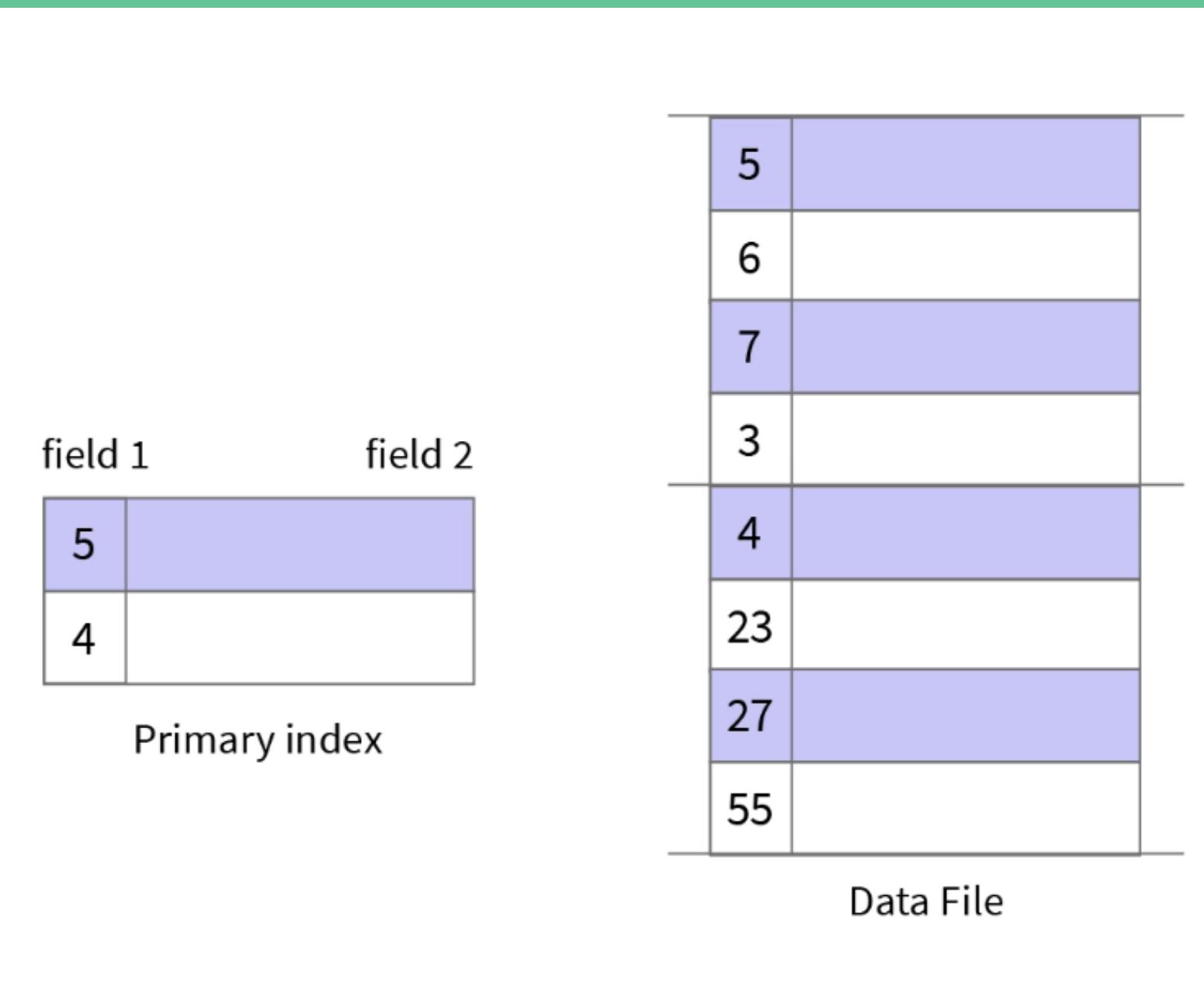
Advantage

In a database management system (DBMS), indexing is a technique used to improve the performance of database queries by enabling fast access to data records. When a query is made against a database, the query optimizer will use the index to quickly locate the records that match the query criteria, rather than scanning the entire table. This can significantly reduce the time it takes to execute a query, especially when dealing with large amounts of data.

Types of Indexing



Primary Indexing



Ordered

Key

Primary indexing is a type of indexing in which the index is created on the primary key of a table.

Advantages-

Faster Data Retrieval

Data Integrity

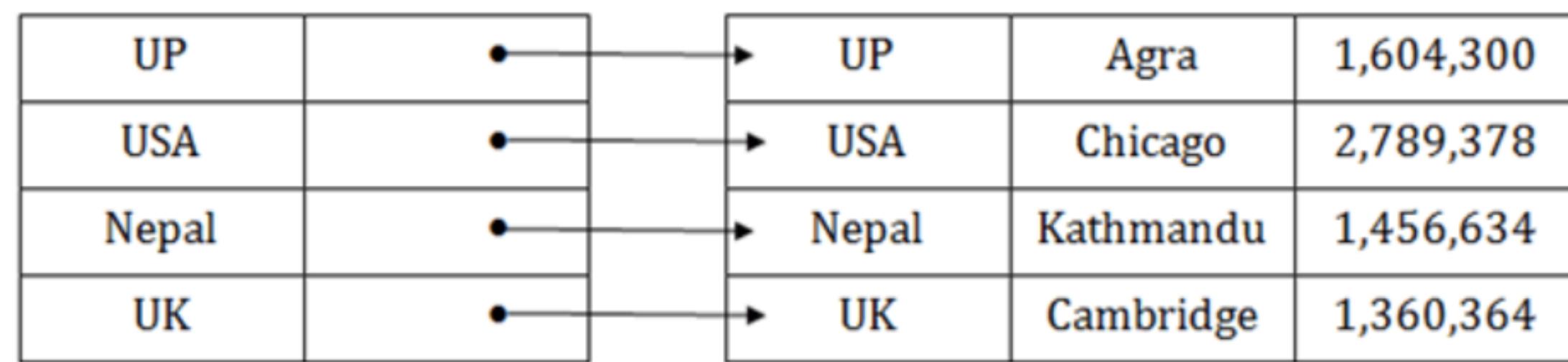
Optimized Query Performance

Disadvantages-

Storage Space

Dense Index

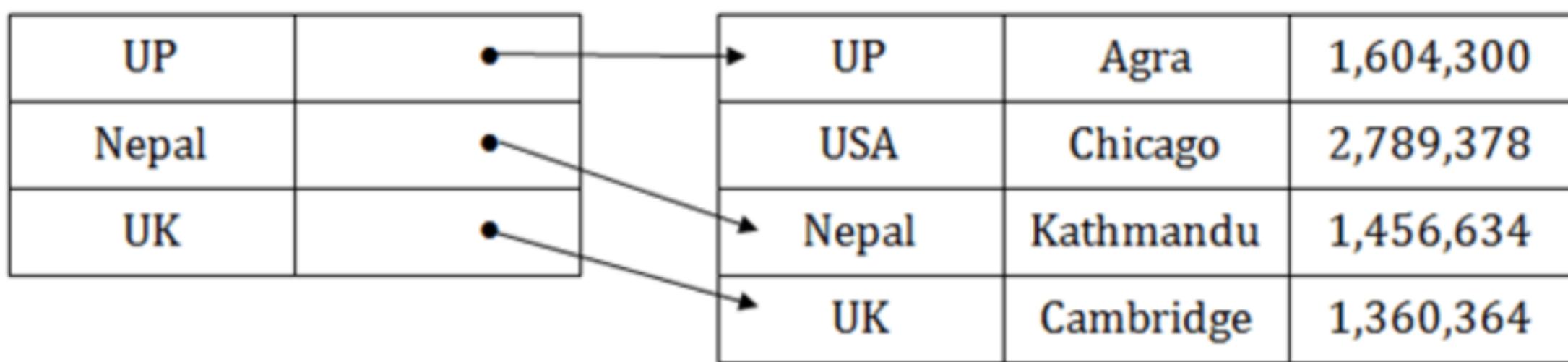
- The dense index contains an index record for every search key value in the data file. It makes searching faster.
- In this, the number of records in the index table is same as the number of records in the main table.
- It needs more space to store index record itself. The index records have the search key and a pointer to the actual record on the disk.



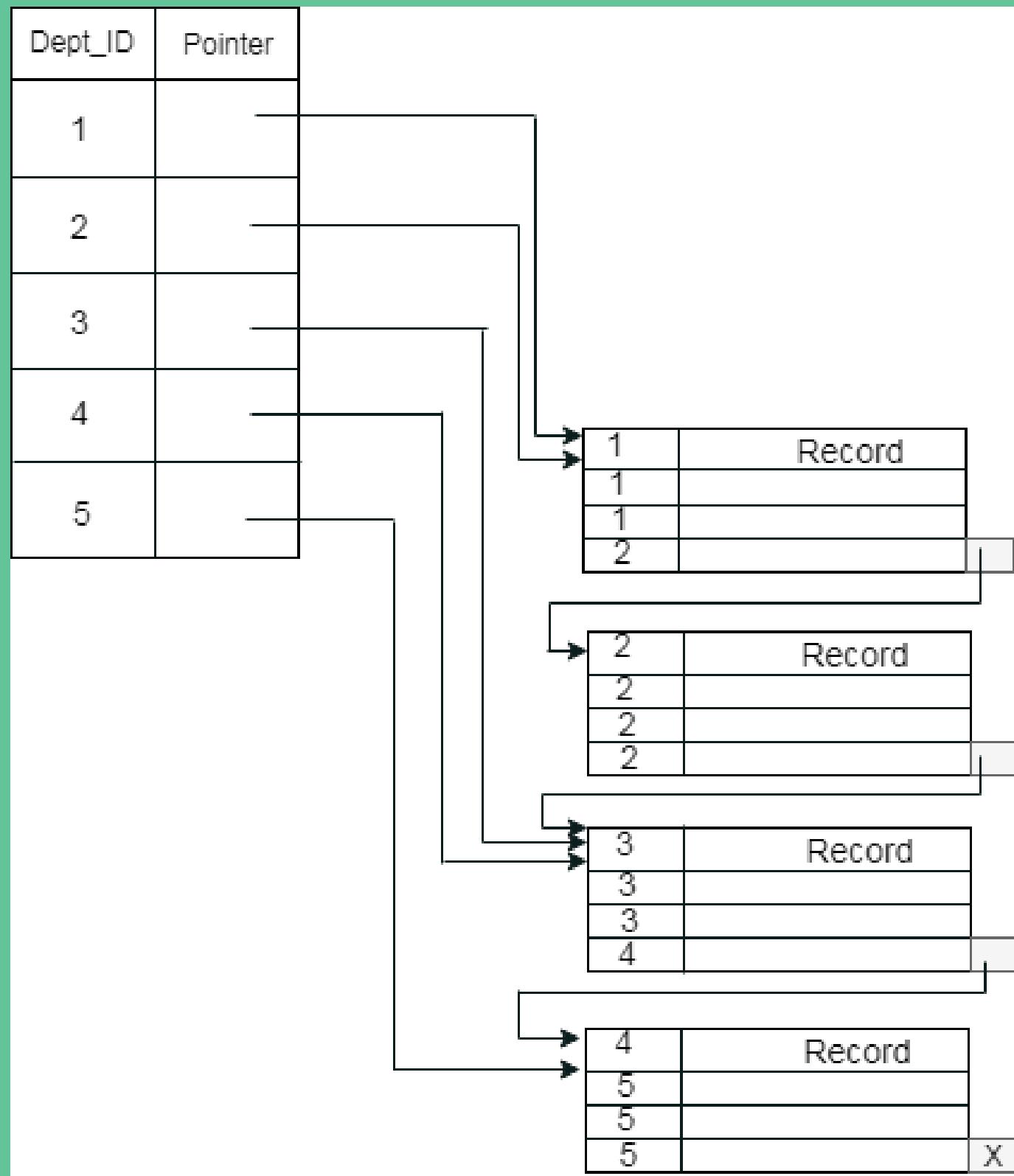
UP	•	→	UP	Agra	1,604,300
USA	•	→	USA	Chicago	2,789,378
Nepal	•	→	Nepal	Kathmandu	1,456,634
UK	•	→	UK	Cambridge	1,360,364

Sparse Index

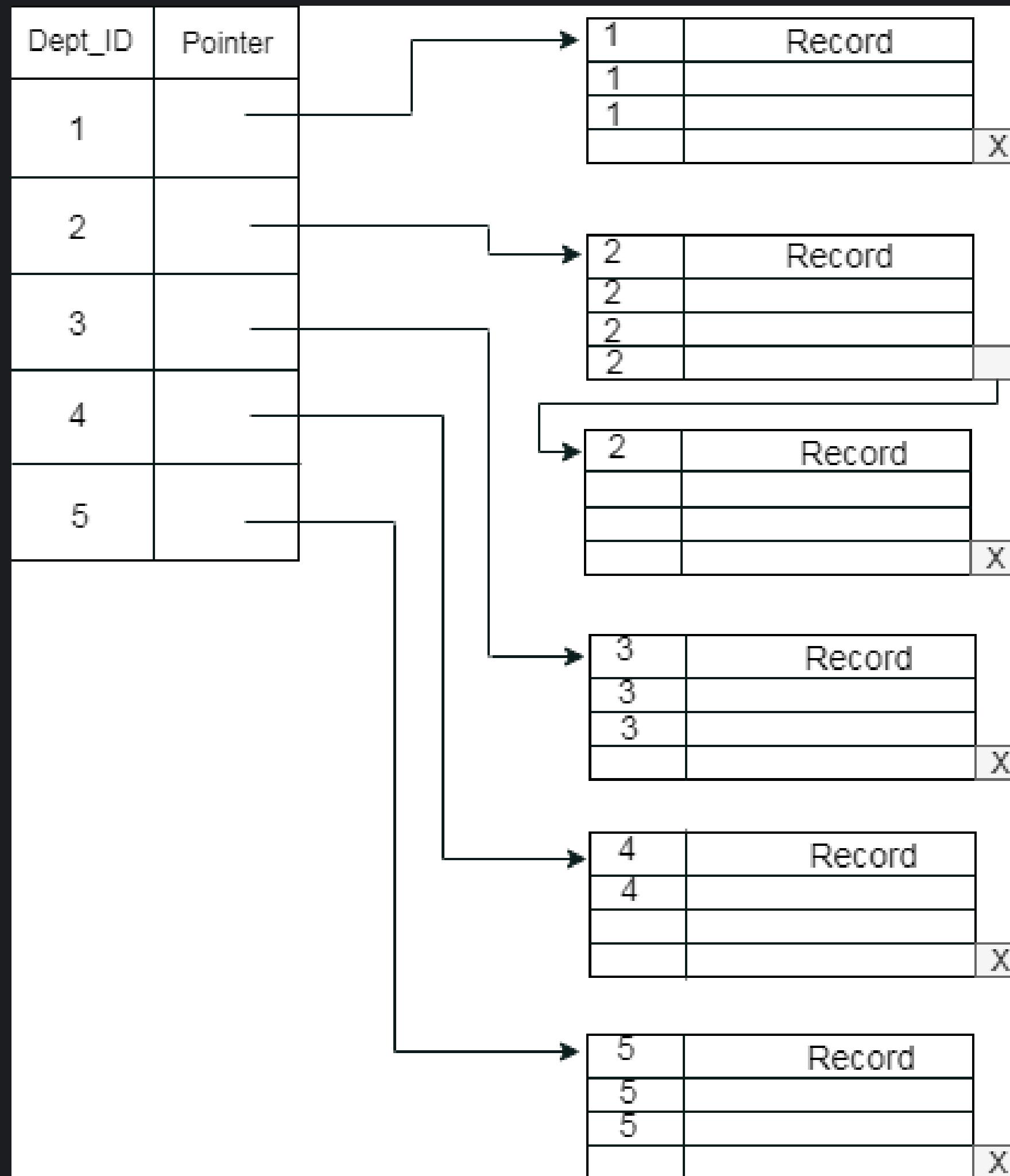
- In the data file, index record appears only for a few items. Each item points to a block.
- In this, instead of pointing to each record in the main table, the index points to the records in the main table in a gap.



Cluster Indexing



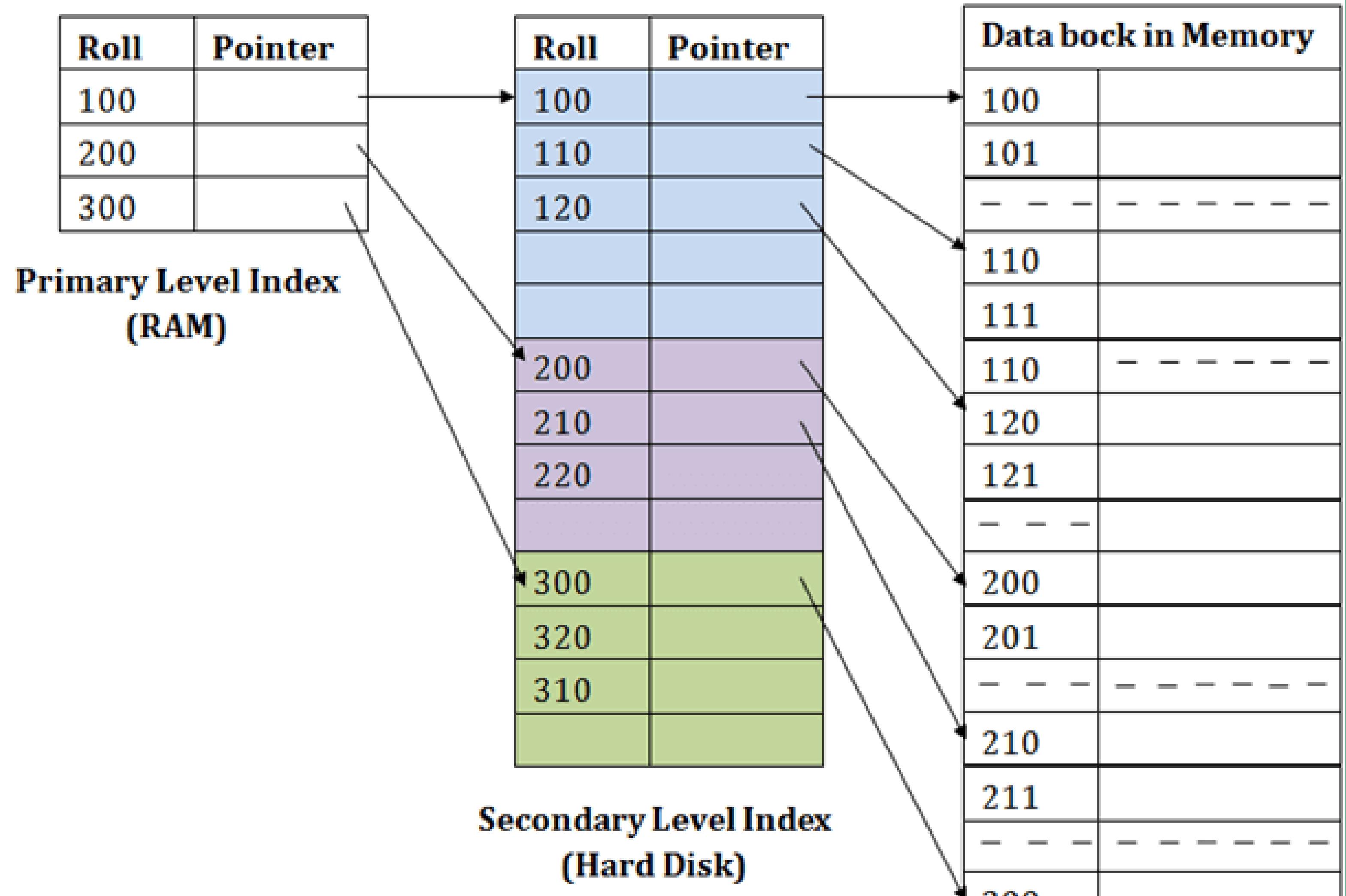
- It works on an ordered and sorted data.
- It stores the data rows in the table or view, based on their key values.
- Index is created on non-primary key columns which may not be unique for each record.
- So to identify the record faster, we will group two or more columns to get the unique value and create index out of them. This method is called a clustering index.
- The records which have similar characteristics are grouped, and indexes are created for these group.



The previous schema is little confusing because one disk block is shared by records which belong to the different cluster. If we use separate disk block for separate clusters, then it will be more efficient.

Secondary Indexing

- >**Secondary indexing is a database feature that creates an additional index for a non-primary key column in a table**
- >**This allows faster retrieval of data based on values in the indexed column**
- >**Secondary indexing is useful when querying a table based on a non-primary key column**
- >**Secondary indexes can be created on one or more columns in a table**
- > Time complexity is $O(\log n)$



Thank You

MacBook Pro