5th Unit

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Questions :- ①

① Construct B Tree of order 3 by inserting number from 1 to 10.

② order 5 B Tree / order 4

③ What is trie tree? Explain insert and search operation on it.

④ Explain Following primary index, secondary index, sparse index, dense index with example?

⑤ Algorithm to insert node in B tree?

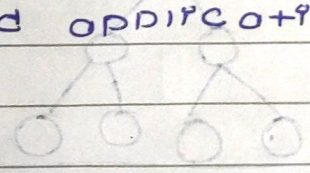
⑥ Construct B+ tree of order 4 / order 3

⑦ algorithm to delete node from B+ tree?

⑧ Insert key to 5 way B tree

⑨ Define trie tree compare trie tree with hash table Draw trie tree for Following data: bear, sell, bid, stock, bull, buy, stop.

⑩ Explain with example trie tree Give advantage and application of trie tree.



Q] Explain the following :-

① Primary Indexing

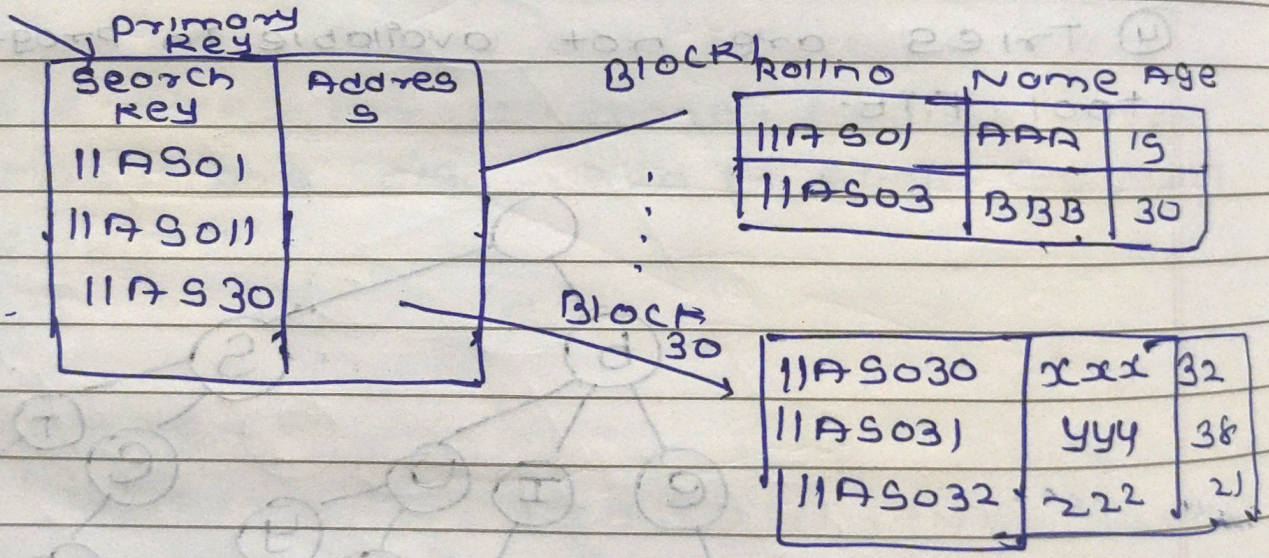
② Secondary Indexing

③ Sparse Indexing

④ Dense Indexing.

→ ① Primary Indexing :-

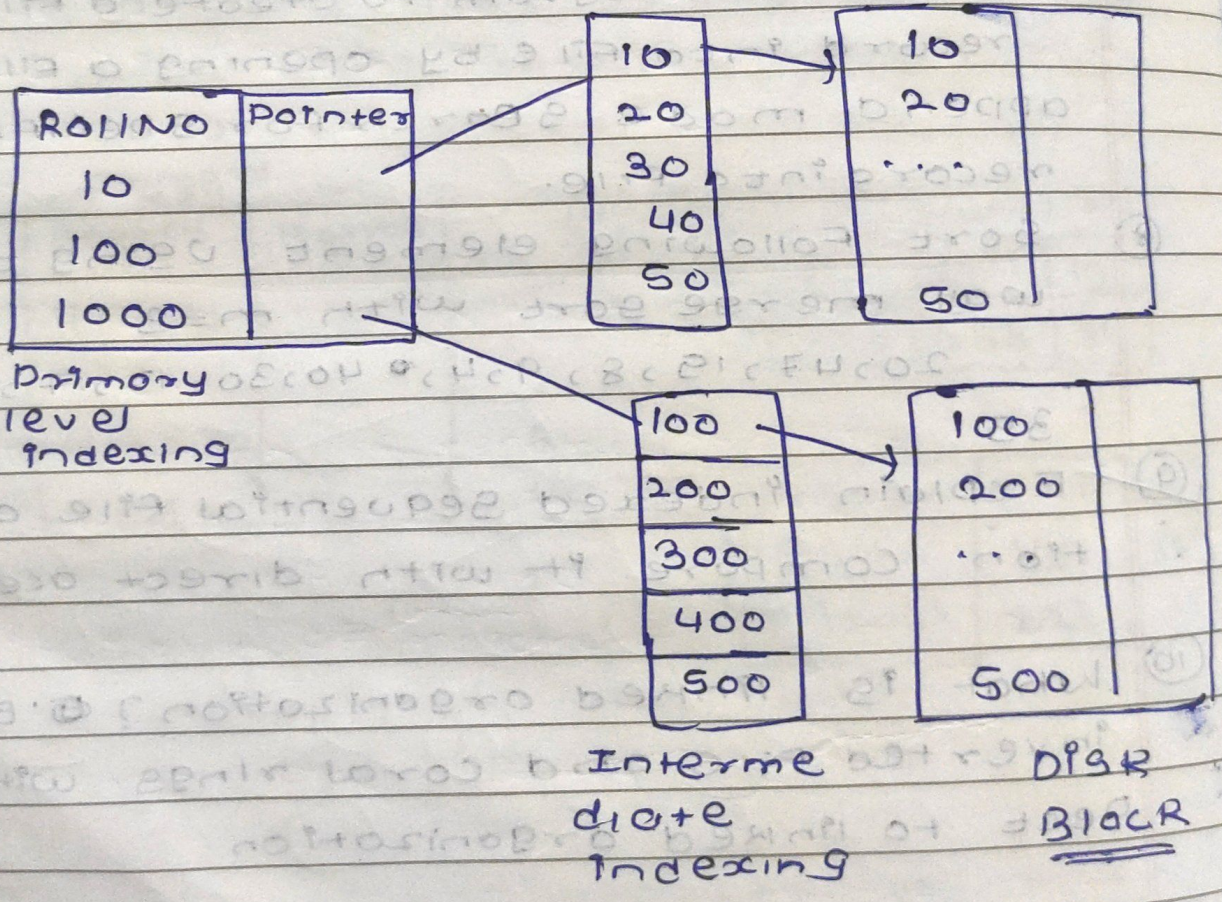
- An index on a set of field that include the primary key is called primary index. The primary should be on sorted order.
- The primary index is always done when data file is arranged in sorted order.



* Secondary Indexing:-

- In this technique, two level of indexing are used in order to reduce the mapping size of 1st level.
- Initially, For 1st level a large range of numbers is selected so that the mapping size is small. Further, each range is divided into subsequent sub range.

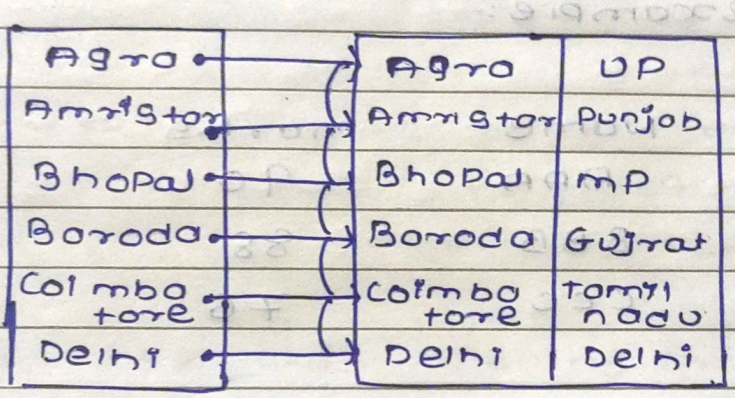
For example:-



* Dense and Sparse Indexing:-

1) Dense Index:-

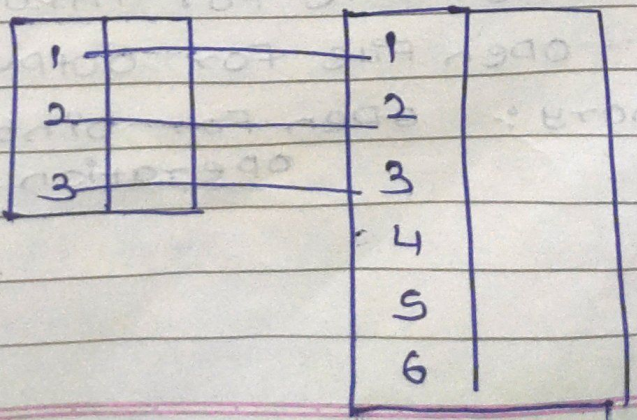
- An index record appear for every search key value in file.
- This record contain search key value and a pointer to actual record.
- For example:-



प्रत्येक search key value पर record index file में होने चाहिए.

2) Sparse Index:-

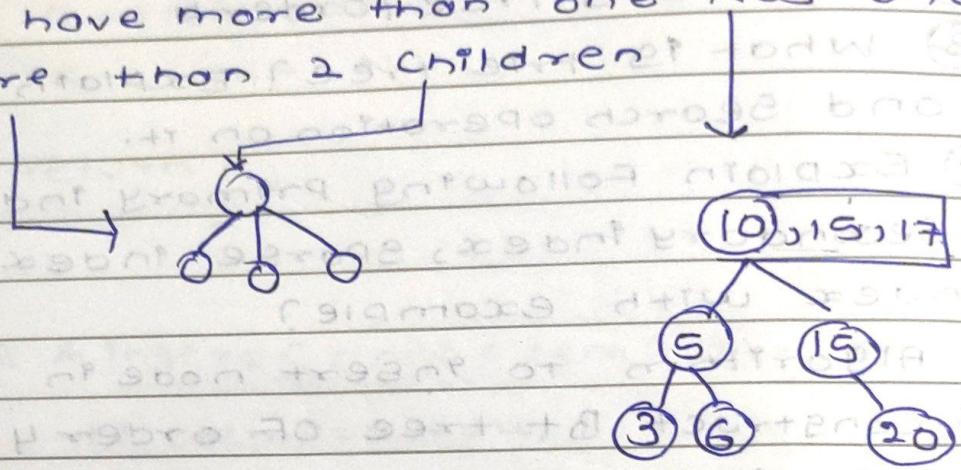
- Index record are created only for some of record.
- To locate a record, we find index value with largest search key value less than or equal to search key value we are looking for:



* B tree :-

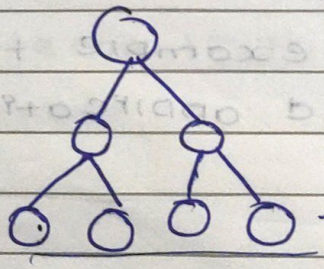
m = 5 way

- Balanced m-way tree
- Generalized of BST in which a node can have more than one key and more than 2 children



No of Keys depend on value of m.

- All leaf node should be at same level.

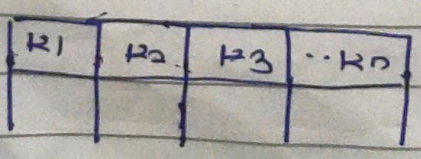


→ leaf node at some level

- B tree of order m has following properties :-

① Every node have max m children

m = 5



→ max 5 keys

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② min children

leaf Node = 0

root → 2

Internal node = $\lceil \frac{m}{2} \rceil = \lceil \frac{5}{2} \rceil = 2.5 = 3$

max

- Every node has (m-1) keys

→ min keys :- root node → 1

all other node → $\lceil \frac{m}{2} \rceil - 1$

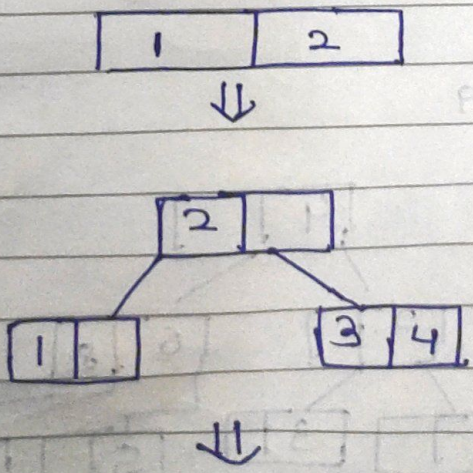
*NOTE :- Insertion is always in leaf Node.

example :-

- Create a B-tree of order 3 by inserting values from 1 to 10.

→ m = 3

max key = (m-1) = 2

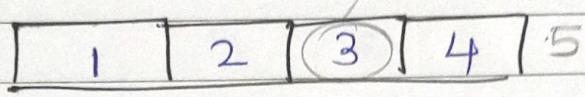


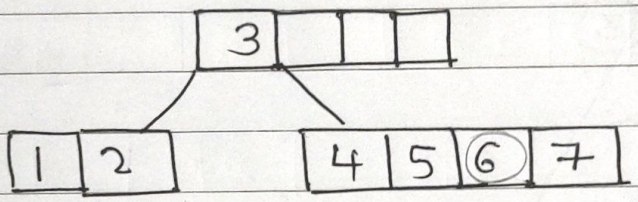
B-TREE

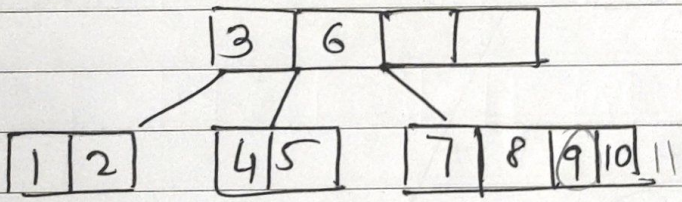
create a btree of order 5 by inserting values from 1 to 20.

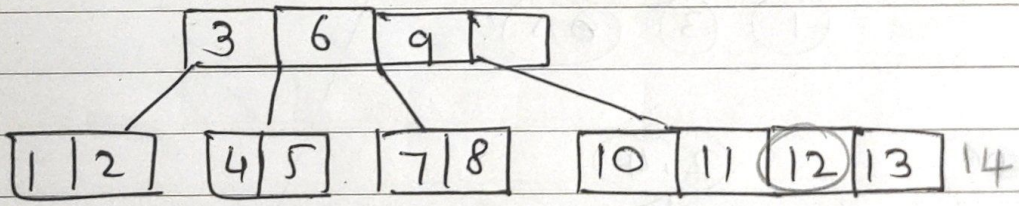
$m = 5$

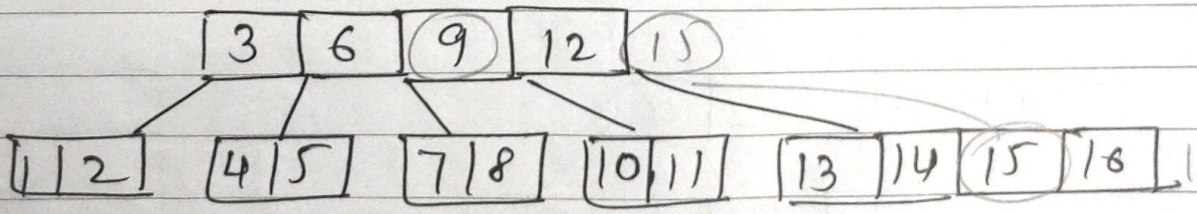
$key = m - 1 = 4$











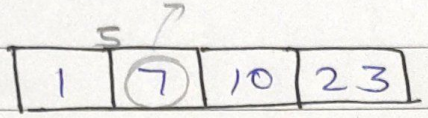
B+ TREE

* 7, 10, 1, 23, 5, 15, ~~15~~, 17, 9, 11, 39, 35, 8, 40, 25

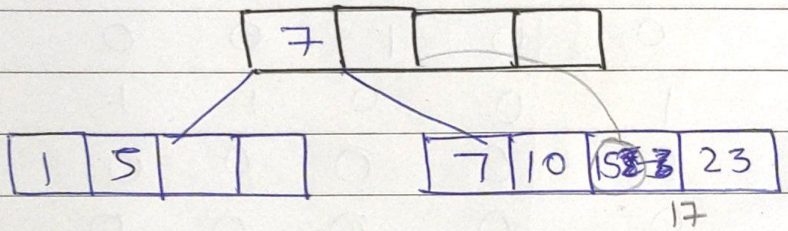
orders (m) = 5

Key = m - 1 = 4

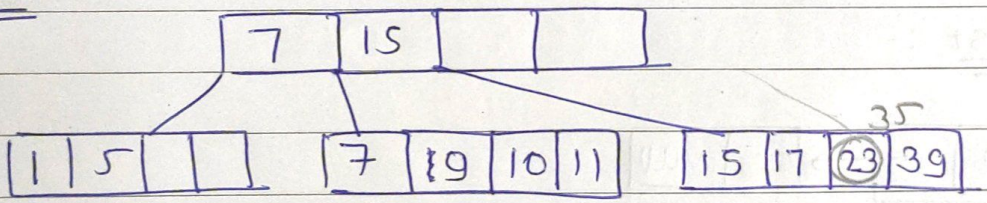
Step 1:



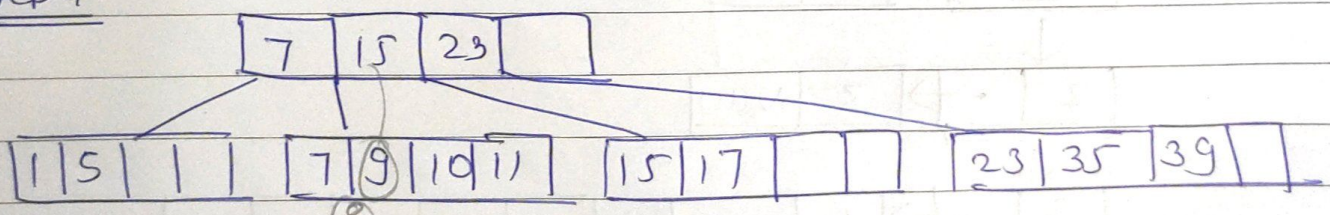
Step 2:

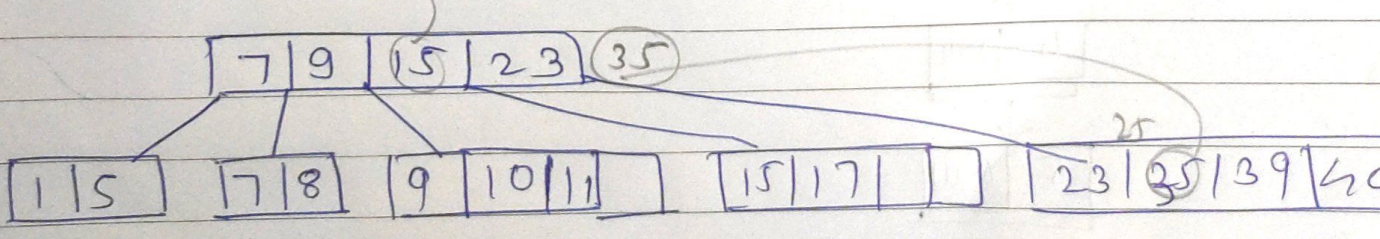


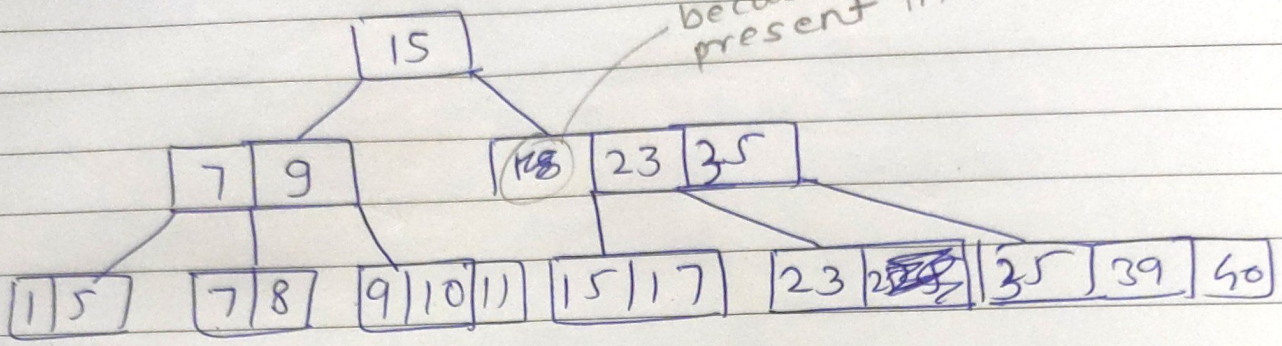
Step 3:



Step 4:



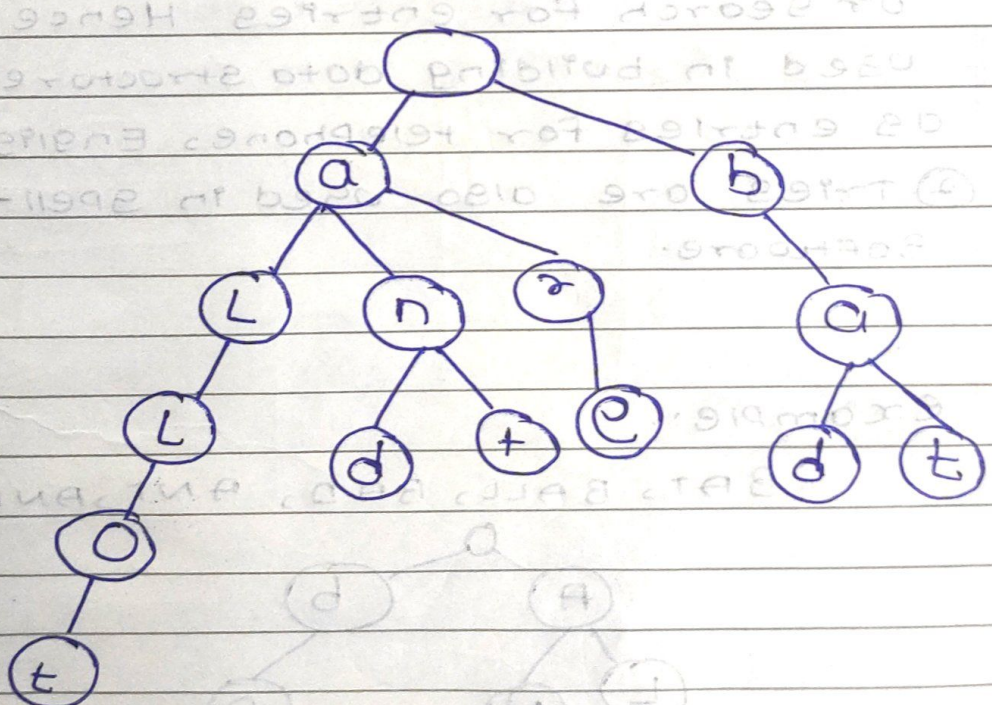



because it is present in leaf node
15
7
9
18
23
35
1
5
7
8
9
10
11
15
17
23
35
39
40

* Trie tree data structure:

Q) What is trie tree data structure? Explain insert and search operation on it?
* Advantage
* example
* Application

→ - A trie is multiway tree data structure used for storing a string over an alphabet. It is used to store a large amount of string.



- Here trie show words like allot, and, ant, are, bad, bat.
- The main idea behind trie tree is to share common prefix from a common node.

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* Advantage of trie tree:-

① In tries the key are searched using common prefixes hence searching is faster.

② Trie take less space when they contain large string as node are shared between keys.

③ Tries help with longest prefix matching, when we want to find key.

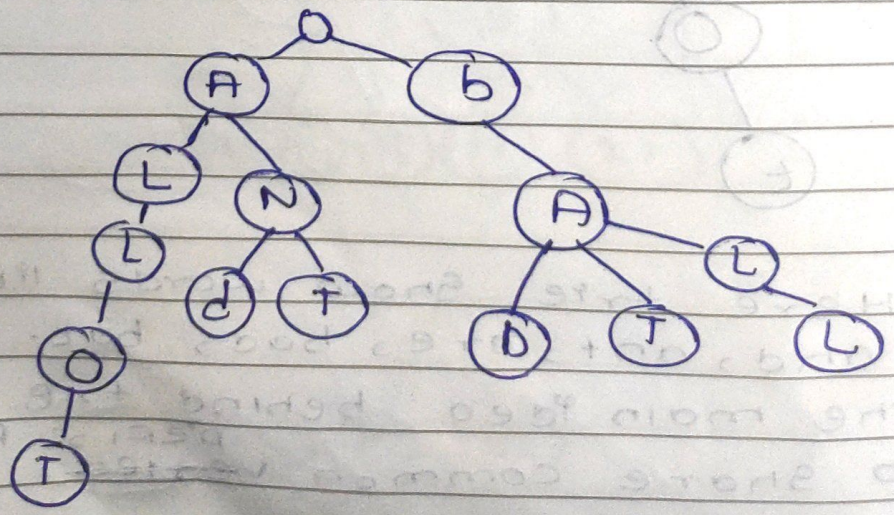
* Application of tries:-

① Tries has ability to insert, delete or search for entries Hence they are used in building data structure such as entries for telephone, English words

② Tries are also used in spell-checking software.

example:-

BAT, BALL, BAD, ANT, AND, ALLOT



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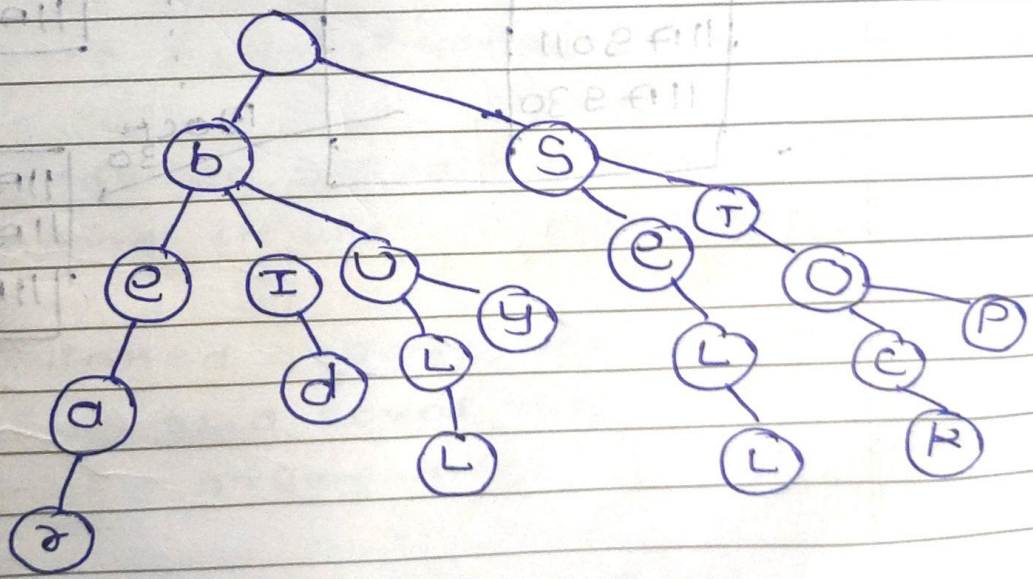
Q] Define trie tree compare trie tree with hashing Drow trie tree for bear, sell, bid, stock, bull, buy, stop.

→ -The multiway datastructure used to store a string over alphabet is called trie tree.

*comparision of trie tree and hashing:-

1. there are no collission of different key in trie
2. No hashfunction is there is trie tree
3. Data retrieval from tries is very slower than hashing
4. Tries are not available in programming tool kit.



trie tree