

## B+ tree

→ It is a Balanced tree

- \* Internal nodes direct the search
- \* Leaf node contain the data entry
- \* Leaf nodes organized into doubly linked list.

### characteristics :

- (1) Minimum occupancy is 50 %  
each node, except root.

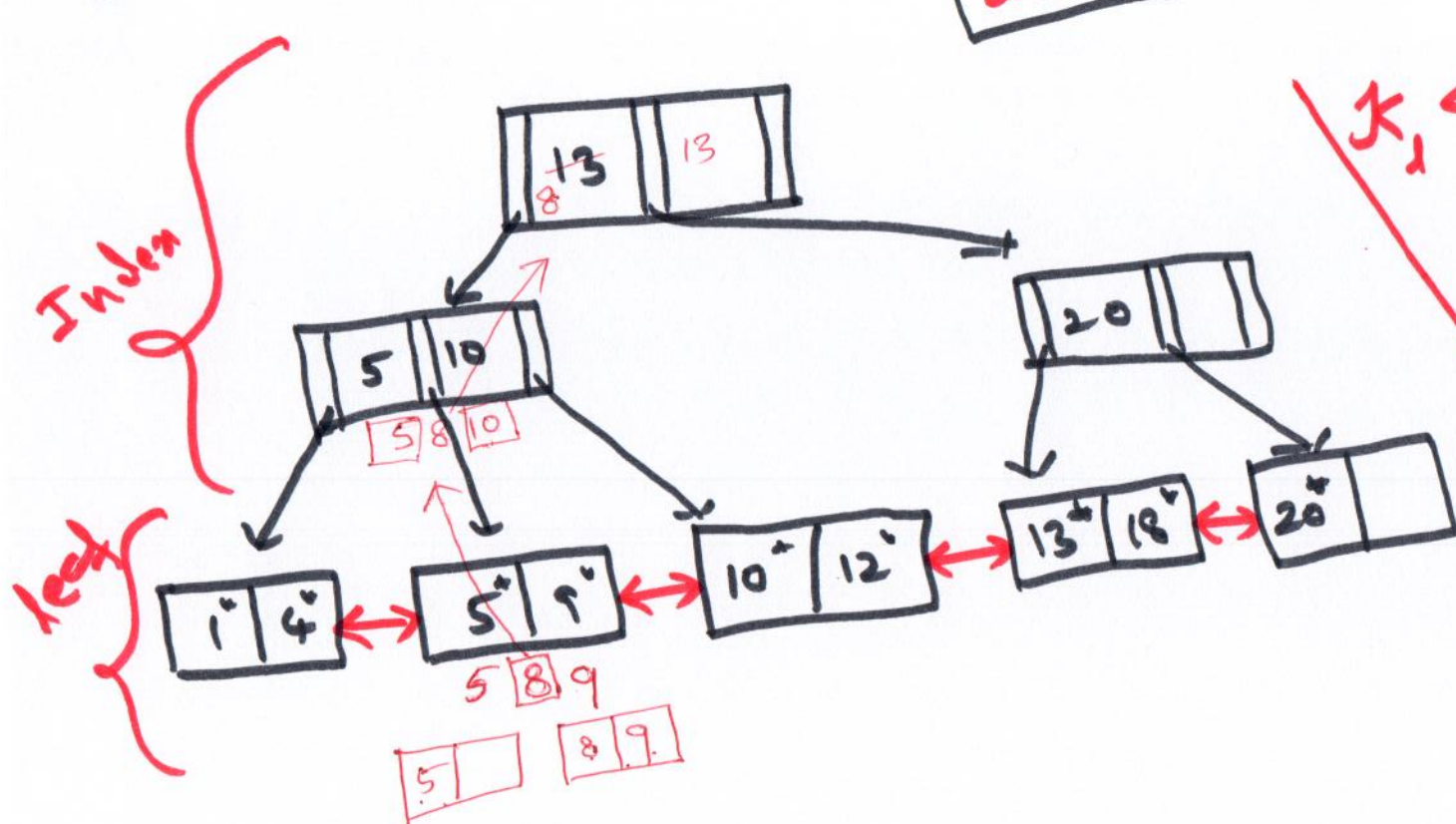
each node contains  $m$  entries

where  $d \leq m \leq 2d$  entries.

$d$  - order of tree

Ex: order  $d=1$

$$d \leq m \leq 2d$$



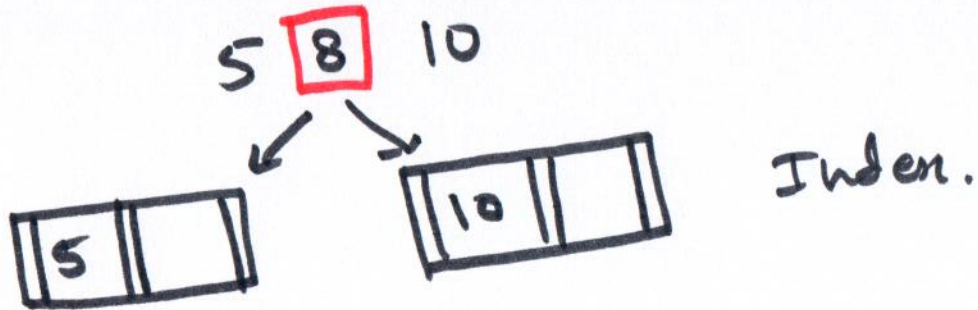
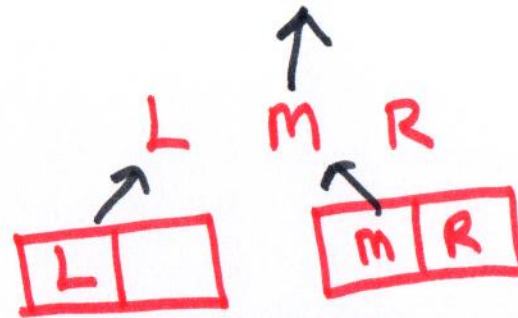
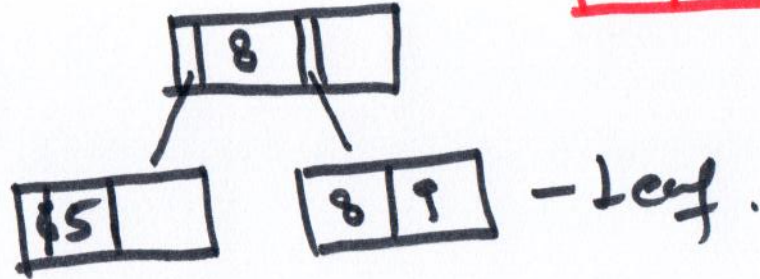
$$K_1 < \boxed{K} < K_r \text{ - Index}$$

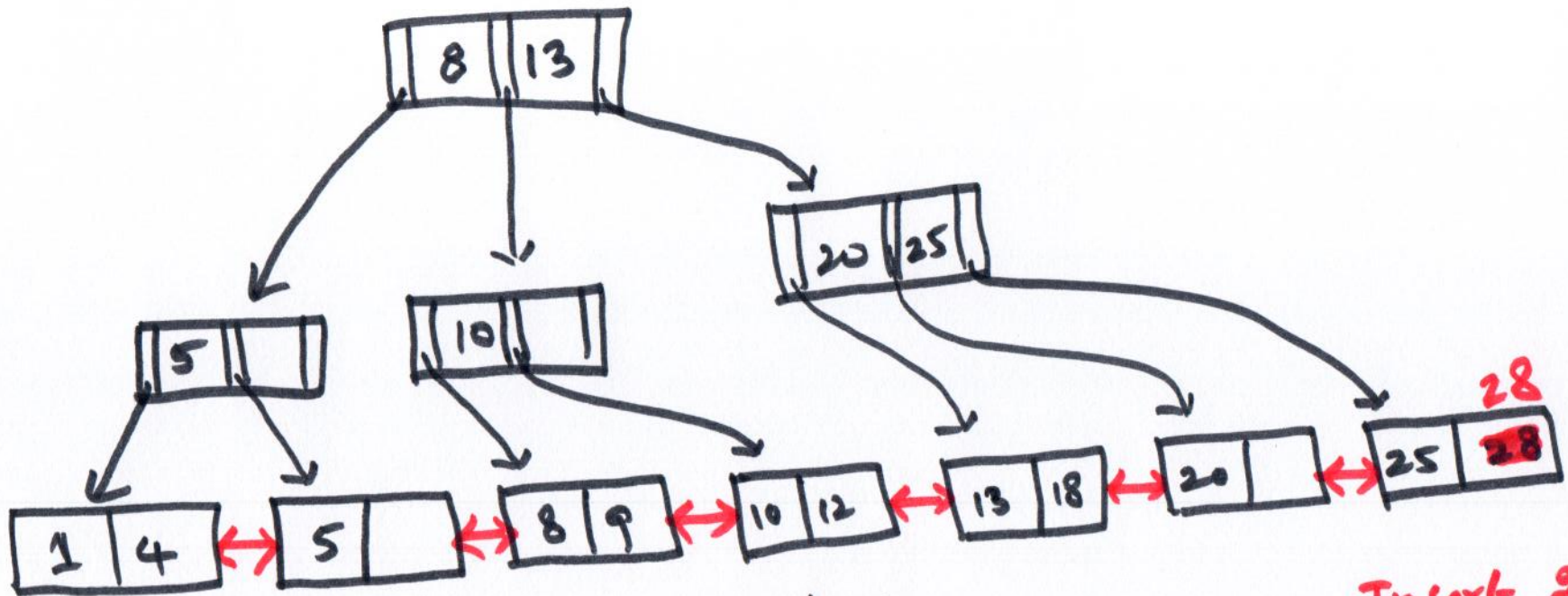
$$D_1 < \boxed{K} \leq D_r \text{ - Leaf.}$$

$$\lceil \frac{n}{2} \rceil$$

Insert 8:

5 8 9





Insert 28.

Leaf node:      L    $\uparrow$  push up   M   R



Index node:      L    $\uparrow$  push up   M   R





Insert 15:

