M- WAY TREES

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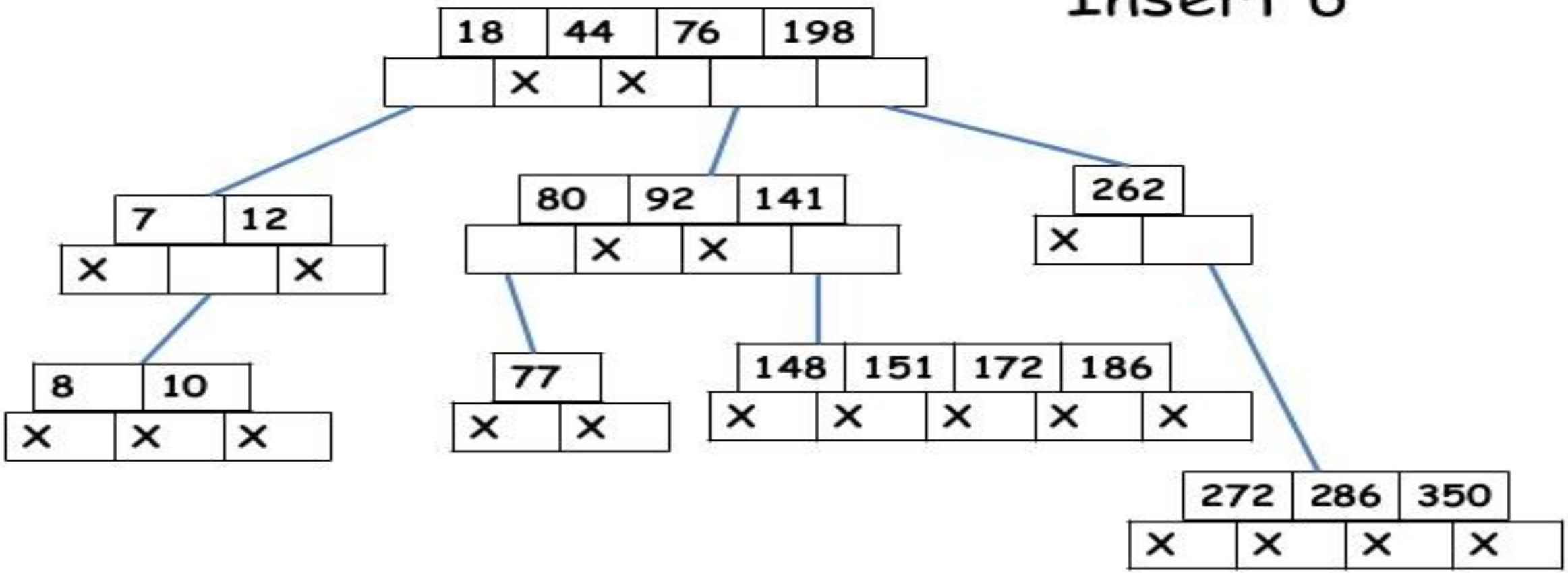
ASSISTANT PROFESSOR

CSVTU, BHILAI

Insertion in an m-Way Search Tree

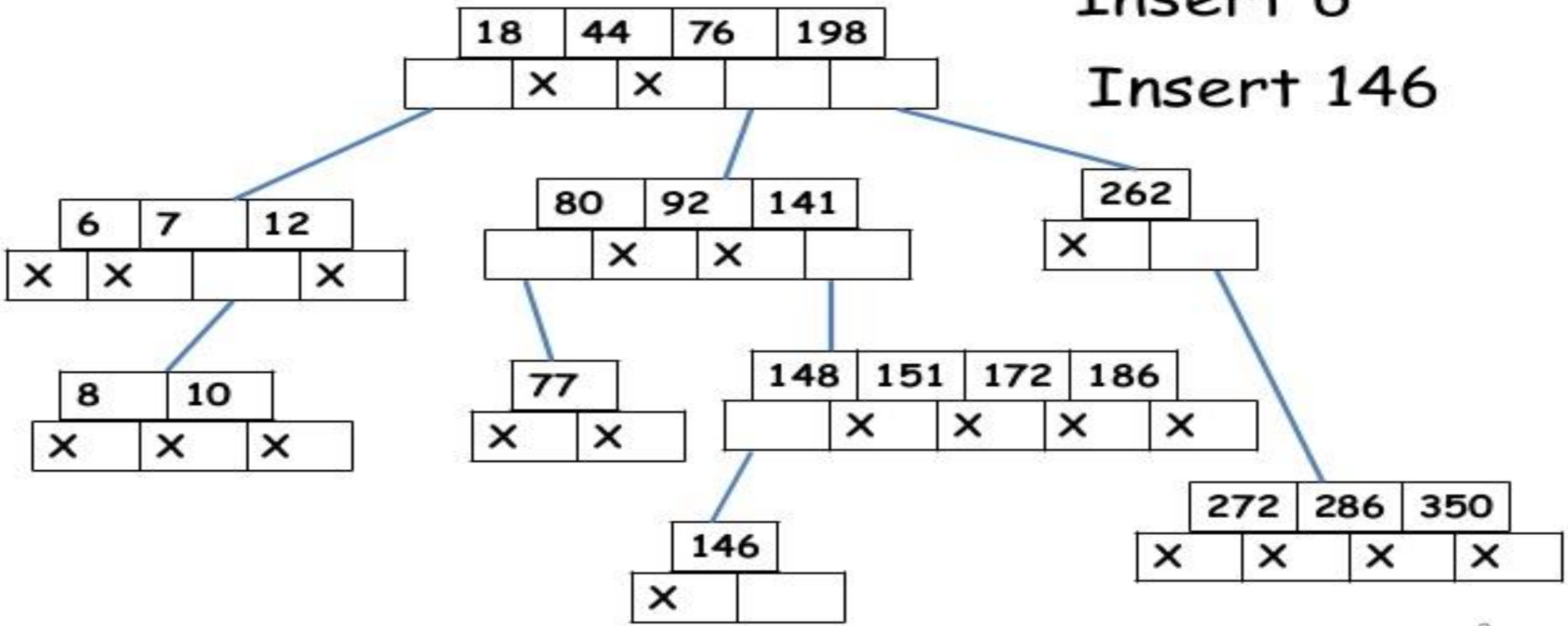
Insert 6



Insertion in an m-Way Search Tree

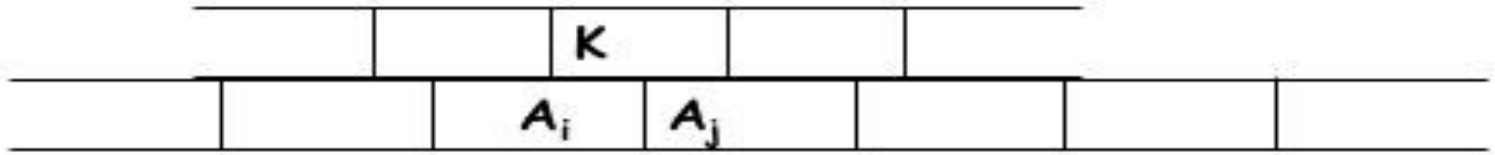
Insert 6

Insert 146



Deletion in an m-Way Search Tree

Let K be the key to be deleted from the m-way search tree.



K : Key

A_i , A_j : Pointers to subtree

Deletion in an m-Way Search Tree

[1] If ($A_i = A_j = NULL$) then delete K

[2] If ($A_i \neq NULL$, $A_j = NULL$) then choose the largest of the key elements K' in the child node pointed to by A_i and replace K by K'.

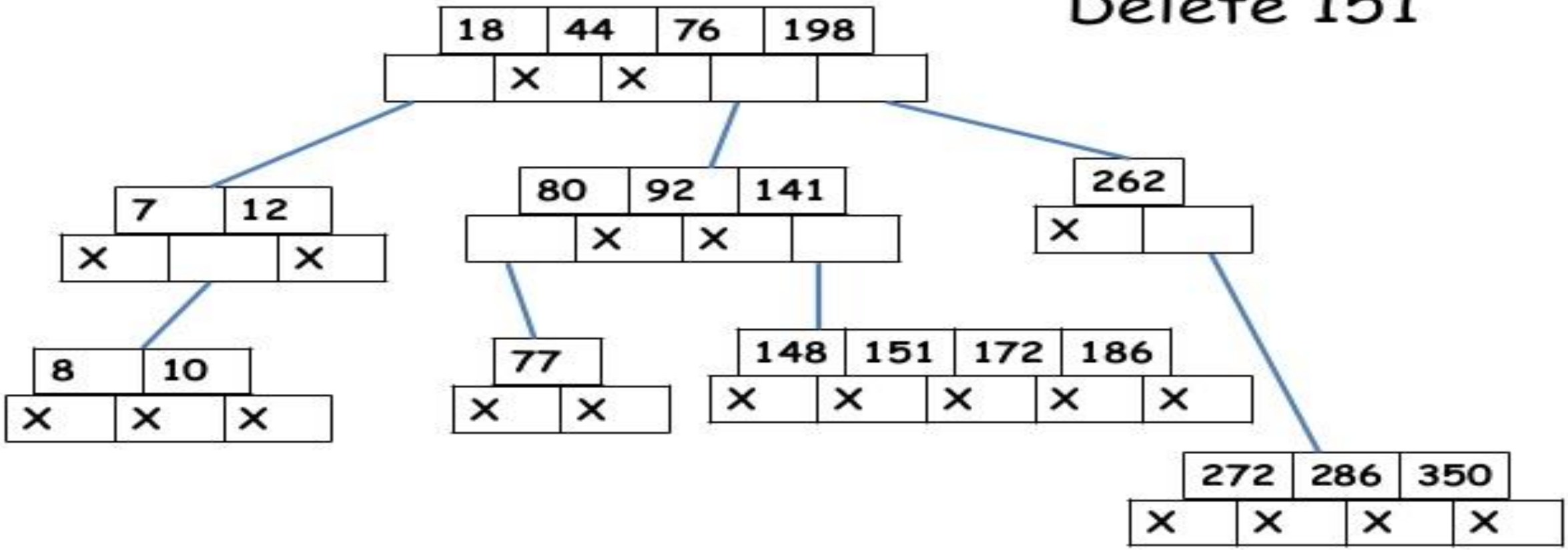
[3] If ($A_i = NULL$, $A_j \neq NULL$) then choose the smallest of the key element K" from the subtree pointed to by A_j , delete K" and replace K by K".

Deletion in an m-Way Search Tree

[4] If ($A_i \neq$ NULL, $A_j \neq$ NULL) then choose the largest of the key elements K' in the subtree pointed to by A_i or the smallest of the key element K" from the subtree pointed to by A_j to replace K.

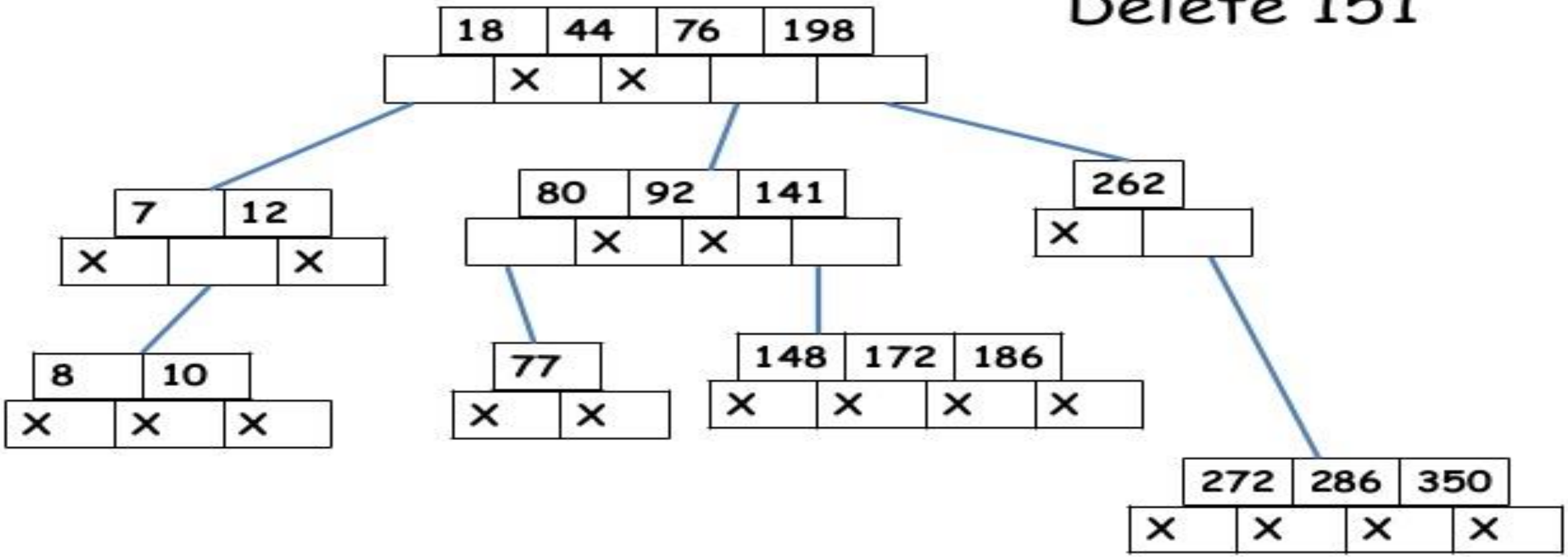
5-Way Search Tree

Delete 151



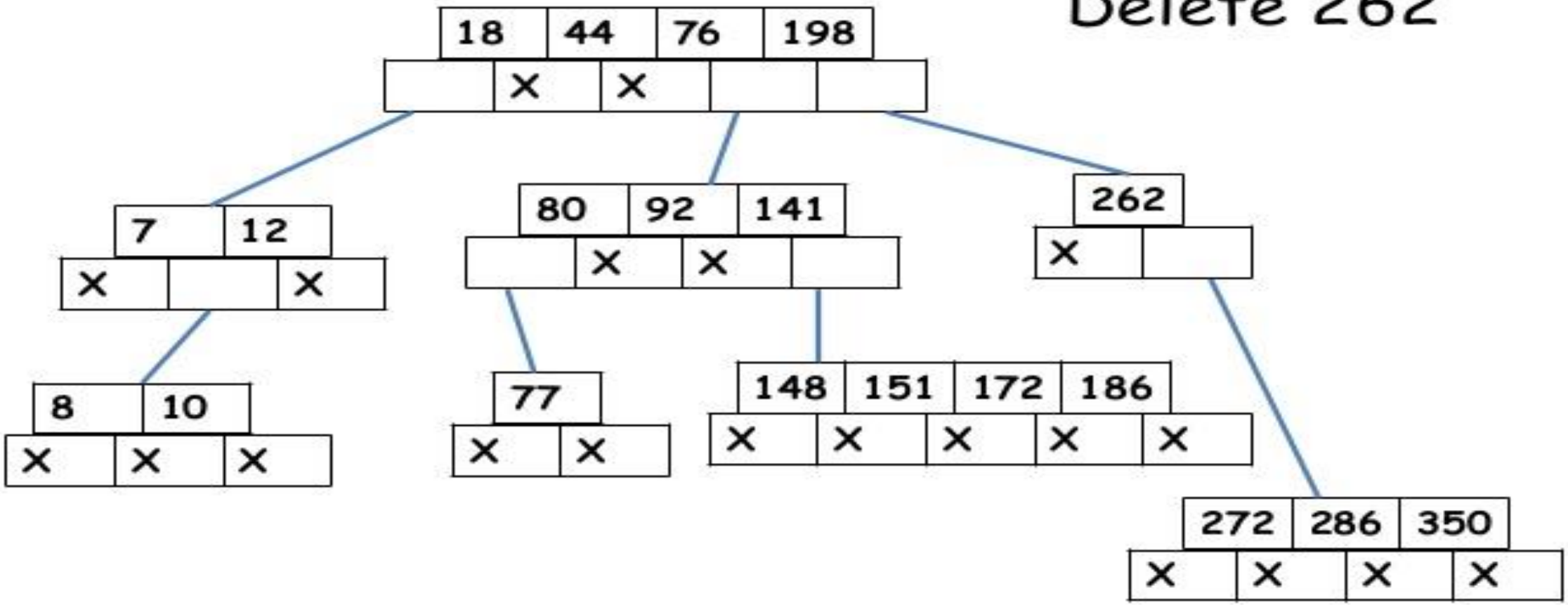
5-Way Search Tree

Delete 151



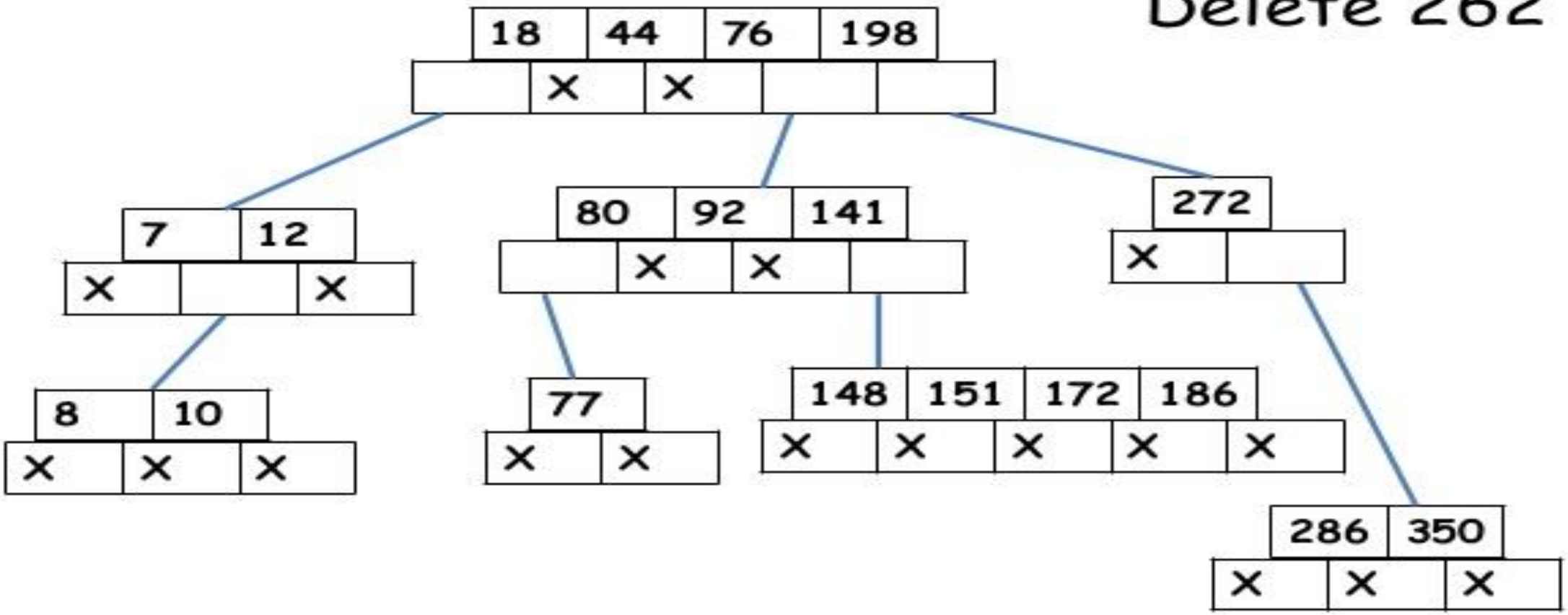
5-Way Search Tree

Delete 262



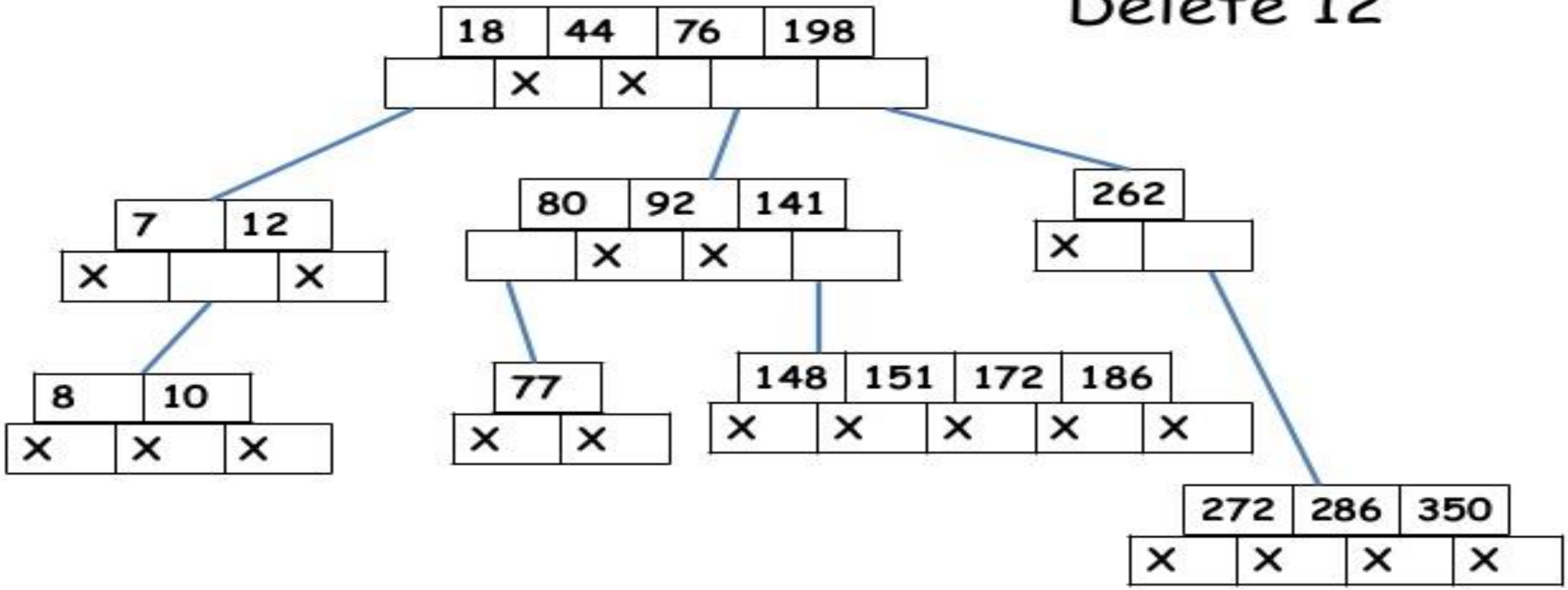
5-Way Search Tree

Delete 262



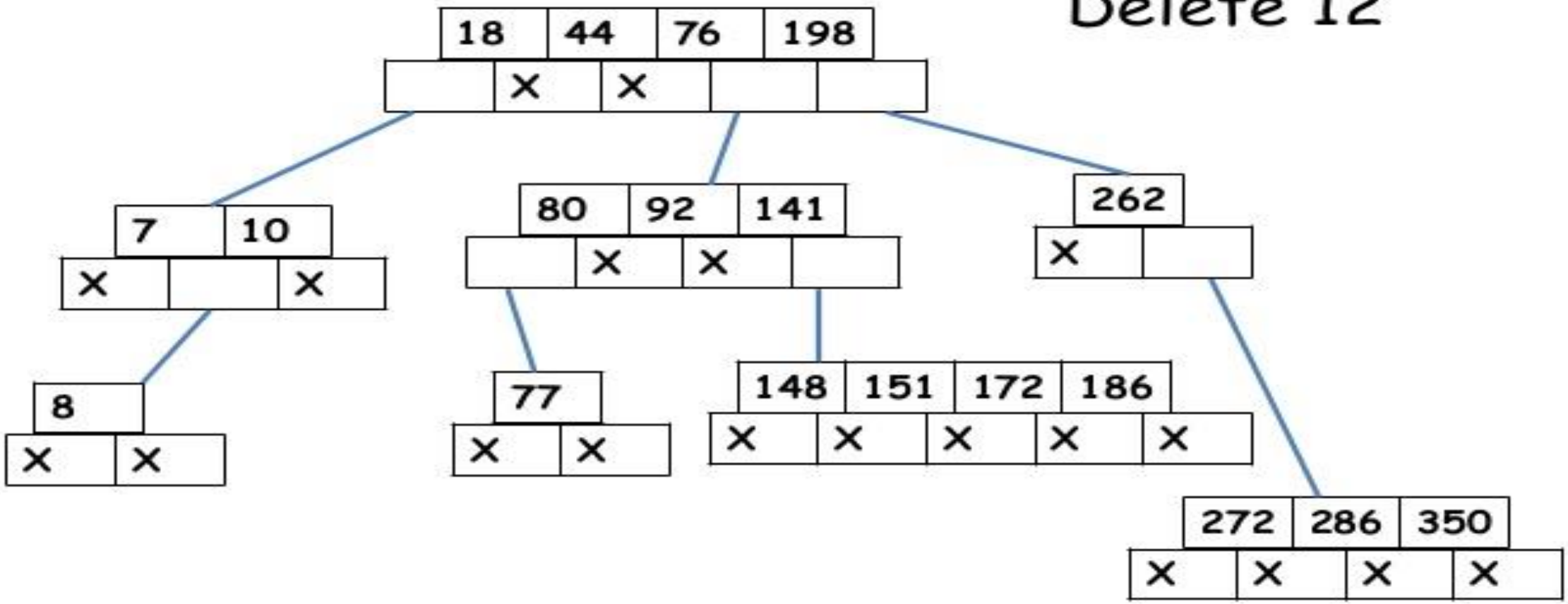
5-Way Search Tree

Delete 12



5-Way Search Tree

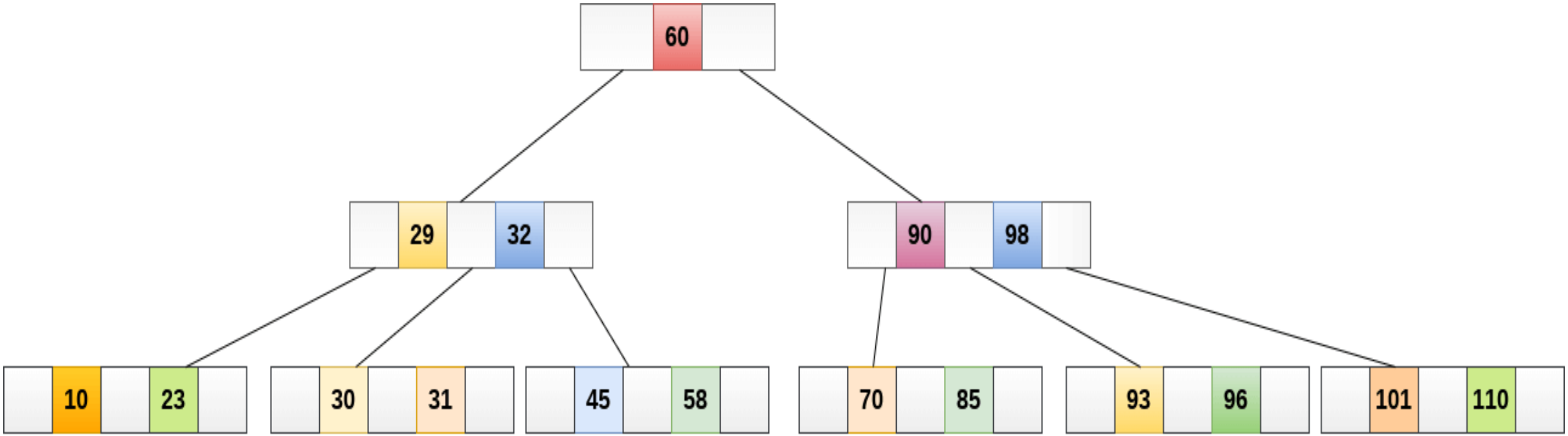
Delete 12



B Tree Introduction

- B Tree is a specialized m-way tree that can be widely used for disk access. A B-Tree of order m can have at most m-1 keys and m children. One of the main reasons of using B tree is its capability to store large number of keys in a single node and large key values by keeping the height of the tree relatively small.
- A B tree of order m contains all the properties of an M way tree. In addition, it contains the following properties.

- 1. Every node in a B-Tree contains at most m children.
- 2. Every node in a B-Tree except the root node and the leaf node contain at least m/2 children.
- 3. The root nodes must have at least 2 child nodes.
- 4. All leaf nodes must be at the same level.
- It is not necessary that, all the nodes contain the same number of children but, each node must have m/2 number of nodes.
- A B tree of order 4 is shown in the following image.


60
29
32
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98
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85
93
96
101
110

- While performing some operations on B Tree, any property of B Tree may violate such as number of minimum children a node can have. To maintain the properties of B Tree, the tree may split or join.

- Thankyou!