① Given B-tree of Order - 6 , that means each node has max 6 children.

Internal nodes - $\lceil \frac{m}{2} \rceil$ - $\lceil \frac{6}{2} \rceil$ - 3

Evernode has max (m-1) keys = 5

after insertion of 8,18,25,49

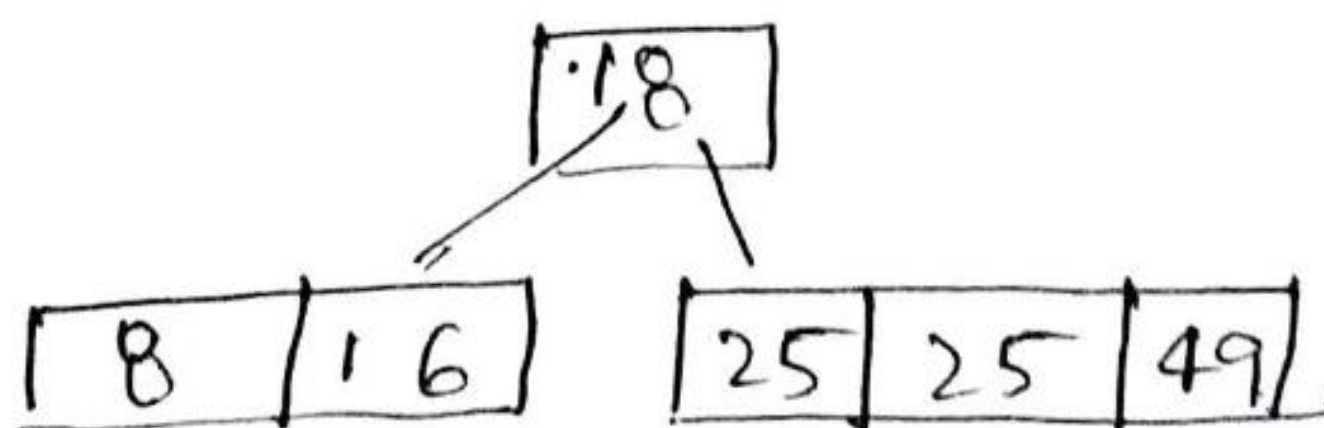| 8 | 18 | 25 | 49 |

i 25 : | 8 | 18 | 25 | 25 | 49 |
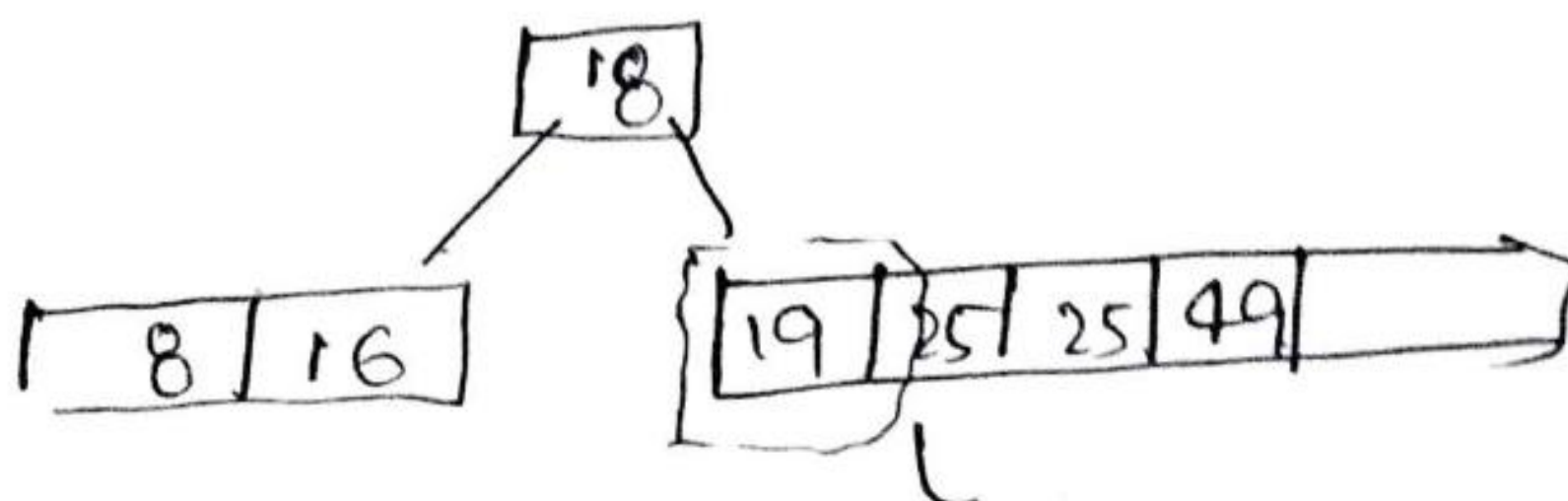
All the elements in the B-tree maintains sorted data

i 16 : | 8 | 16 | 18 | 25 | 25 | 49 | - Size of max
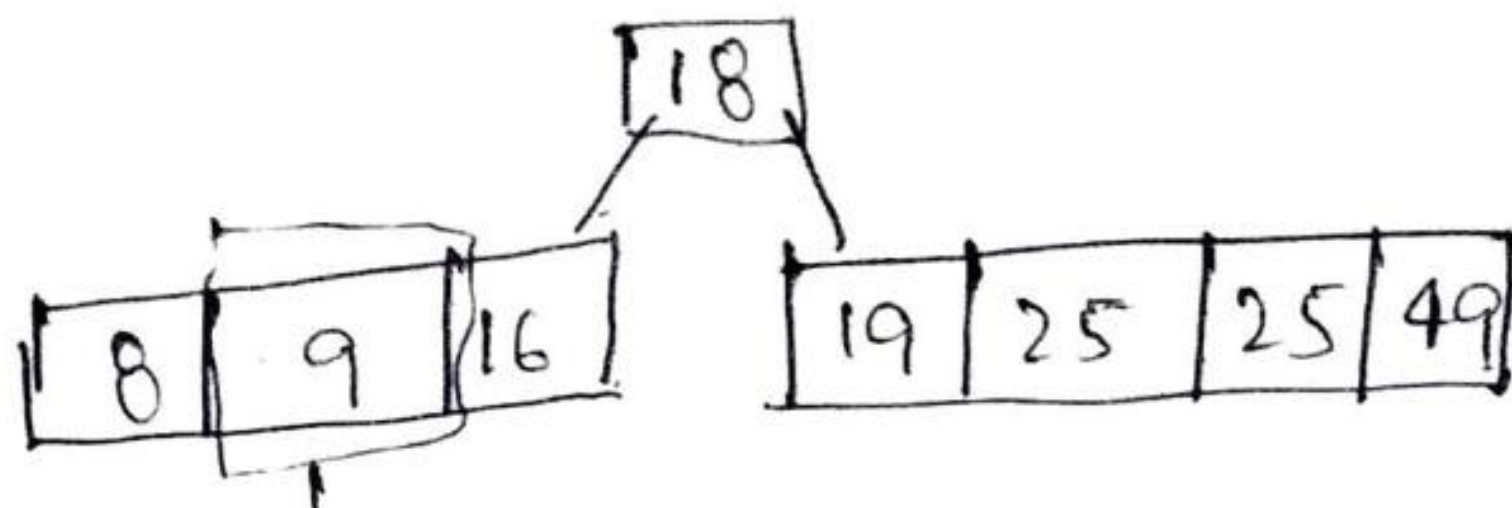   ↑ middle (left)   key > 5
                                                so Spilt

| 18 |

| 8 | 16 | | 25 | 25 | 49 |

i 19 : | 18 |

| 8 | 16 | | 19 | 25 | 25 | 49 |

without any modification it will insert on rightside

: 9 :

```
                    [18]
                   /    \
   [8 | 9 |16]   [19|25|25|49]
          |
```

without any modification it will insert on left side

: 7 :

```
                    [18]
                   /    \
   [7|8|9|16]    [19|25|25|49]
```
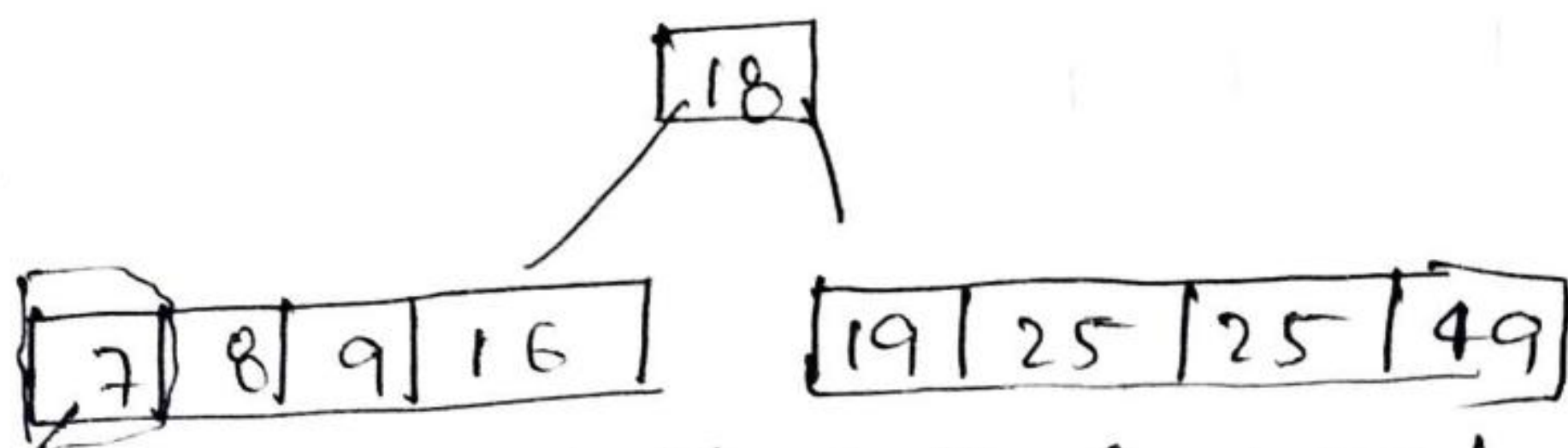
max size on left <=5, so insert

: 63 :

```
                    [18]
                   /    \
   [7|8|9|16]    [19|25|25|49|63]
                              |
```
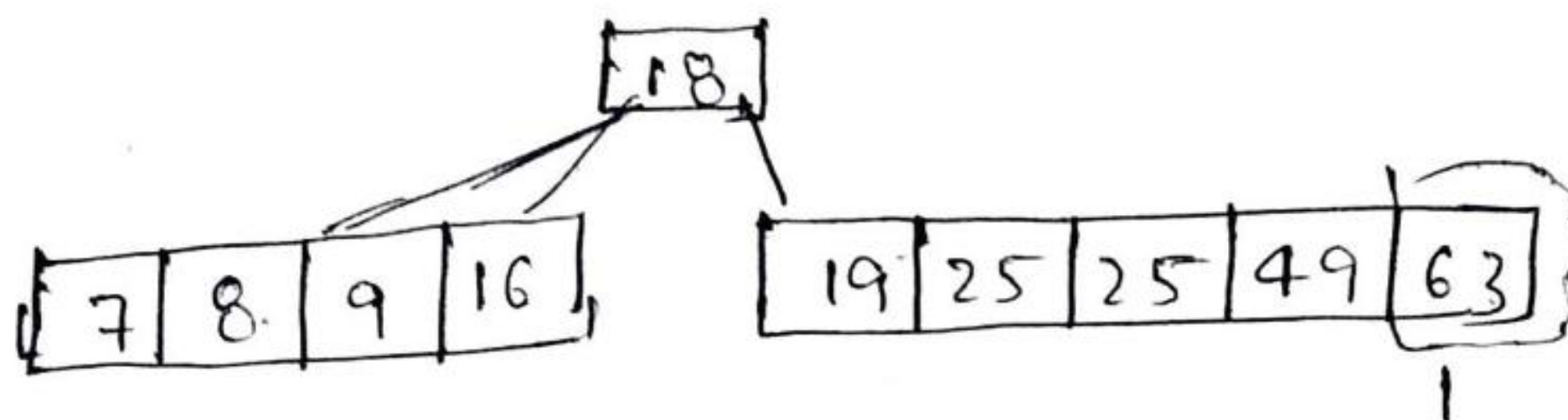
max size 5 keys insertion
completed, further more
insertion need to split

: 12 :

```
                    [18]
                   /    \
 [7|8|9|12|16]   [19|25|25|49|63]
```
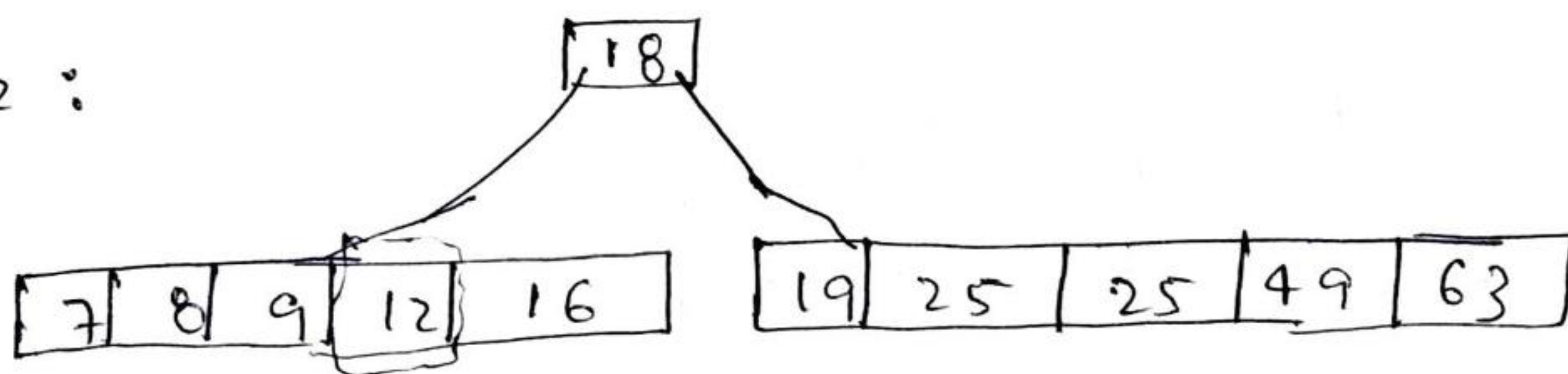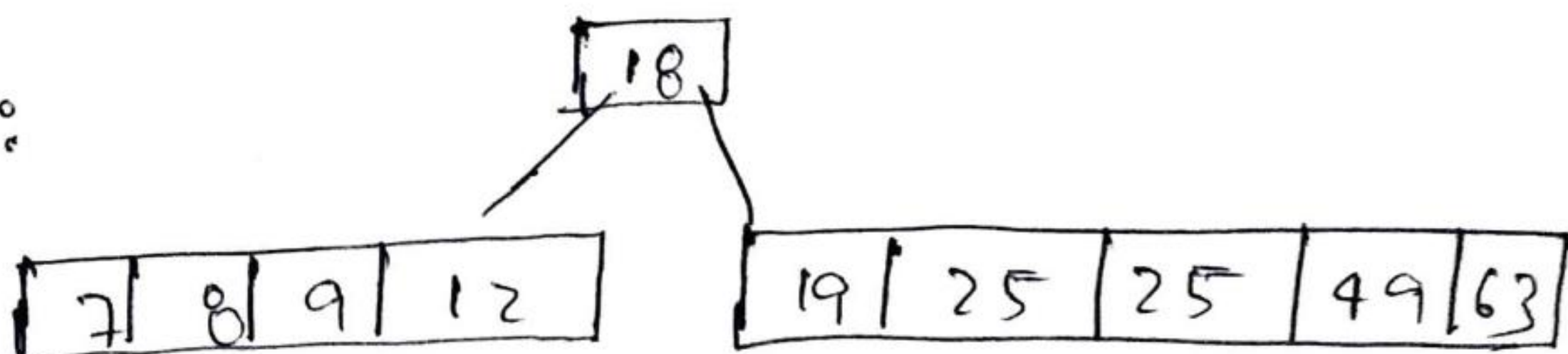
Both left and right side max keys insertion
completed furthermore insertion need to split
the trees.

② Deletion of 16

d 16 :

$$\boxed{18}$$

$$\boxed{7 \mid 8 \mid 9 \mid 12} \qquad \boxed{19 \mid 25 \mid 25 \mid 49 \mid 63}$$
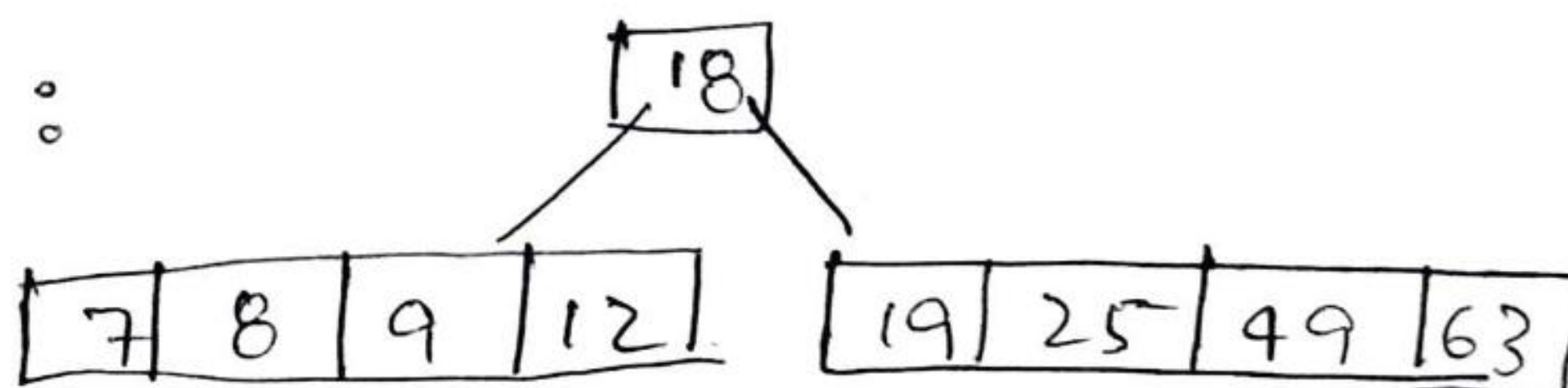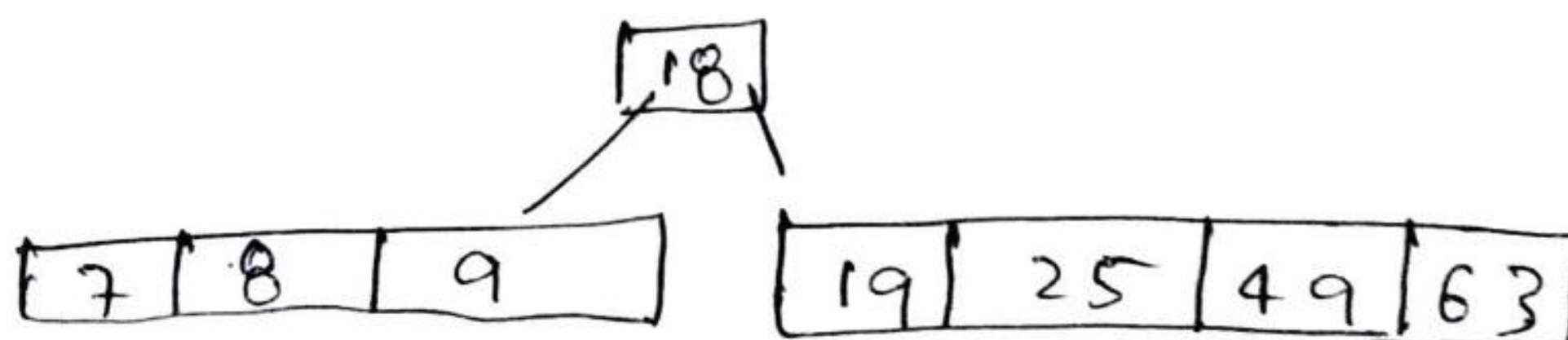
Deletion of 16 doesn't effect any modification because min key is $\lceil \frac{m}{2} \rceil - 1 = 3 - 1 = 2$

d 25 :

$$\boxed{18}$$

$$\boxed{7 \mid 8 \mid 9 \mid 12} \qquad \boxed{19 \mid 25 \mid 49 \mid 63}$$

doesn't effect any thing min key >= 2

d 12 :

$$\boxed{18}$$

$$\boxed{7 \mid 8 \mid 9} \qquad \boxed{19 \mid 25 \mid 49 \mid 63}$$

Same as above like do underflow condition bcz of min keys >= 2.