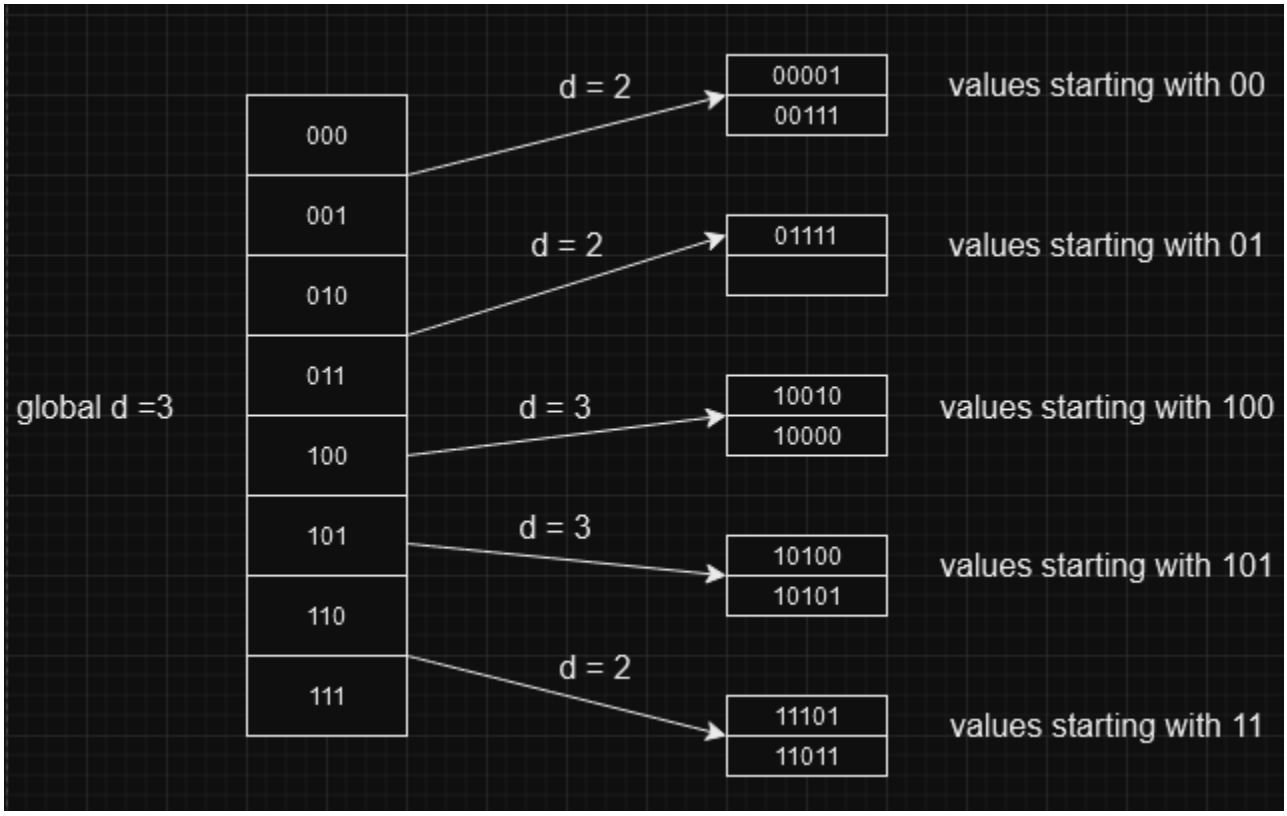
# CS443 – Lab 5

## Question 1:

Use extended hashing technique to insert the employees in which their corresponding binary Empl_IDs are shown below. Assume you can have two employees per block. Show the depth of both global and local directories. The bits should be considered from left to right.

**10010, 00001,10000, 00111, 11101, 10100, 11011, 10101, 01111**

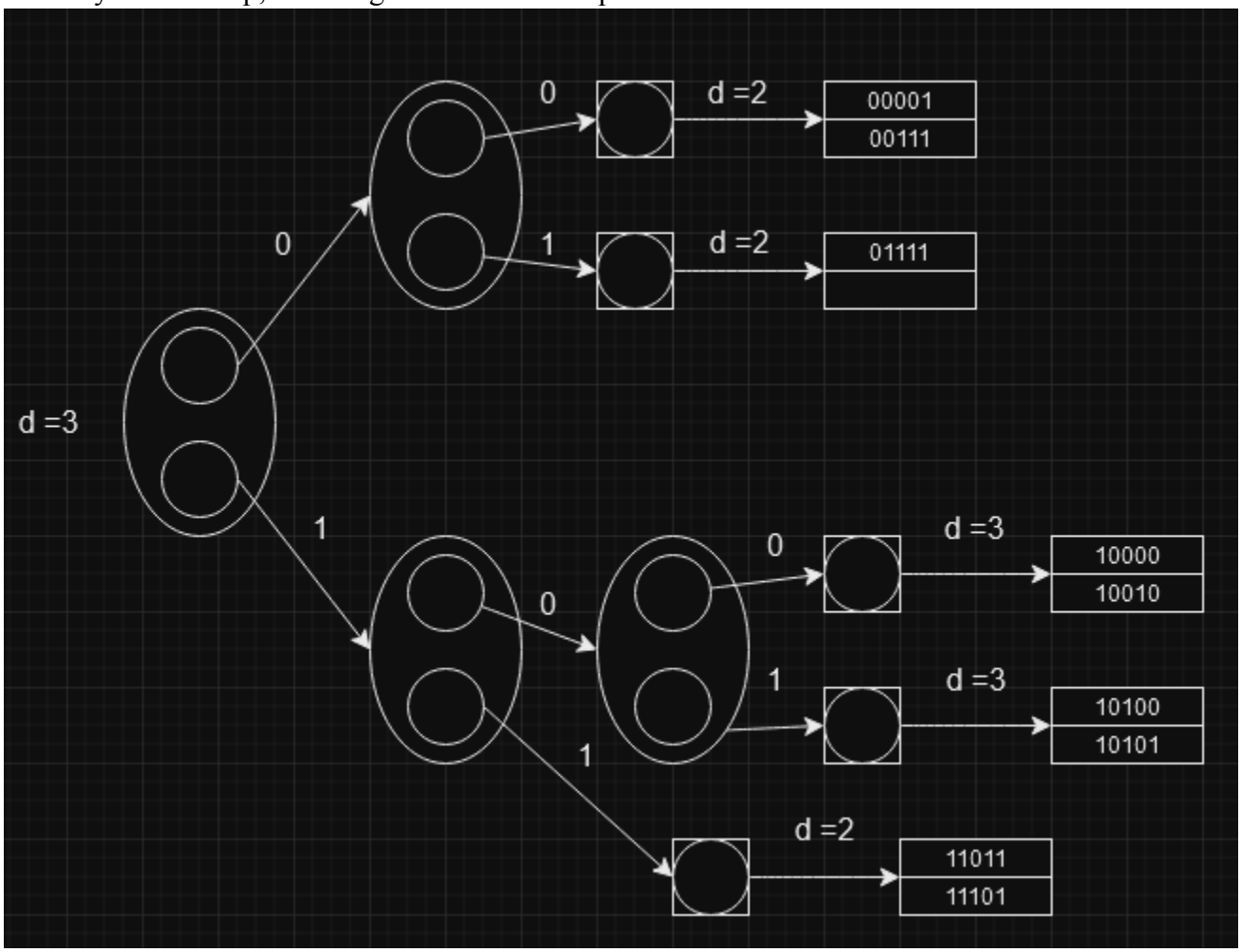


## Question 2:

Consider the following records: (Again Digits should be considered from left to right)

**00001, 10000, 10100, 00111, 11011, 11101, 10010, 01111, 10101**

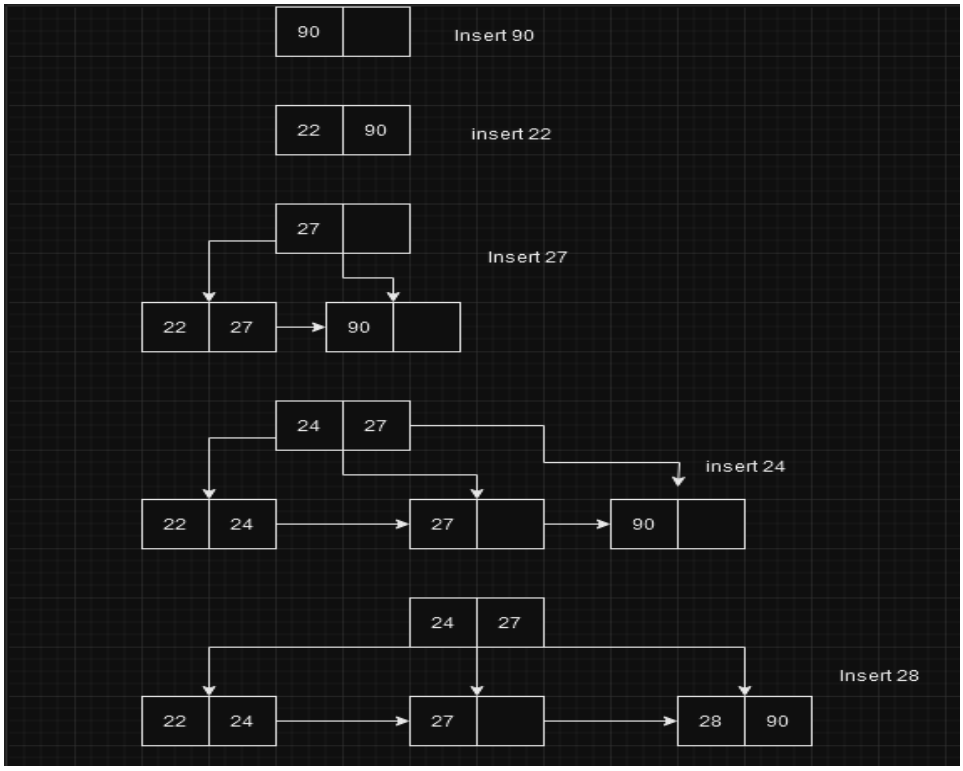
Load the records into files using Dynamic Hashing Scheme. You can put two records per block. Show the directory at each step, and the global and local depths.

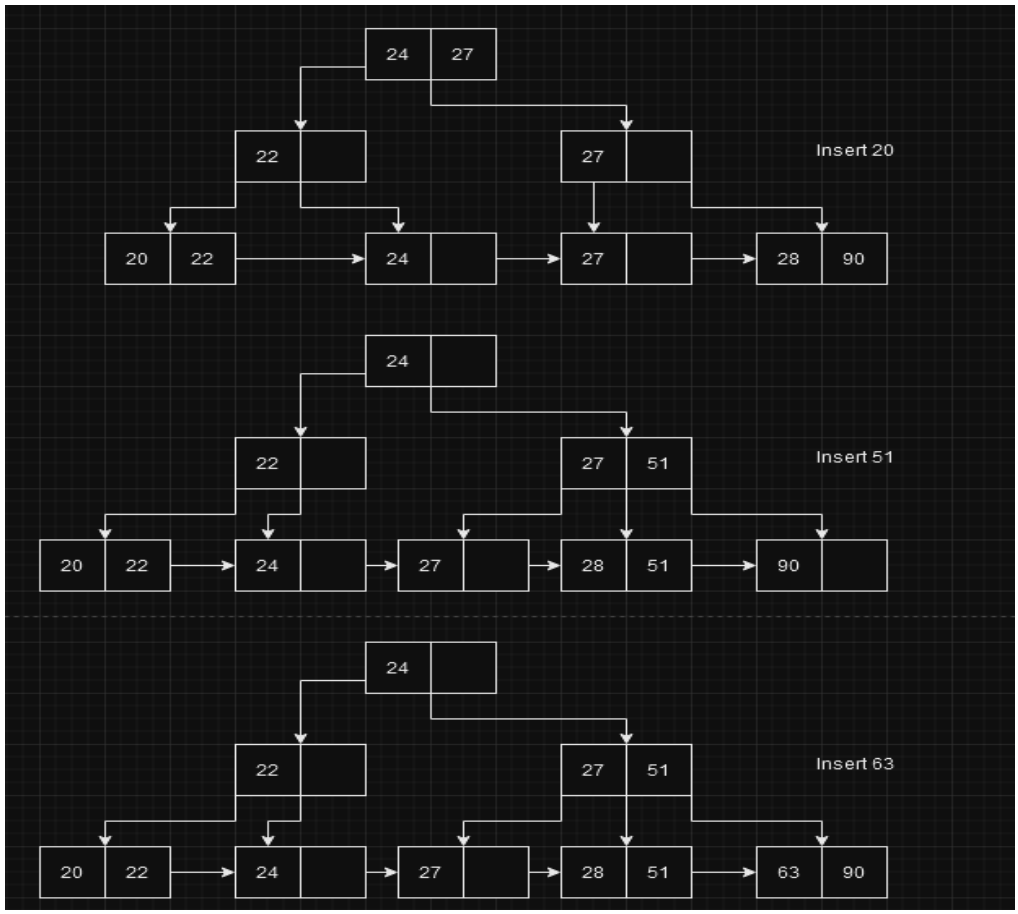


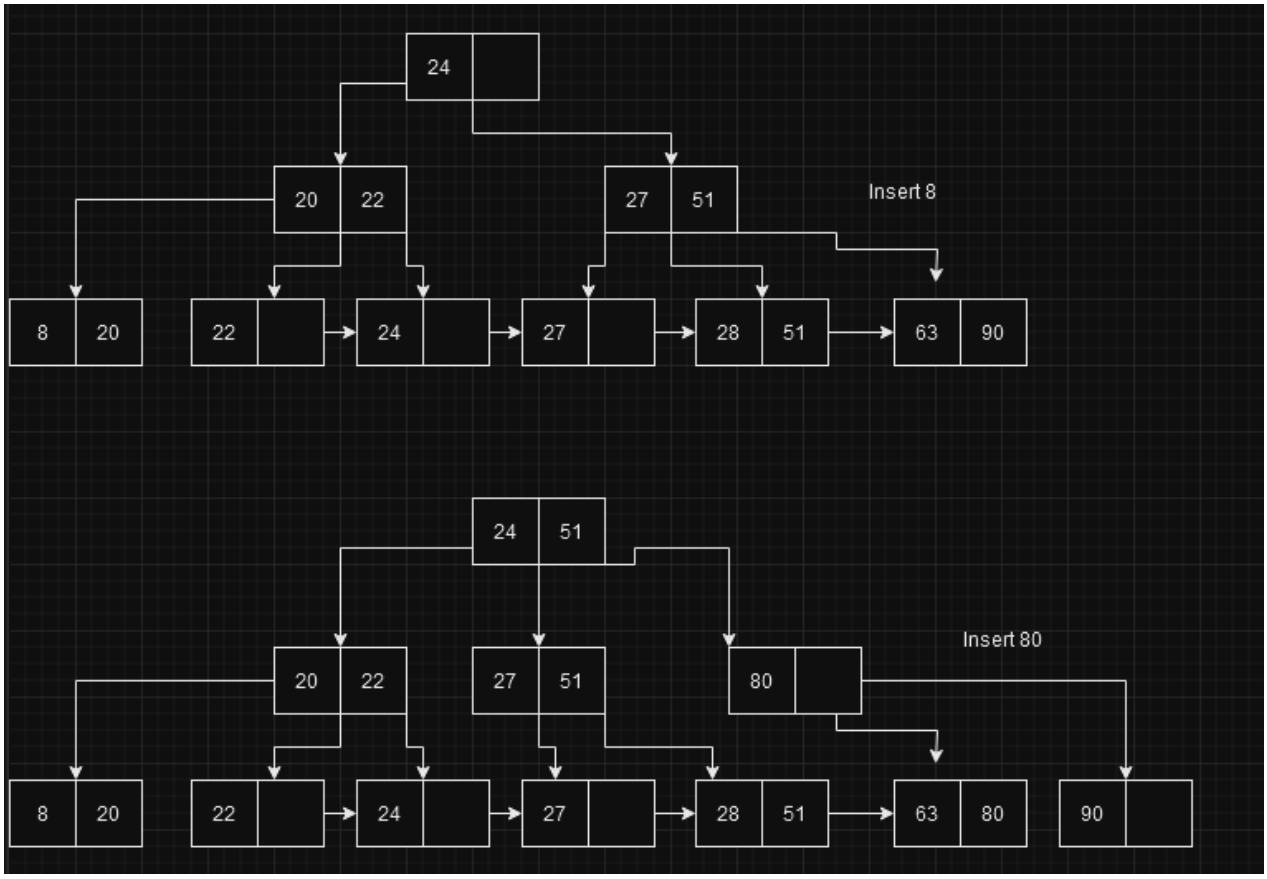

## Question 3:

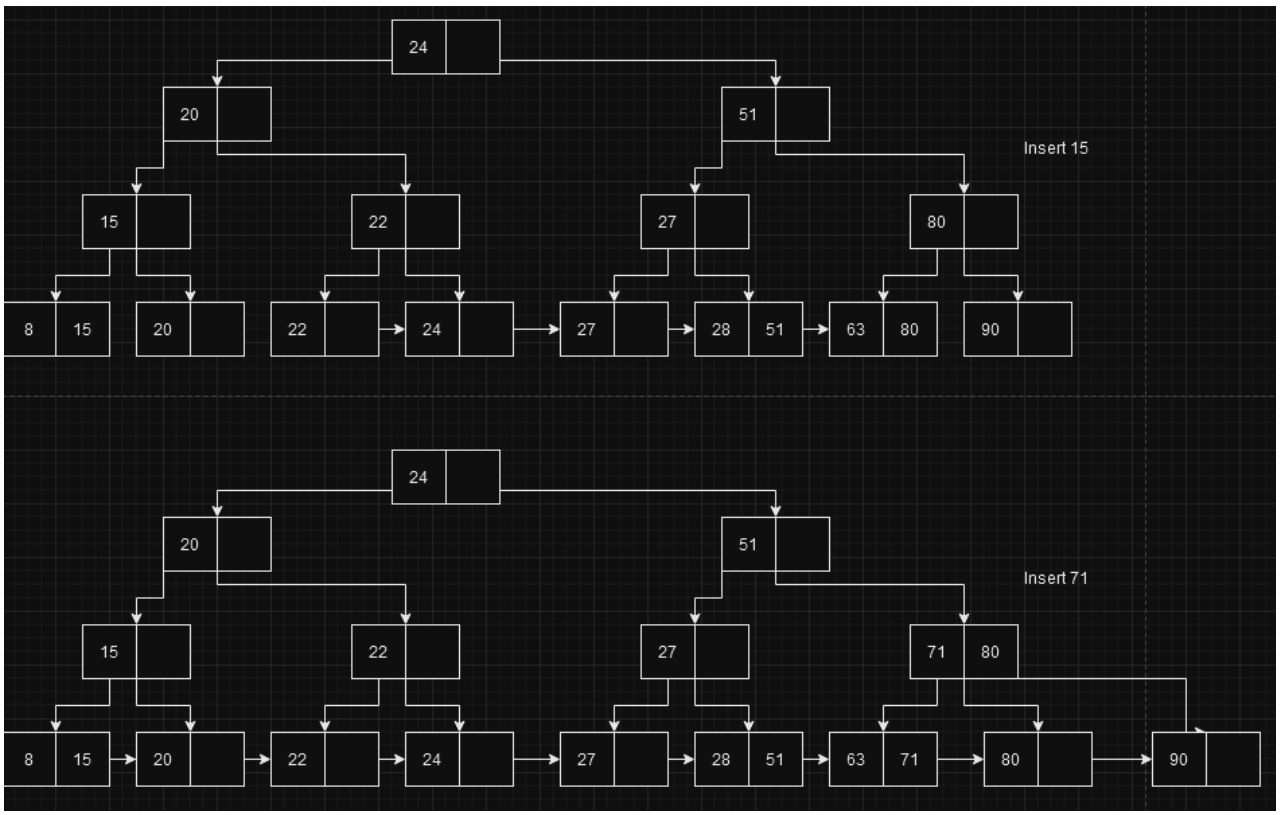
Insert the following into $B^+$ tree of order **3**. Show your work step by step with proper illustration of pointers as shown in pages 47-54 in multi-way trees lecture

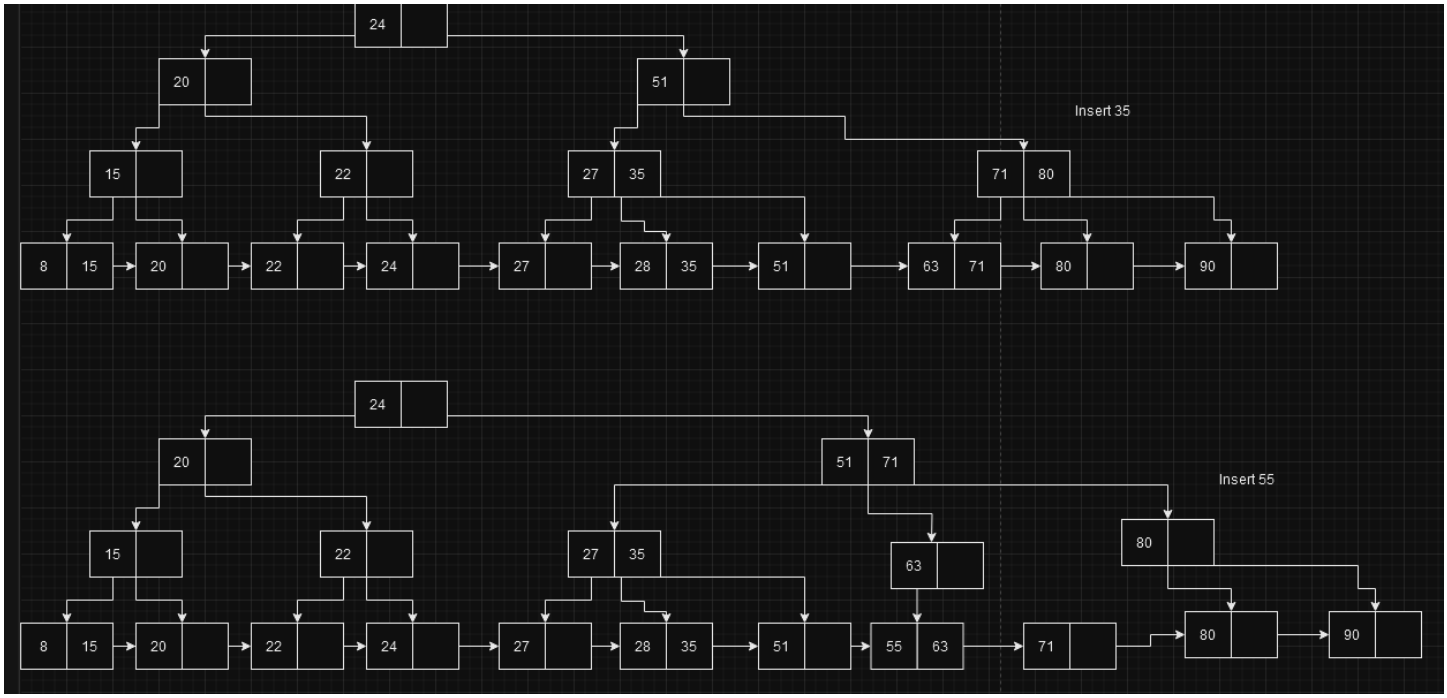
**90, 22, 27, 24, 28, 20, 51, 63, 8, 80, 15, 71, 35, 55**


90
Insert 90
22
90
insert 22
27
Insert 27
22
27
90
24
27
insert 24
22
24
27
90
24
27
Insert 28
22
24
27
28
90


24
27
22
27
Insert 20
20
22
24
27
28
90
24
22
27
51
Insert 51
20
22
24
27
28
51
90
24
22
27
51
Insert 63
20
22
24
27
28
51
63
90


24
20
22
27
51
Insert 8
8
20
22
24
27
28
51
63
90
24
51
Insert 80
20
22
27
51
80
8
20
22
24
27
28
51
63
80
90

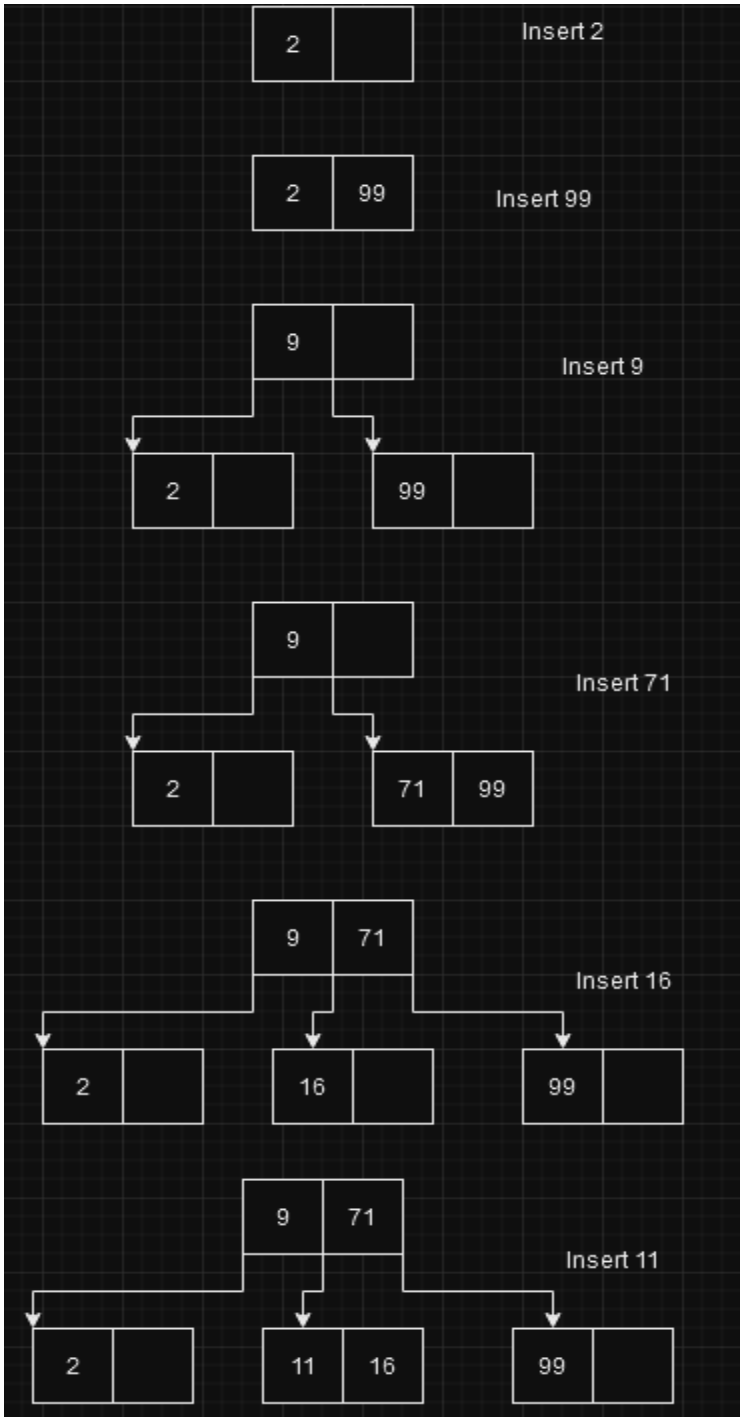

24
20
51
Insert 15
15
22
27
80
8
15
20
22
24
27
28
51
63
80
90
24
20
51
Insert 71
15
22
27
71
80
8
15
20
22
24
27
28
51
63
71
80
90

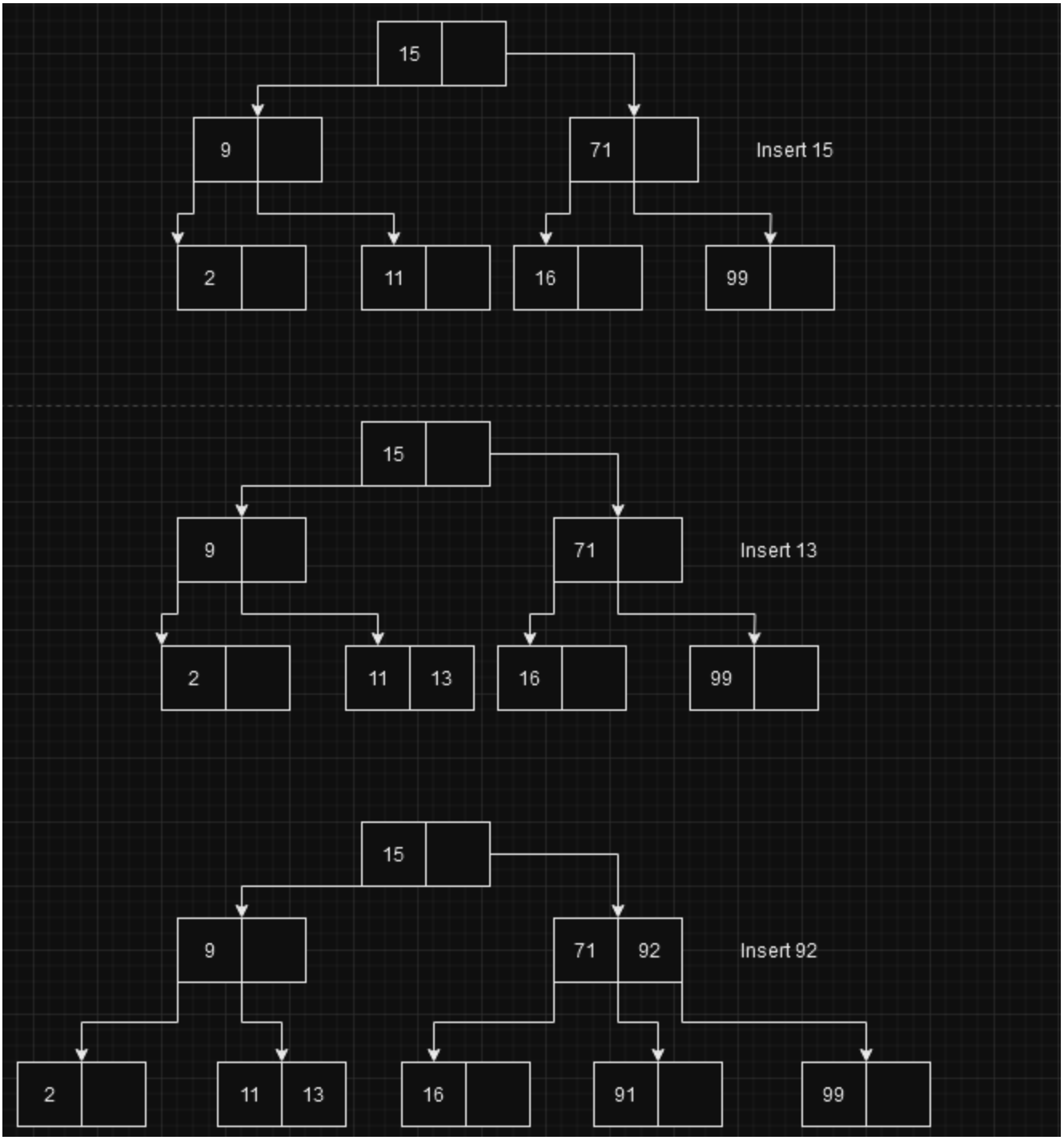

24
20
51
Insert 35
15
22
27
35
71
80
8
15
20
22
24
27
28
35
51
63
71
80
90
24
20
51
71
Insert 55
15
22
27
35
63
80
8
15
20
22
24
27
28
35
51
55
63
71
80
90

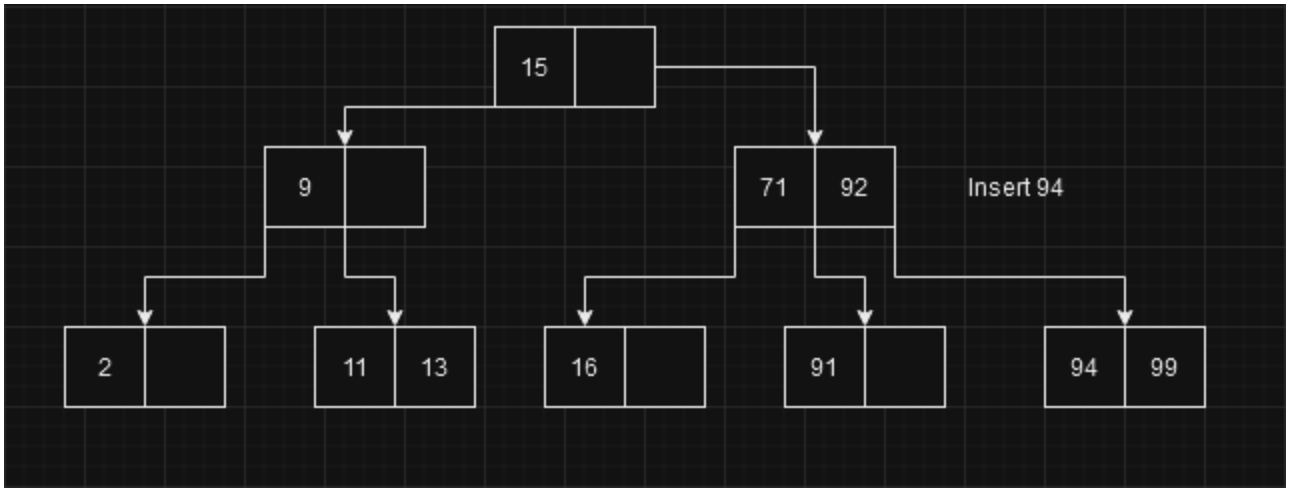
## Question 4:

Insert the following into B_ tree of order **3**. Show your work step by step with proper illustration of pointers as shown in pages 47-54 in multi-way trees lecture

**2, 99, 9, 71, 16, 11, 15, 13, 91, 92, 94**

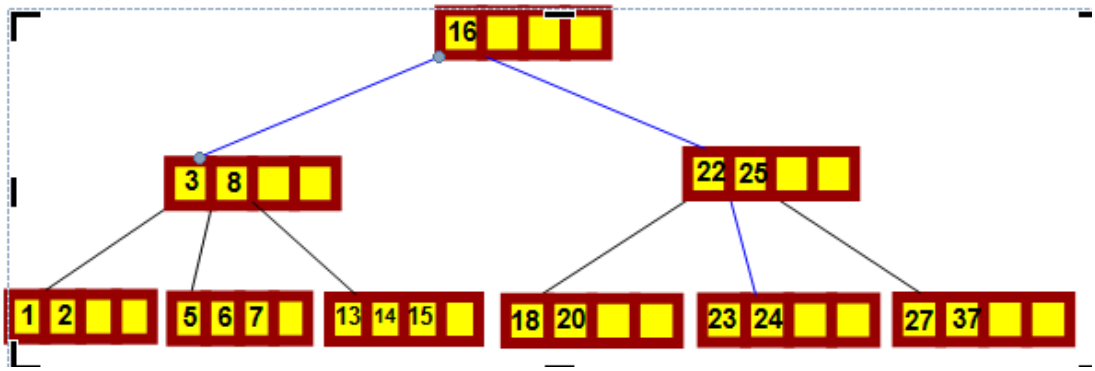



15
9
71
Insert 15
2
11
16
99
15
9
71
Insert 13
2
11
13
16
99
15
9
71
92
Insert 92
2
11
13
16
91
99

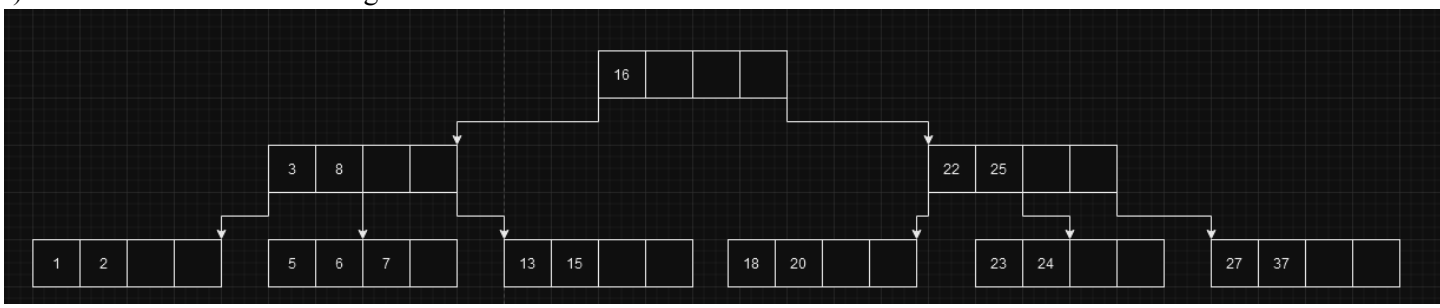



## Question 5:

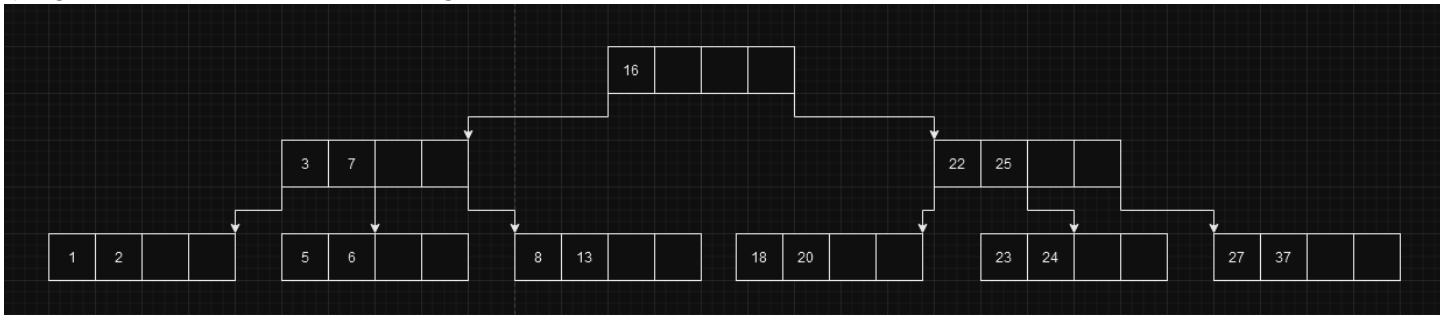
Consider the following B-tree.



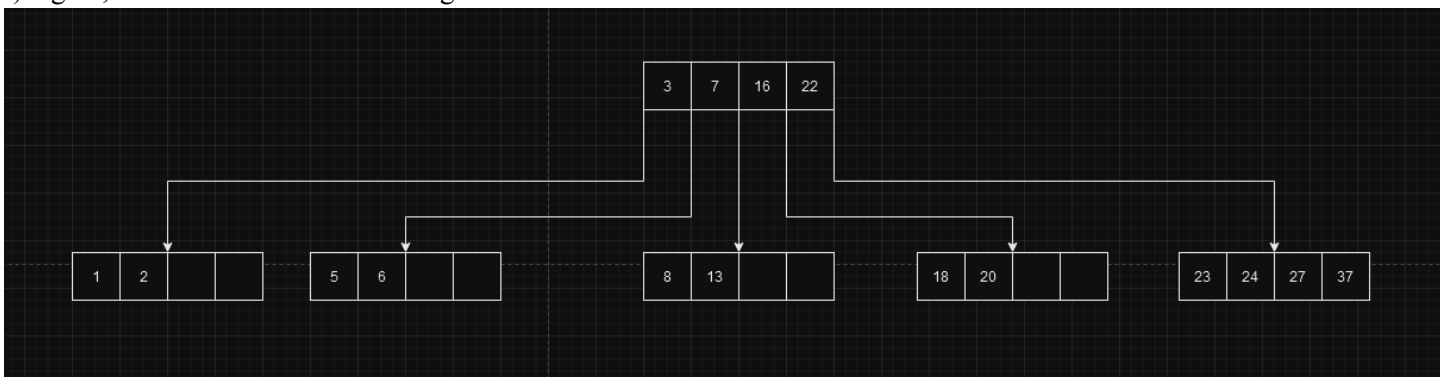

a) Redraw the tree after deleting 14.




b) Again, redraw the tree after deleting 15.

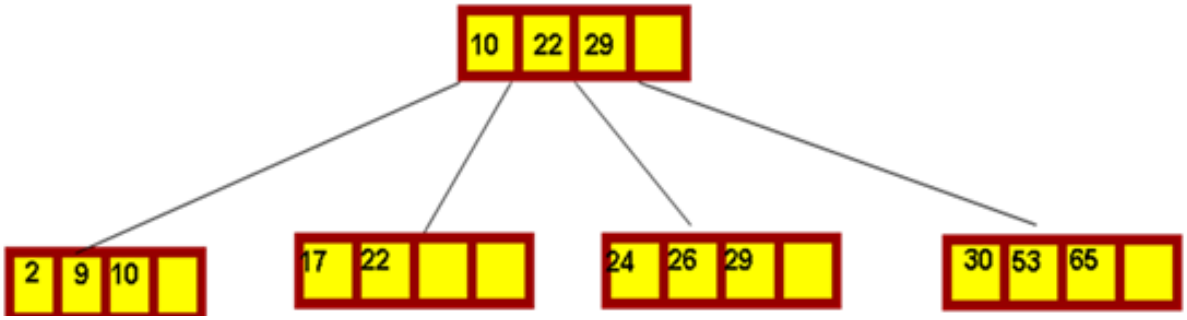


c) Again, redraw the tree after deleting 25.

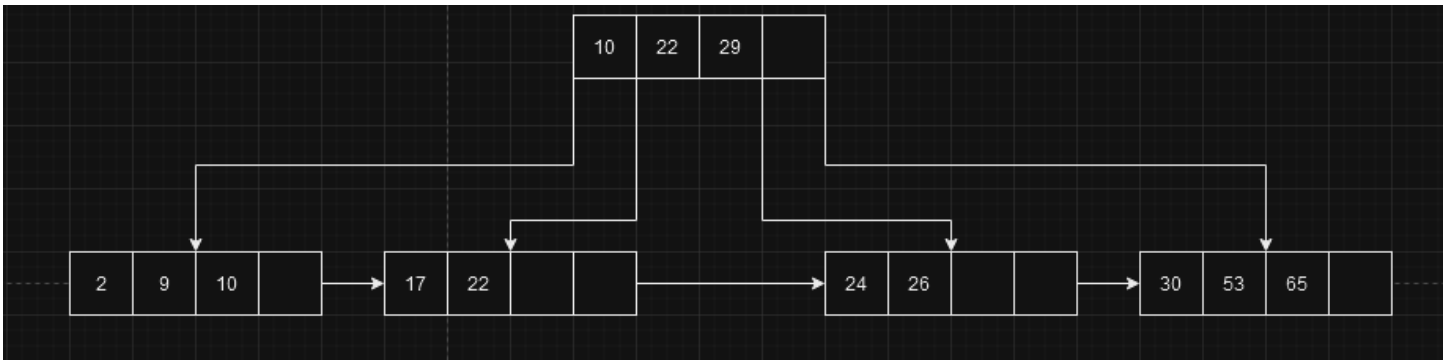



## Question 6:

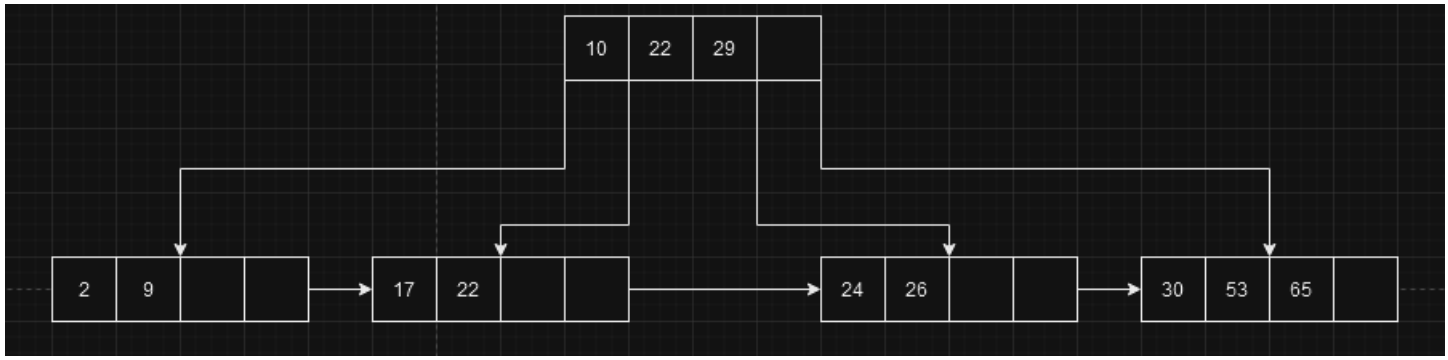
Consider the following B+ tree:



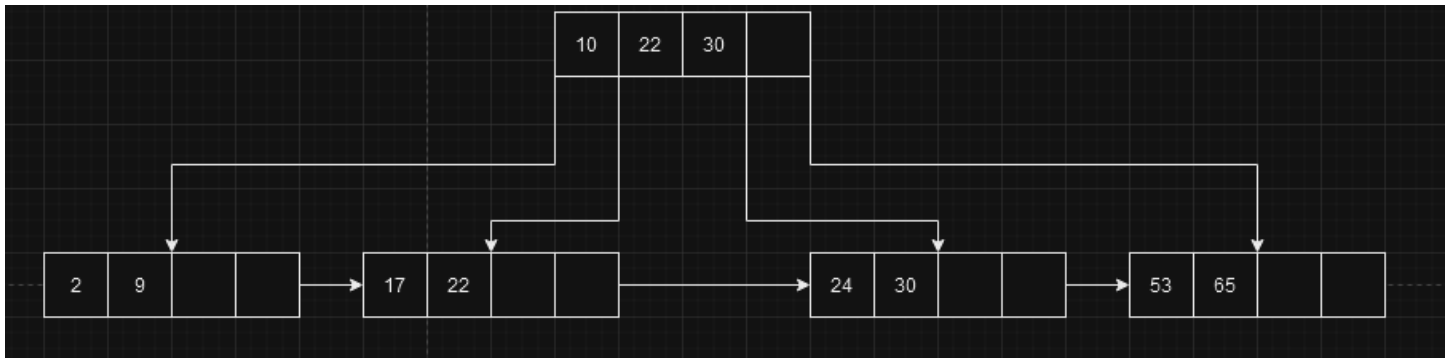

a) Delete 29 and redraw the tree after that



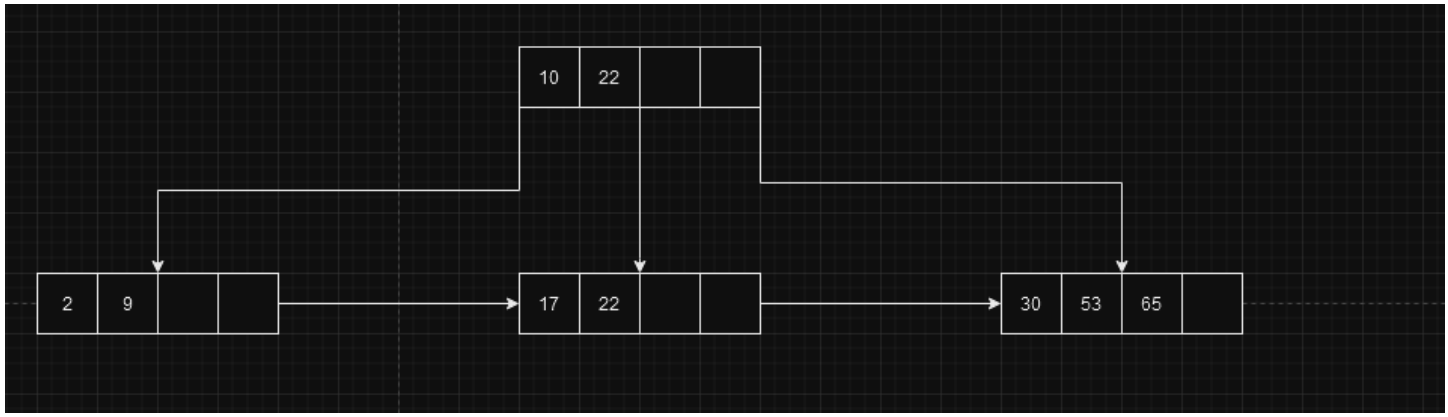

b) Next delete 10 and redraw the tree after that




c) Next delete 26 and redraw the tree after that




d) Next delete 24 and redraw the tree after that




e) Next delete 9 and redraw the tree after that