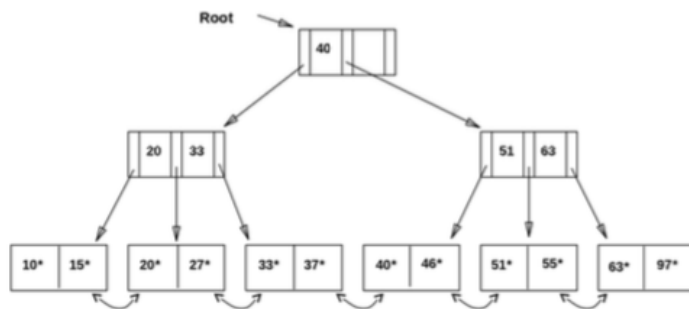|	
Started on	Wednesday, January 12, 2022, 7:15 PM
State	Finished
Completed on	Wednesday, January 12, 2022, 8:16 PM
Time taken	1 hour 1 min
Grade	**100.00** out of 100.00

Information

Introduction - Representing B+ Trees

To answer the questions, we will follow a specific notation to represent a B+ tree as text. You need to write your B+ tree by the following rules below;

- The keys of a node are separated by a comma ",".
- The nodes of the tree in the same level are separated with the symbol "/".
- You shouldn't use spaces or any other characters.
- Root level is considered to be the 1st level and level is incremented by 1 at every successor level.

Here is an example for the sake of clarity;

The proper version of the above tree with the specified notation is;
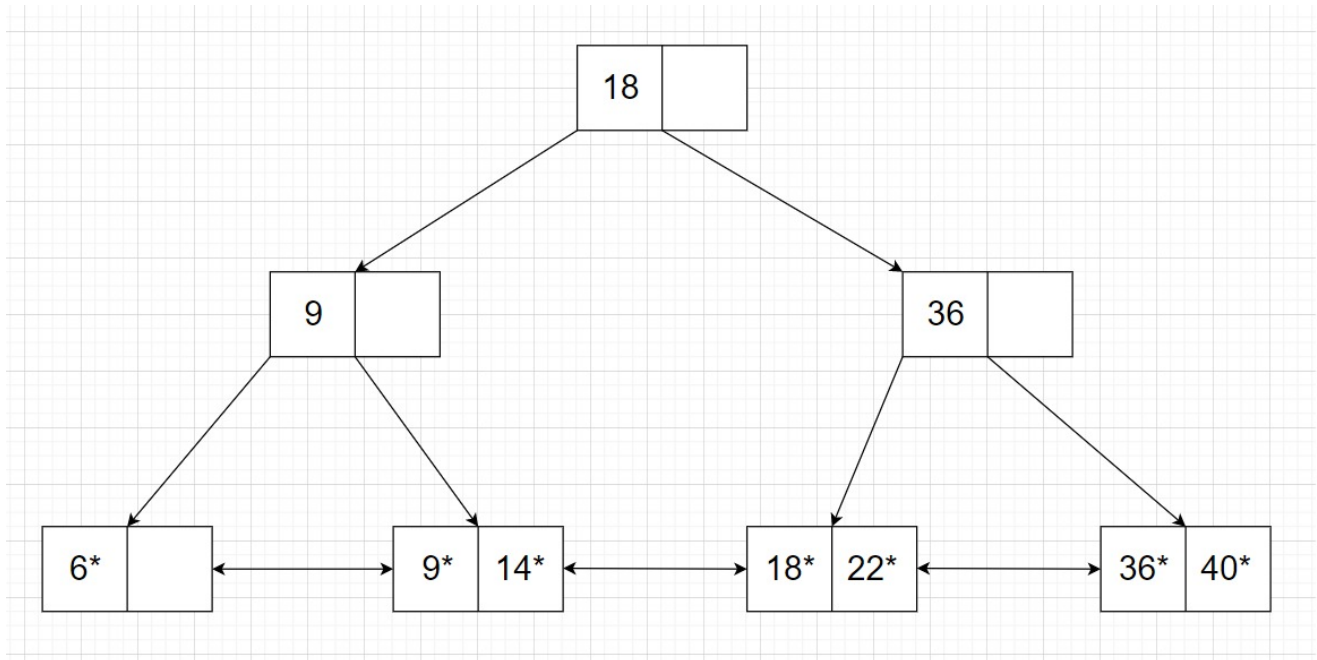
Level 1:40

Level 2:20,33/51,63

Level 3:10,15/20,27/33,37/40,46/51,55/63,97

Information

For the given B+ tree of order 1 (each node can hold at most 2 keys) below, perform successive insertions* with the given keys and give the state of the tree after certain insertions.

*You will start with the given tree, and insert the keys one by one sequentially.

keys = [2,4,10,20,8,17,28]

Question **1**

Correct

10.00 points out of 10.00

a) Give the contents of the B+ tree after insertion of 2.

Level 1: 18

Level 2: 9/36

Level 3: 2,6/9,14/18,22/36,40

Level 4:

Question **1**

Correct

10.00 points out of 10.00

a) Give the contents of the B+ tree after insertion of 2.

Question **2**

Correct

15.00 points out of 15.00

b) Give the contents of the B+ tree after insertion of 17.

Level 1: 9,18

Level 2: 4,6/10,14/20,36

Level 3: 2/4/6,8/9/10/14,17/18/20,22/36,40

Level 4:

Question **3**

Correct

15.00 points out of 15.00

c) Give the contents of the B+ tree after insertion of 28.

Level 1: 18

Level 2: 9/22

Level 3: 4,6/10,14/20/36

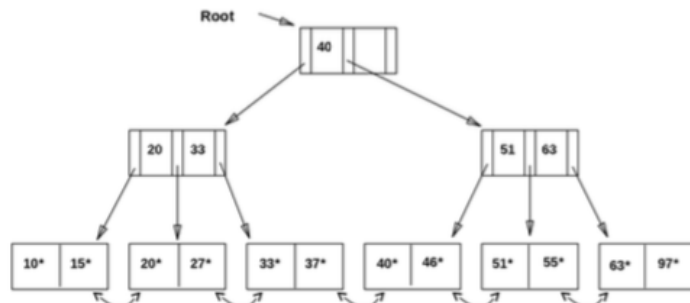Level 4: 2/4/6,8/9/10/14,17/18/20/22,28/36,40

Information

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The proper version of the above tree with the specified notation is;
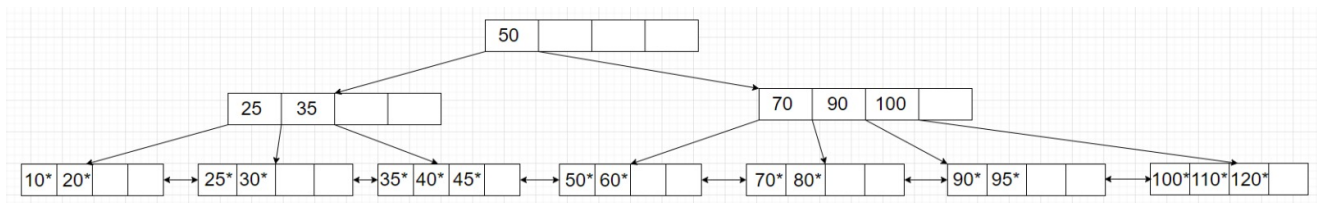
Level 1:40

Level 2:20,33/51,63

Level 3:10,15/20,27/33,37/40,46/51,55/63,97

Question **4**

Correct

10.00 points out of 10.00

Given the B+ tree (of order 2) above, give the contents of the tree after deleting 90. In case of underflow in the leaf nodes, use the right sibling to redistribute the entries

Level 1: 50

Level 2: 25,35/70,95,110

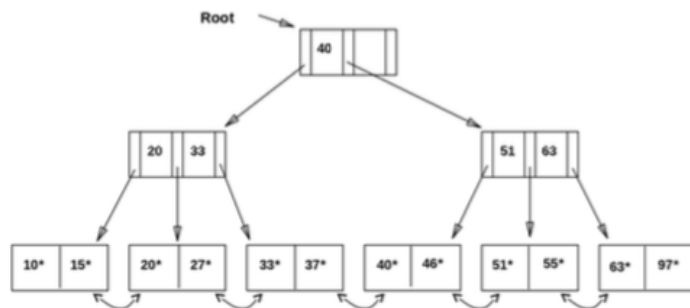Level 3: 10,20/25,30/35,40,45/50,60/70,80/95,100/110,120

Information

Introduction - Representing B+ Trees

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Here is an example for the sake of clarity;

The proper version of the above tree with the specified notation is;
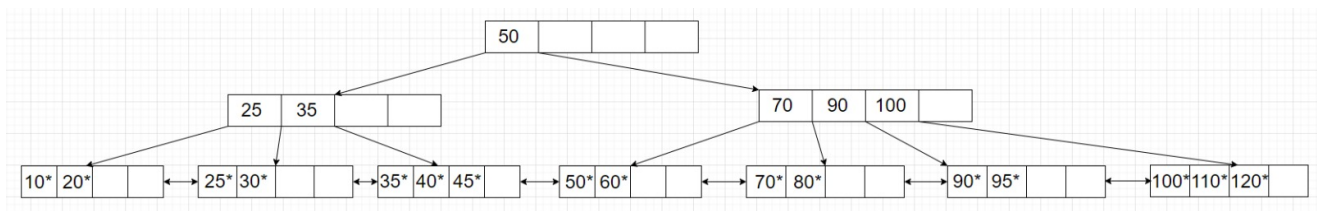
Level 1:40

Level 2:20,33/51,63

Level 3:10,15/20,27/33,37/40,46/51,55/63,97

Question **5**

Correct

15.00 points out of 15.00

Given the B+ tree (of order 2) above, give the content of the tree after deleting 25 and 35 sequentially. Note that you will give the content of the B+tree right after 35 is deleted.

Level 1: 70

Level 2: 30,50/90,100

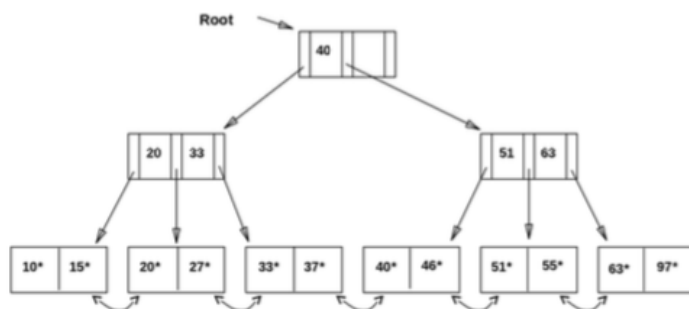Level 3: 10,20/30,40,45/50,60/70,80/90,95/100,110,120

Information

Introduction - Representing B+ Trees

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The proper version of the above tree with the specified notation is;
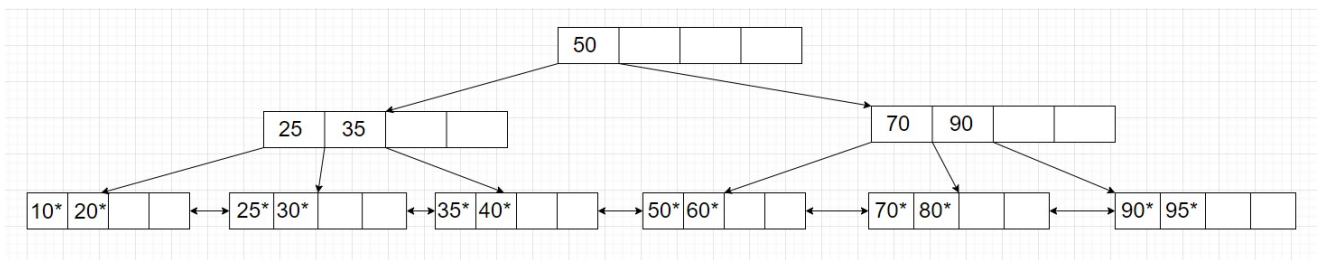
Level 1:40

Level 2:20,33/51,63

Level 3:10,15/20,27/33,37/40,46/51,55/63,97

Question **6**

Correct

15.00 points out of 15.00

Given the B+ tree (of order 2) above, give the contents of the tree after deleting 40.

Level 1: 25,50,70,90

Level 2: 10,20/25,30,35/50,60/70,80/90,95

Level 3:

Information

You wondered if using B+ trees would be more effective than storing each Pokemon using the Hash table. In order to make this decision, you need to make some calculations according to this B+ tree's properties.

The index will be on the pokemon key which is known to be unique for each pokemon.

The size of a key is 10 bytes and the size of a block pointer is 6 bytes. The block size of the disk is 2416 bytes.

There are 67.000.000 pokemon (assume that we've discovered a bunch of new pokemon) and the average fill-factor is 67%.

You can floor the values that are not an integer.

Question **7**

Correct

4.00 points out of 4.00

What will be the order of the tree?

Answer: 75 ✔

Question **8**

Correct

8.00 points out of 8.00

How many leaf blocks are required if all the videos are indexed? (You can discard the right and left pointers in the leaf nodes.)

Answer: 670000 ✔

Question **9**

Correct

8.00 points out of 8.00

How many levels will the resulting tree have if all the pokemons are added?

Answer: 4 ✔

◄ Static&ExtendibleHashing-UPDATED

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ICA4 (ONLINE) ►