

RPI Computer Science

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Database Systems

Lecture 19 Exercise



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New submission for: Lecture 19 Exercise

Due: 11/13/2021 @ 04:00 PM EST

**Gradeable Time Remaining: 01
days 23 hours**

1. In this question, you are asked to compute the value n for a B-tree, maximum number of tuples that can be addressed in a leaf node. Recall that in a leaf node, you can store at most n key values and pointers to tuples, and 1 extra pointer to a sibling node.

Suppose the following: (a) you are indexing $R(A)$ where attribute A is 60 bytes long, (b) a pointer (tuple or disk node address) is 20 bytes long, and (c) a disk page has 7200 bytes of usable storage (after header information).

What is n for this B-tree, i.e. the maximum number of tuples you can address in a leaf node?

- ☐ 85
- ☐ 89
- ☒ 90
- ☐ 92
- ☐ 95
- ☐ 119
- ☐ 120
- ☐ 359
- ☐ 360
- ☐ None of these values

Clear

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2. Suppose you have a B-tree for key value R(A) where each node on the average stores 150 pointers (with the exception of root). Disregard any sibling nodes in your computation. This means that each leaf node addresses 150 tuples and each internal node addresses 150 nodes below.

Suppose A has 9 million tuples. Check all options below that is true about this B-tree node.

3 levels (leaf+internal+root)

4 levels (leaf+internal+internal+root)

✓ Total number of nodes in the tree is more than 64,000 (leaf, internal and root)

✓ Total number of nodes in the tree is more than 60,403 (leaf, internal and root)

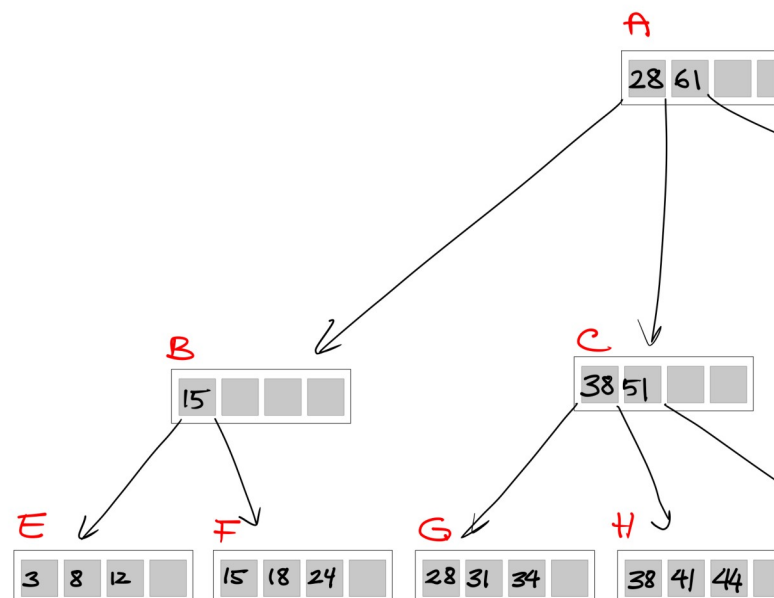
✓ Total number of nodes in the tree is more than 60,402 (leaf, internal and root)

✓ Total number of nodes in the tree is more than 60,400 (leaf, internal and root)

None of these options

Clear

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3. Suppose you are given the following B-tree on $R(A)$.

Check all nodes that are visited for the following search: $A=50$.

☒ A

B

☒ C

D

E

F

G

☒ H

I

J

K

Clear

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4. Suppose you are given the B-tree from Question 3.

Check all nodes that are visited for the following search: $25 \leq A \leq 60$.

☒ A

☒ B

C

D

E

☒ F

☒ G

☒ H

☒ I

☒ J

K

Clear

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5. Suppose you are given the B-tree from Question 3.

Check all nodes that are visited for the following search: $A \leq 40$.

☒ A

☒ B

☐ C

☐ D

☒ E

☒ F

☒ G

☒ H

☐ I

☐ J

☐ K

Clear

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