B-Trees and B+ Trees Tutorial

Q1: Consider a B+-tree in which the maximum number of keys in a node is 5. What is the minimum number of keys in any non-root node?

A) 1

B) 2

C) 3

D) 4

Solution: B

Q2: Which one of the following is a key factor for preferring B-trees to binary search trees for indexing database relations?

A) Database relations have a large number of records

B) Database relations are sorted on the primary key

C) B-trees require less memory than binary search trees

D) Data transfer from disks is in blocks.

Solution: D

Q3: B+ trees are preferred to binary trees in databases because

A) Disk capacities are greater than memory capacities

B) Disk access is much slower than memory access

C) Disk data transfer rates are much less than memory data transfer rates

D) Disks are more reliable than memory

Solution: B

Q4: The order of a leaf node in a B+ tree is the maximum number of (value, data record pointer) pairs it can hold. Given that the block size is 1K bytes, the data record pointer is 7 bytes long, the value field is 9 bytes long, and a block pointer is 6 bytes long, what is the order of the leaf node?

A) 63

B) 64

C) 67

D) 68

Solution: A

Q5: A B+ tree index is to be built on the Name attribute of the relation STUDENT. Assume that all student names are of length 8 bytes, disk blocks are size 512 bytes, and index pointers are of size 4 bytes. Given this scenario, what would be the best choice of the degree (i.e. the number of pointers per node) of the B+ tree?

A) 16

B) 42

C) 43

D) 44

Solution: C

Q6: Consider a B+ tree in which the search key is 12 bytes long, block size is 1024 bytes, record pointer is 10 bytes long, and block pointer is 8 bytes long. The maximum number of keys that can be accommodated in each non-leaf node of the tree is

A) 49

B) 50

C) 51

D) 52

Solution: B

Q7: A B-Tree used as an index for a large database table has four levels, including the root node. If a new key is inserted into this index, then the maximum number of nodes that could be newly created in the process are:

A) 5

B) 4

C) 3

D) 2

Solution: A

Q8: A B-tree of order 4 is built from scratch by 10 successive insertions. What is the maximum number of node splitting operations that may take place?

A) 5

B) 4

C) 3

D) 6

Solution: A