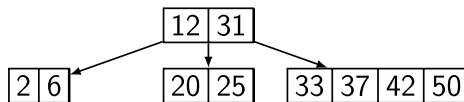


1. Which of the following statements is true for a B-tree of order  $m$  containing  $n$  items?

- (i) The height of the B-tree is  $O(\log_m n)$  and this bounds the total number of disk seeks.
  - (ii) A node contains a maximum of  $m - 1$  keys, and this bounds the number of disk seeks at each level of the tree.
  - (iii) Every Binary Search Tree (or AVL tree) is also an order 1 B-Tree.
- A. [Your Answer] Only item (ii) is true.
  - B. Two of the statements are true.
  - C. [Correct Answer] Only item (i) is true.
  - D. Only item (iii) is true.
  - E. None of the statements are true.

2. Consider this B-Tree:



How many disk seeks are required during the execution of `Find(42)`? Assume that none of the data exists in memory when the call is made.

- A. [Correct Answer] 2
- B. 4
- C. The number of disk seeks cannot be determined because we do not know the order of the tree.
- D. 1
- E. [Your Answer] 5

3. What is the maximum number of keys that can be stored in a B-Tree of order 16 and height 6?

- A. [Your Answer] None of the other options are correct
- B.  $15 \times (16^6 - 1)$
- C.  $6 \times 2^{16} - 1$
- D. [Correct Answer]  $16^7 - 1$
- E.  $15 \times (6^{16} - 1)$

4. What is the minimum number of keys that can be stored in a B-Tree of order 64 and height 5?

- A. [Correct Answer] [Your Answer]  $2^{26} - 1$
- B.  $2^{25} + 1$
- C.  $2^{30} + 1$
- D.  $2^{25} - 1$
- E.  $2^{30} - 1$