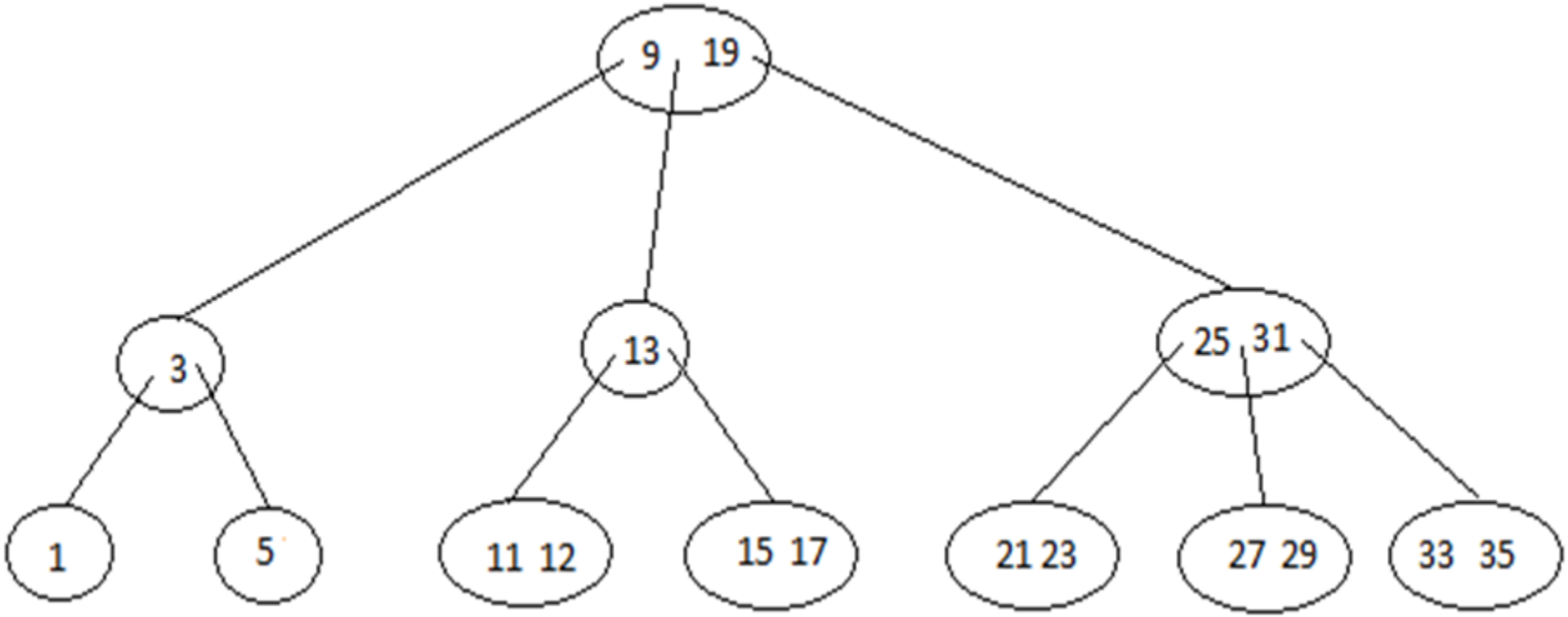
2-3 tree



2-3 tree

(Not for the exam)

The tree is empty

or the root is

- 2-node ***r*** with data element ***a***. If r has left child L and right child R, then L and R are non-empty 2-3 trees of the same height, a is greater than each element in L, and a is less than each data element in R.

or

- 3-node r with data elements a and b, where a < b. If r has left child L, middle child M, and right child R, then L, M, and R are non-empty 2-3 trees of equal height, a is greater than each data element in L and less than each data element in M, and b is greater than each data element in M and less than each data element in R.

B-tree

B-tree of order **m**

is a tree which satisfies the following properties:

1. Every node has at most **m** children.
2. Every non-leaf node (except root) has at least **⌈m/2⌉** children.
3. All leaves appear on the same level
4. The root has at least two children if it is not a leaf node.
5. A non-leaf node with **k** children contains **k−1** keys
   - keys: $key_1,...,key_{k-1}$ are sorted
   - keys in subtree i $SubTree_i >= key_{i-1}$ if i>1
     $SubTree_i <= key_i$ if i<k