CS 400

B-Tree Insert

ID: 08-02

B-Tree Insertion

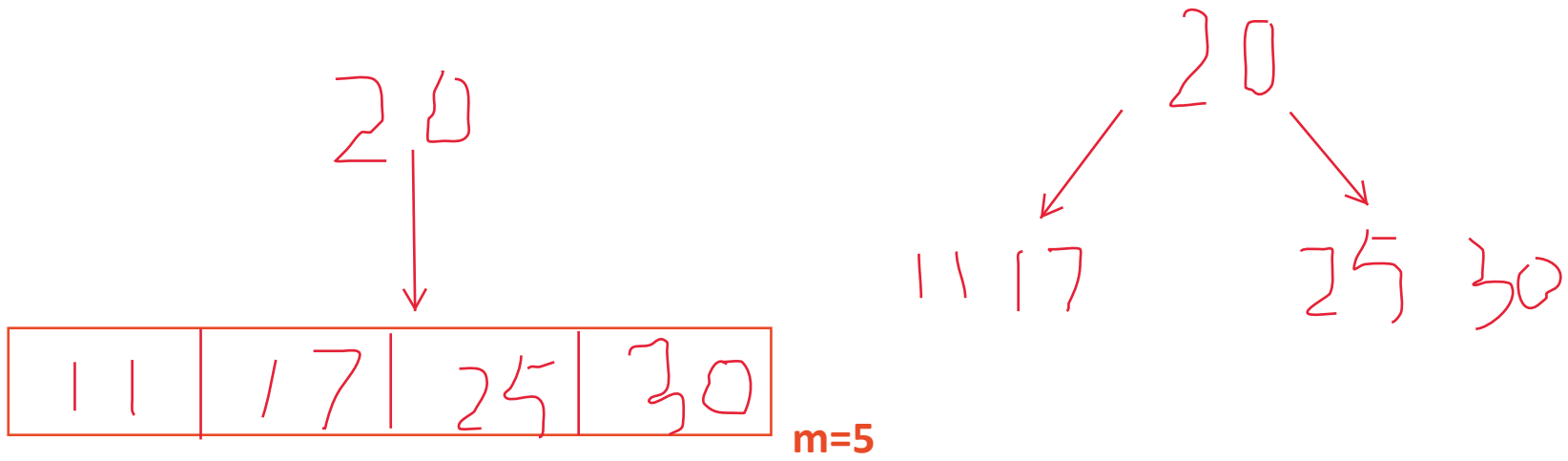
For a B-tree "of order **m**":

- All keys within a node are in sorted order.
  (Note: These are two different meanings for the word "order".)
- Each node contains no more than **m-1** keys.
- Each internal node can have at most **m** children,
  so a B-tree of order m is like an m-way tree.

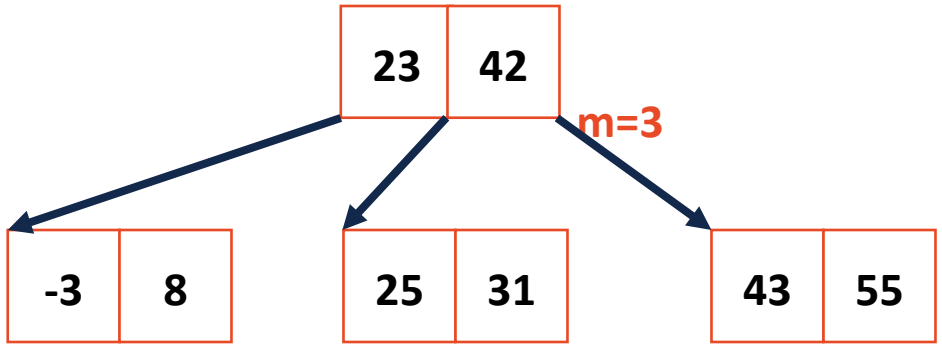
m=5

B-Tree Insertion

When a B-tree node reaches **m** keys:



B-Tree Recursive Insert



B-Tree Properties

For a B-tree "of order **m**":

1. All keys within a node are in sorted order.

2. Each node contains no more than **m-1** keys.

3. Each internal node has exactly **one more child than key**
   (at most **m** children, so a B-tree of order m is like an m-way tree).
   - A root node can be a leaf or have **[2, m]** children.
   - Each non-root, internal node has **[ceil(m/2), m]** children.

4. All leaves are on the same level.

B-Tree