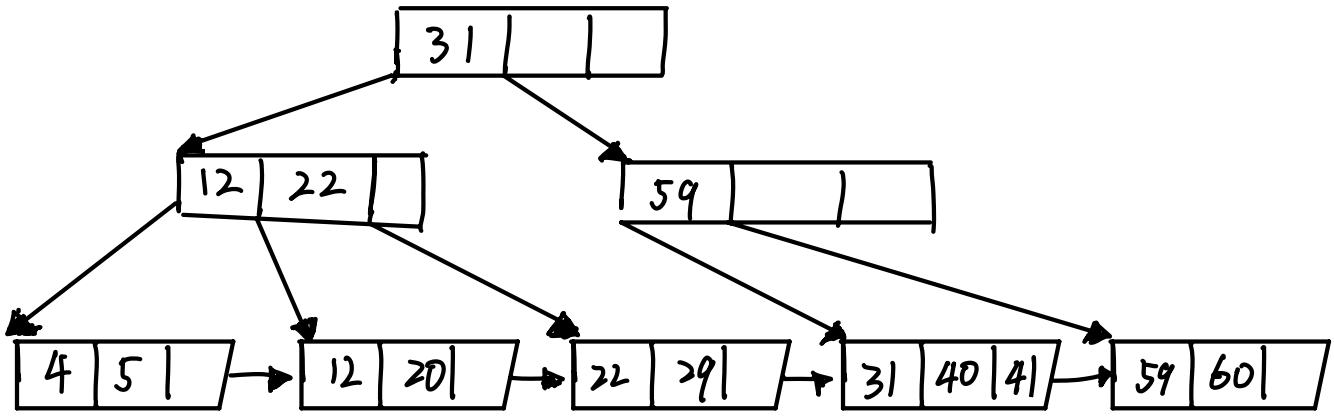
1. $n = 4$

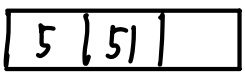
For internal node: # of children: $\frac{n}{2} = 2 \leq$ # of children $\leq n = 4$

For leaf node: # of value: $\frac{n-1}{2} = 2 \leq$ # of value $\leq n-1 = 3$

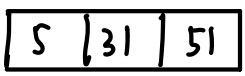


1. ① insert 5

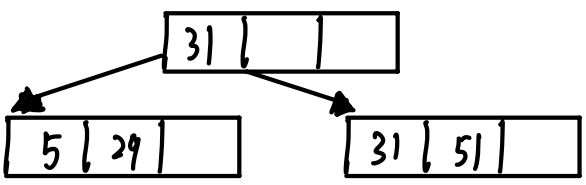
② insert 51



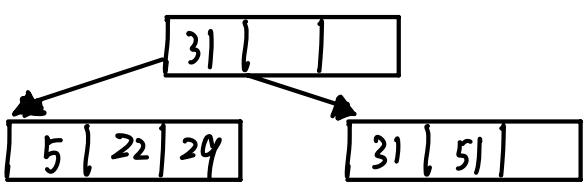
③ insert 31



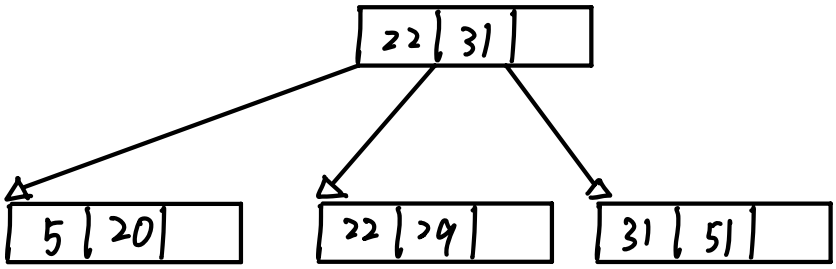
④ insert 29



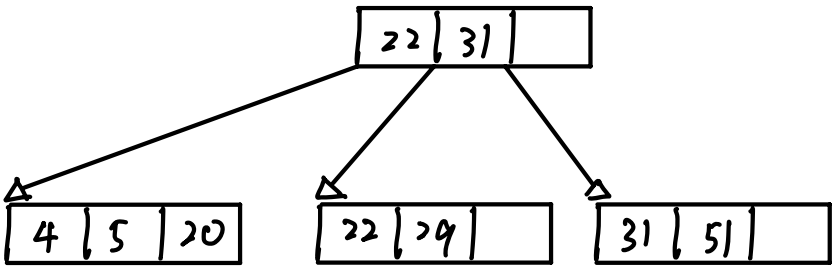
⑤ insert 22



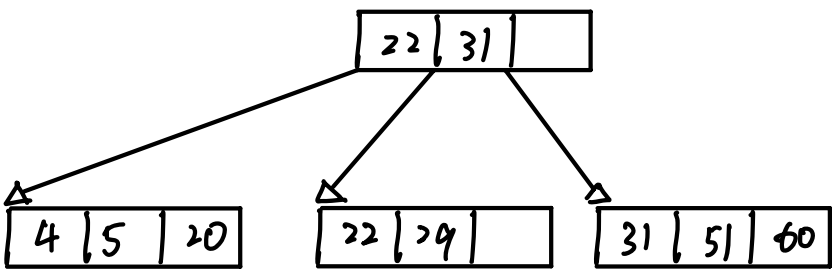
⑥ insert 20



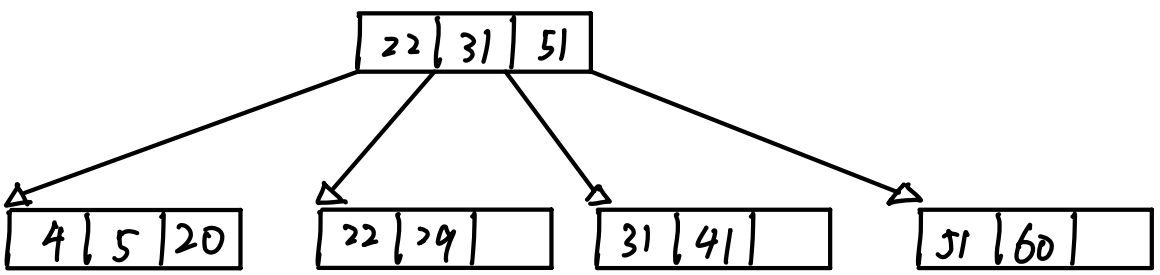
⑦ insert 4



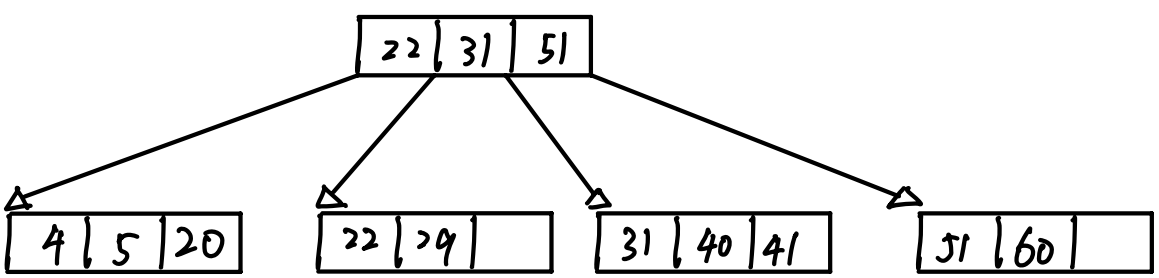
⑧ insert 60



⑨ insert 41

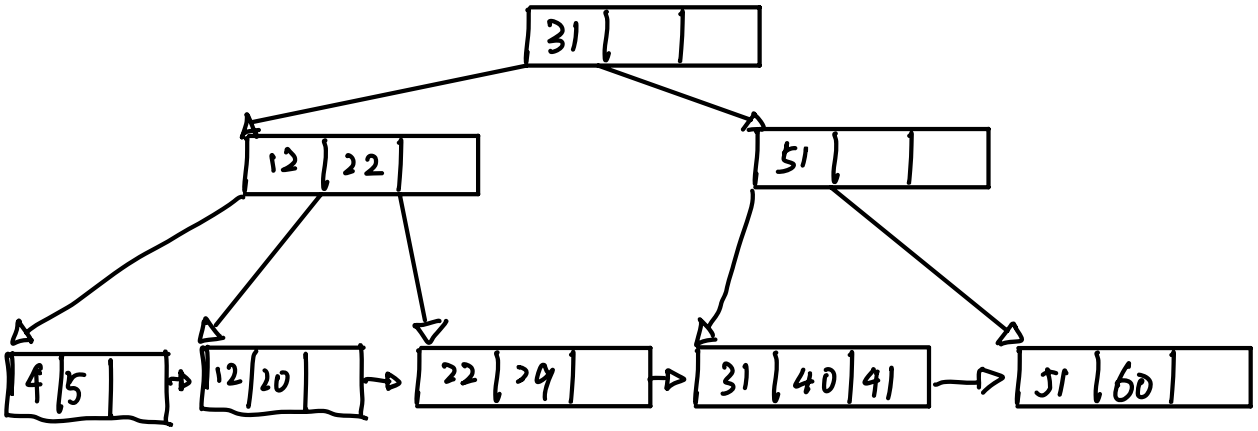


⑩ insert 40



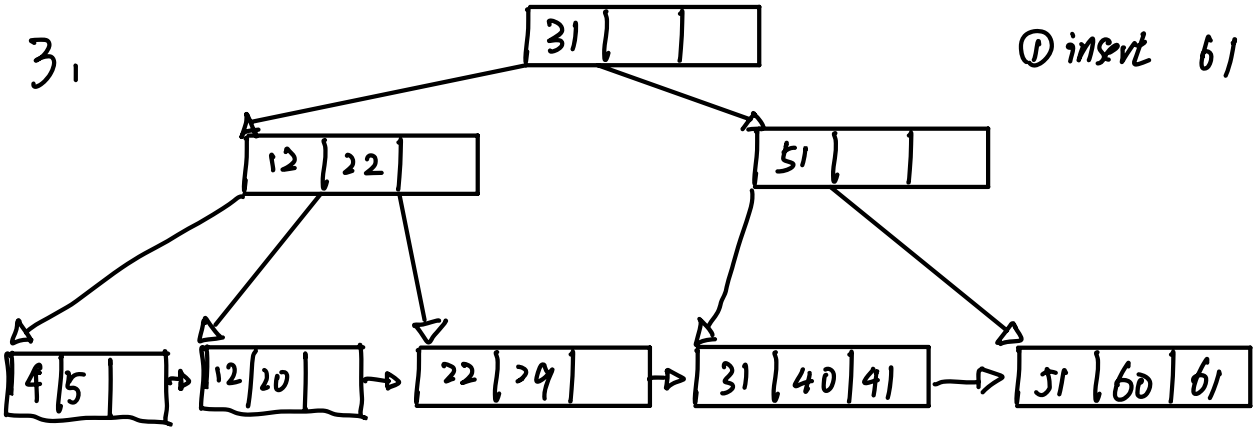
⑪ insert 12

next page

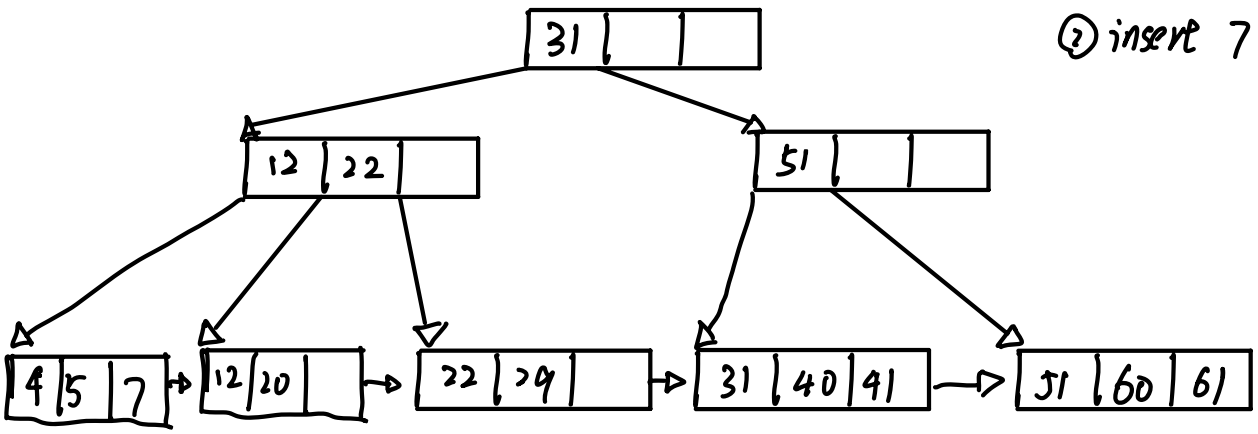


3.

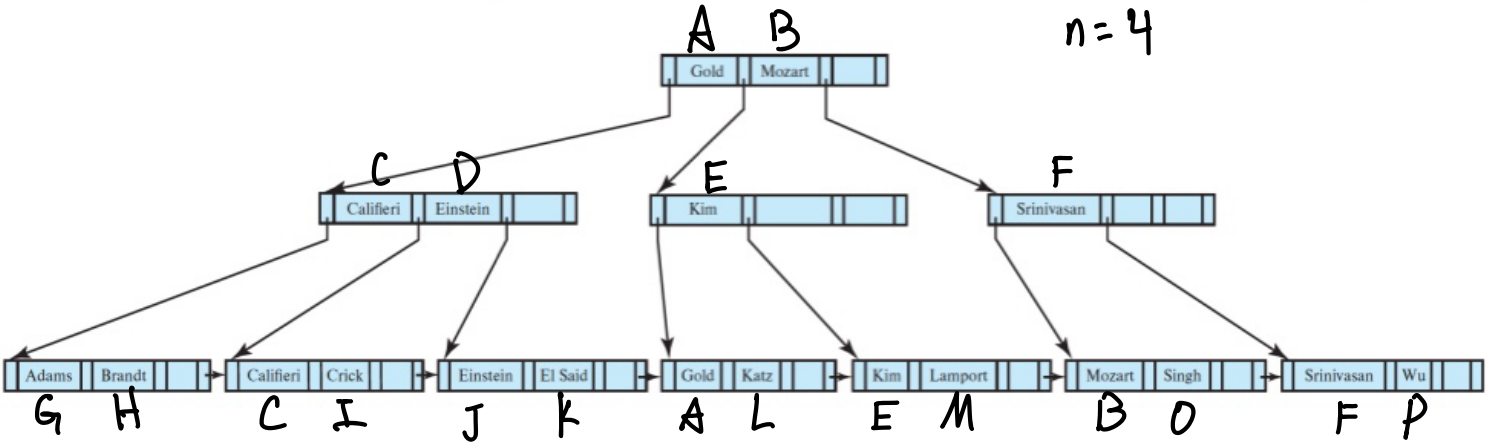
① insert 61



② insert 7

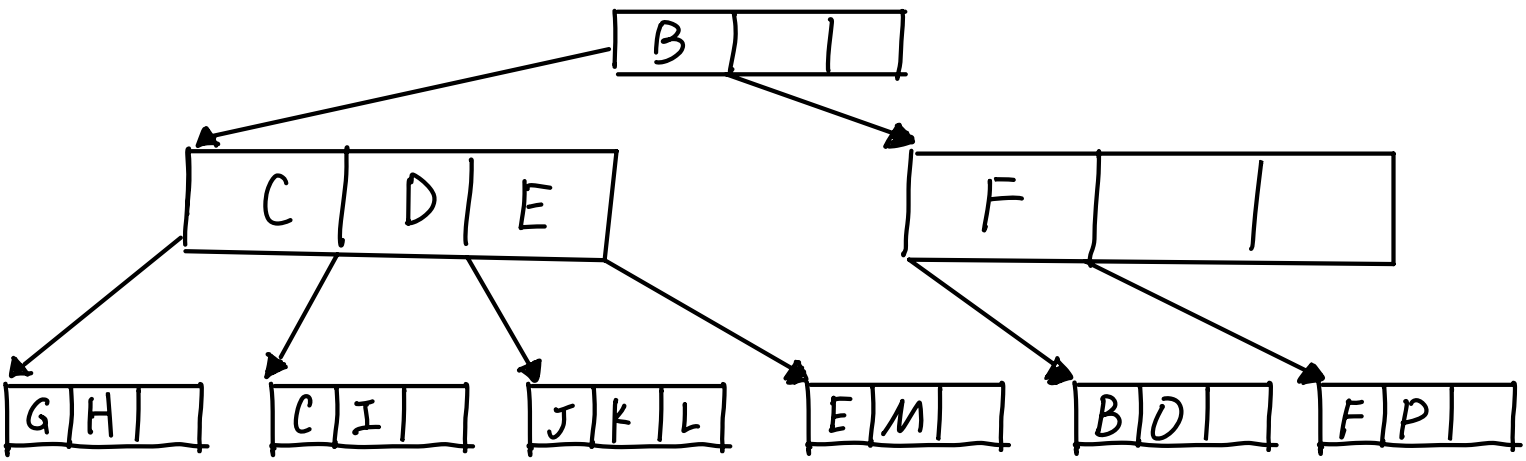


4.



After remove Gold in leaf node, we merge katz to the left sibling ⇒ [Elinstein | El Scaid | katz]

Then we also merge kim in the internal node to its sibling ⇒ [Califfleri | Einstein | kim]

Lastly, remove Gold in the root ⇒ [Mozart | |]

use letter to represent the tree, below is the final state