Examples of 2–4 search trees

Red–Black search tree: Binary tree with "black" nodes and "red" nodes. Root must be black.
A black node can have red children, but a red node CANNOT have red children
So, a black node functions as a 2–4 tree node when it is combined with its 0, 1 or 2 red children!
The balance condition translates to: All root–to–leaf paths have the same number of black nodes.

Subtle but easy to program rules give ways to make small rearrangements and color changes so that balance is maintained when a key (virtual address) is inserted or deleted. See good algorithms books/CSI403/503.