COP3503 – AS1 – Deletion

Things needed to take care:

-Adjust the value

-Reconnect with the children

-Reconnect with the parent

1.Delete at root:

a. Root is leaf -> root has 1 value -> direct delete

-> root has 2 value -> direct delete

-> root has 3 value -> direct delete

b. Root is non leaf -> root is two node + both of its children is two node -> fuse and direct delete

-> root is two node + one of its children is not two node

-> check if it is left children, pick right most value of left children

-> check if it is right children, pick the left most value of right children

-> replace delete value with this new value

->search the new value and delete it

-> root is three node:

->children has more than 1 key -> find the successor, swap the value with successor,

delete successor value at successor spot

->children has less than 1 key like the example below

10 20

9 15 25

->delete 10: because both of its children is 9 and 15 is 2 node.

-> fuse 9 10 15 and then delete 10

20

9 15 25

->delete 20: same progress

-> root is four node (like in the picture):

->children has more than 1 key -> find the successor, swap the value with successor,

delete successor value at successor spot

->children has less than 1 key like the picture below -> same progress with three node

A picture containing text, handwriting, paper, paper product

Description automatically generated

2.Delete at node

A. Current node is leaf node:

a.Current node is 2 node:

If right or left sibling has > 1 keys, choose one and make adjacent key the parent, bring down the current parent. Then delete value

Else steal a key from the parent and fuse with the sibling

b. Current node is 3 node: direct delete

c. Current node is 4 node: direct delete

B. Current node is not a leaf node:

a.Current node is 2 node:

If right or left children has > 1 keys, choose one and make adjacent key the parent, bring down the current parent. Then delete

Else steal a key from the parent and fuse with the sibling

b. Current node is 3 node:

do the same case with root is three node

c. Current node is 4 node:

do the same case with root is four node