Nhat Nguyen COMS 120 HW 4

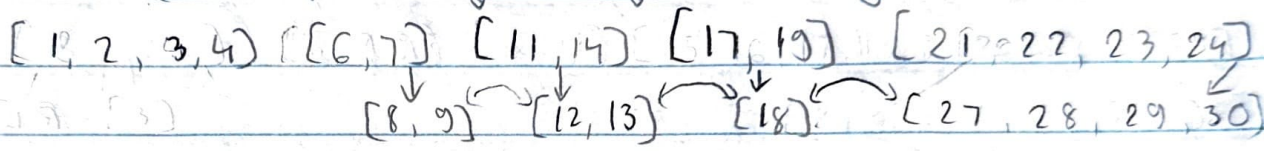
1. Note: The B+ tree below are built and operate according to the class's textbook description of a B+ tree.

m: number of entries, $d \leq m \leq 2d$

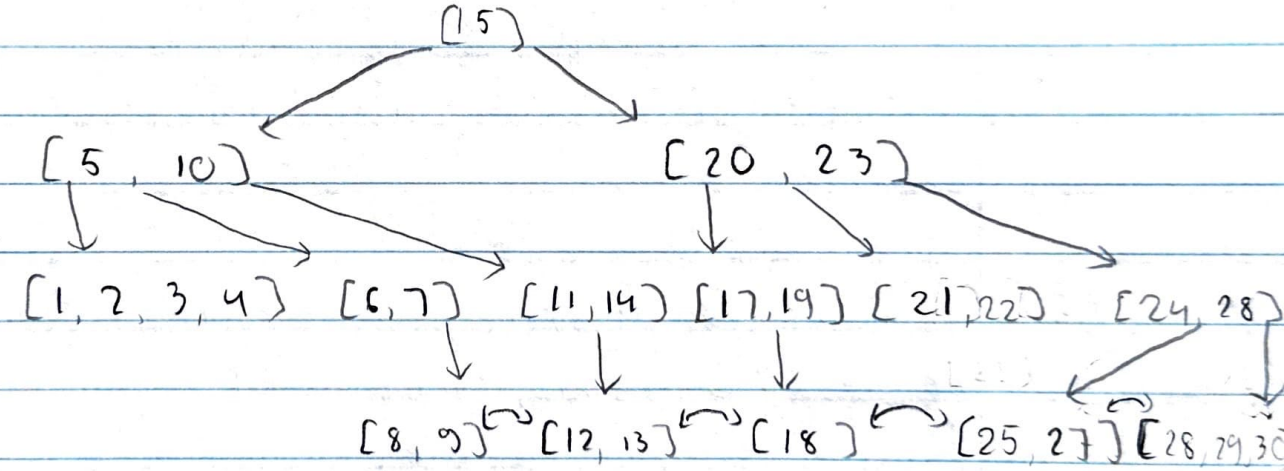
d: order

height: the length of a path from a root to a leaf

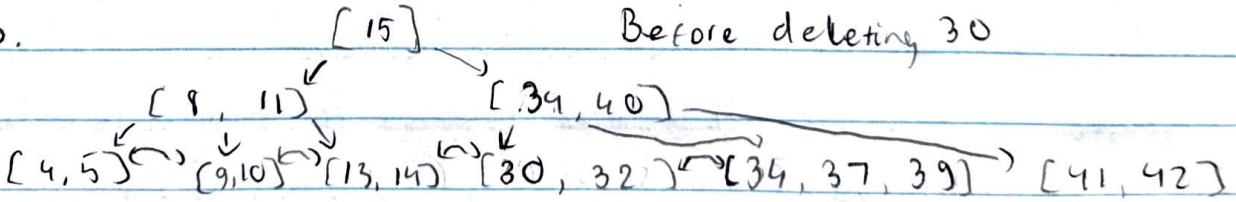
a. h = 2 [5, 10, 15, 20] Before inserting 25



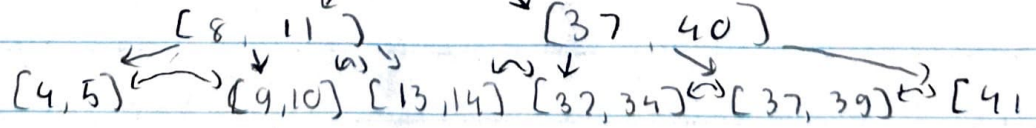
h = 3 After inserting 25



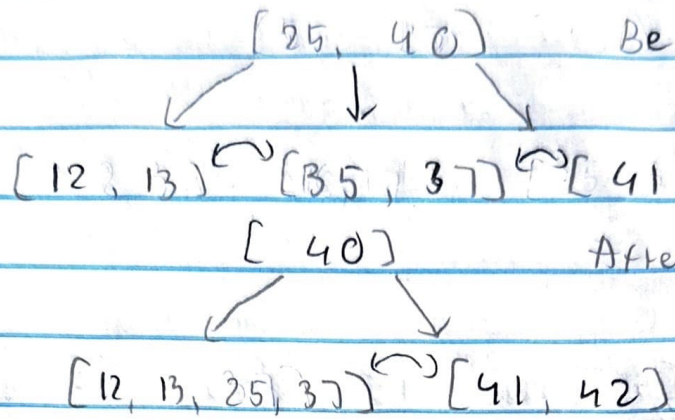
b. [15] Before deleting 30



[15] After deleting 30



c.



2.

a) It is thanks to the method of round-robin bucket split. Since the bucket to be split is chosen in a round-robin and not the bucket in which the data entry is inserted, this will lead to uniform bucket splits and thereby redistributing the overflow chains before the chain can develop.

5)

No, due to the presence of overflow chains as part of the Linear Hashing structure. Although an equality selection cost just one disk I/O, overflow pages required more disk accesses to retrieve the records. On average, it is about 1.2 disk accesses for reasonably uniform data distribution.