Middle East Technical University

CENG 302

Introduction to Database Management Systems

Spring 2021-2022

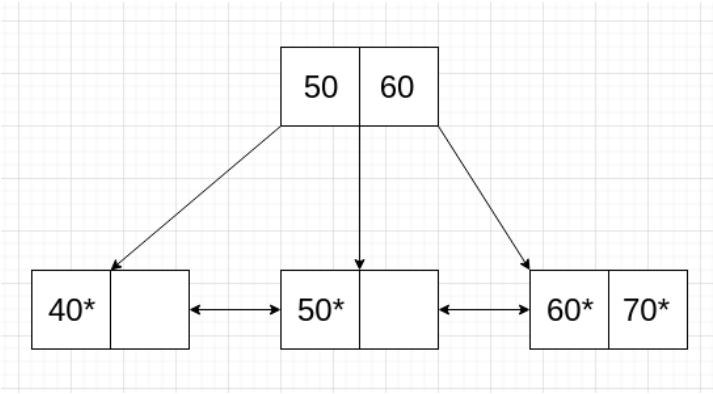
Homework 3

Due Date: 25 January 2022, Tuesday

1) For the given B+ tree of order 3 (each node can hold at most 2 keys) below, perform successive insertions* with the given keys and give the state of the tree after certain insertions.

*You will start with the given tree, and insert the keys one by one continuously.

keys = [**80**,90,**100**,30,20,**35**]

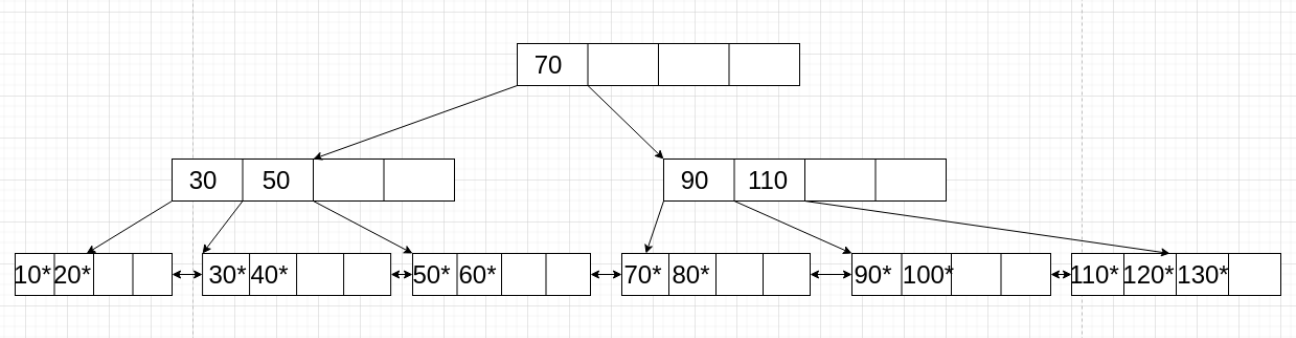


a) Draw the B+ tree after insertion of 80.

b) Draw the B+ tree after insertion of 100.

c) Draw the B+ tree after insertion of 35.

2)



a) Given the B+ tree (of order 5) above, draw the B+ tree after deleting 100. In case of underflow in the leaf nodes, use the right sibling to redistribute the entries

b) Given the B+ tree (of order 5) above, draw the B+ tree after deleting 20.

3) Consider the following relation and the FDs.

R = (A B C D E F)

F→C
ADE→F
BD→F
BC→DF
E→BC
D→A
AB→F

a) Find the candidate key(s) of R and minimal cover of FD set.

b) If R is not in BCNF, decompose it into a set of relations that satisfy BCNF.