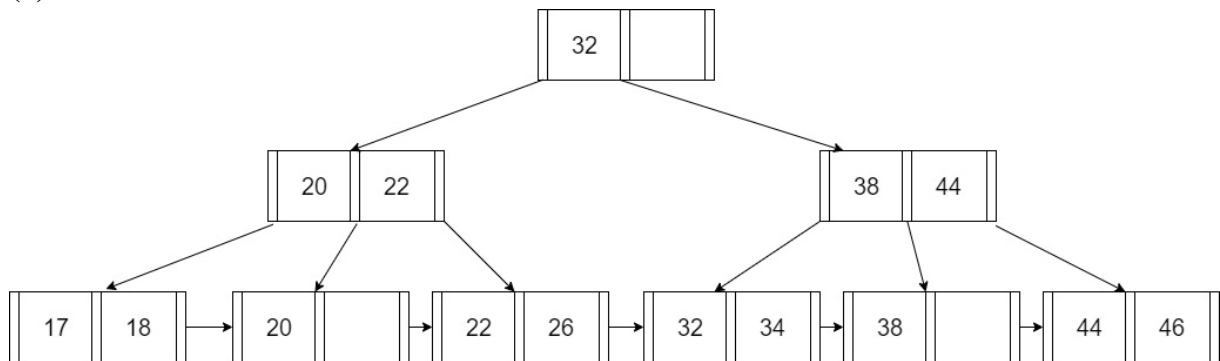


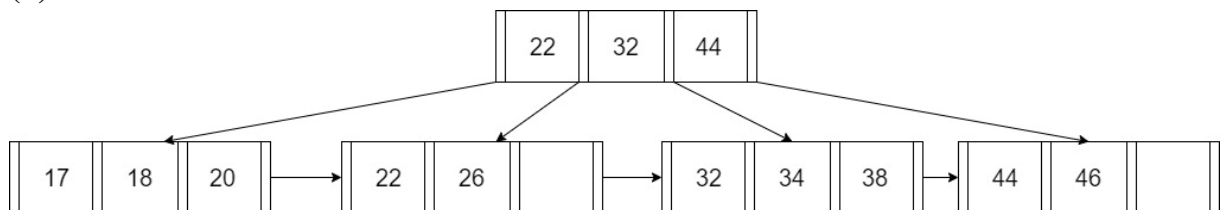
CS 353 Fall 2022
Homework 6 Solutions

Q.1 [36 pts, 12 pts each]

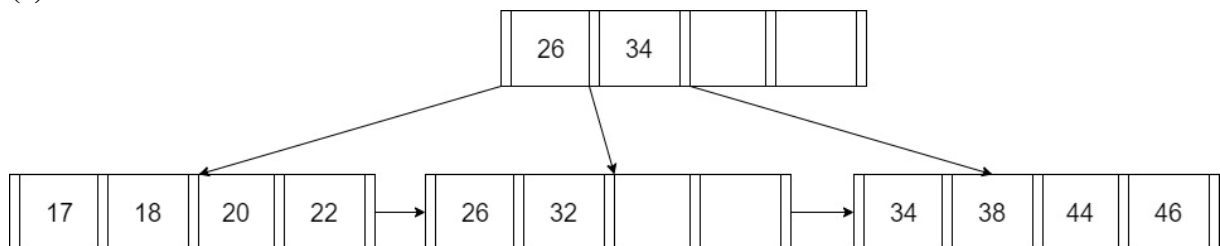
(a)



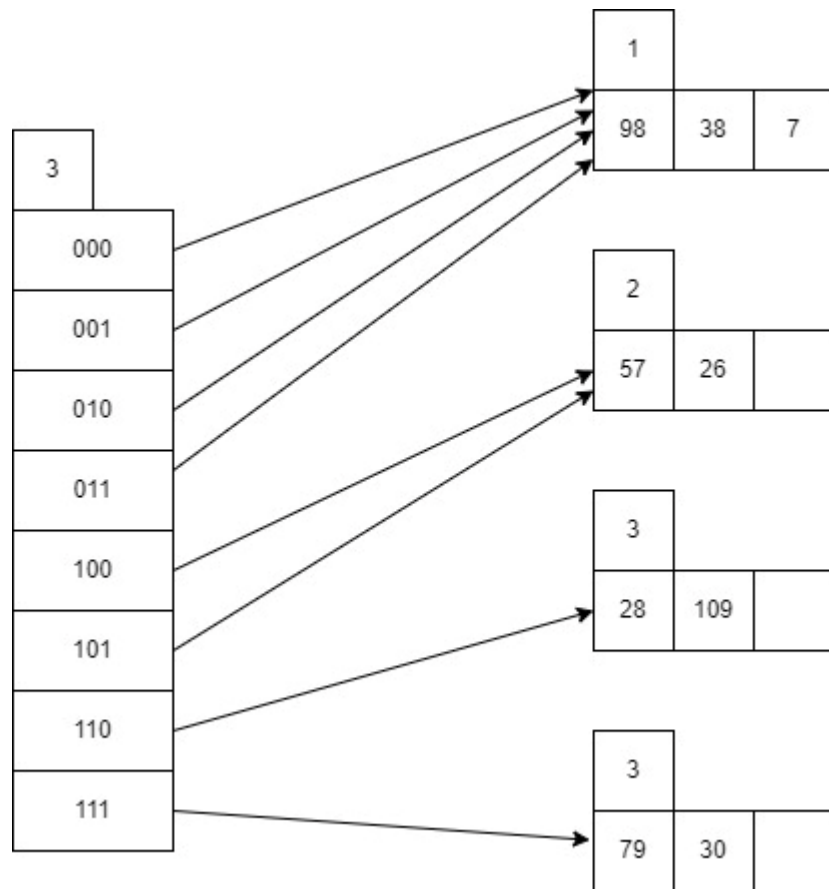
(b)



(c)



Q.2 [40 pts]



(a) [25 pts]

Insertion of 98, 79, 30 leads to bucket splits.

Insertion of all these 3 key values (i.e., 98, 79, 30) causes the bucket address table to double.

(b) [15 pts]

- 3
- 2
- 3
- 1
- 3

Q.3 [24 pts]

(a) [8 pts]

Number of merge passes = $\lceil \log_{M-1}(b_r/M) \rceil$, where b_r is the file size and M is the memory size

Number of merge passes = $\lceil \log_{49}(5000/50) \rceil = \lceil \log_{49}(100) \rceil = 2$

(b) [16 pts]

Number of merge passes = $\lceil \log_{M-1}(b_r/M) \rceil = 2$

$\lceil \log_{M-1}(b_r/M) \rceil = 2 \Rightarrow (b_r/M) \leq (M-1)^2 \Rightarrow b_r \leq M(M-1)^2 \Rightarrow M = 48$

(This can also be simplified to $b_r \leq M^3$, in which case $M = 47$)