



United International University

- **Assignment No :** Assignment-01
- **Submitted by :**
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 - ➡ Section : D
 - ➡ Department of CSE.
- **Course Title :** ➡ Database Management System
- **Submitted to :**
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 - ➡ Lecturer, Department of CSE.
- **Date of Submission :** 9/02/2025



3] hash function $h(x) = (x * 31) \% 8$

Hence return value of hash function between 0 to 7 (iii).

3 keys per bucket

$$h(1) = (1 * 31) \% 8 = 7 \text{ (iii)}$$

$$h(7) = (7 * 31) \% 8 = 1 \text{ (001)}$$

$$h(13) = (13 * 31) \% 8 = 3 \text{ (011)}$$

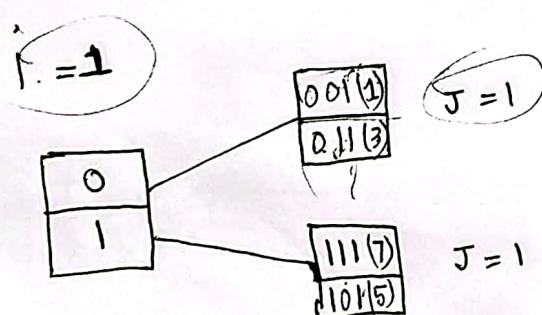
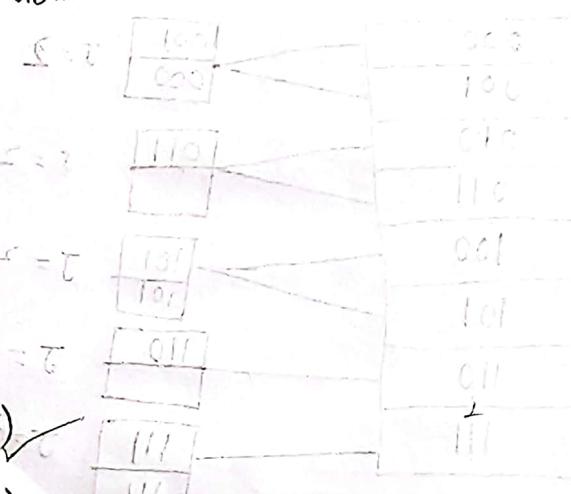
$$h(27) = (27 * 31) \% 8 = 5 \text{ (101)}$$

$$h(35) = (35 * 31) \% 8 = 5 \text{ (101)}$$

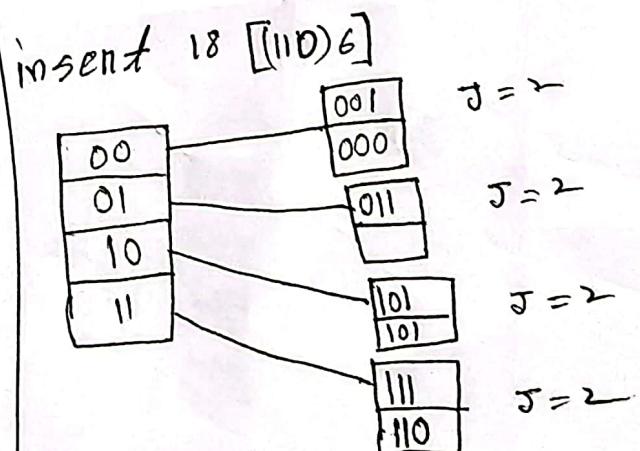
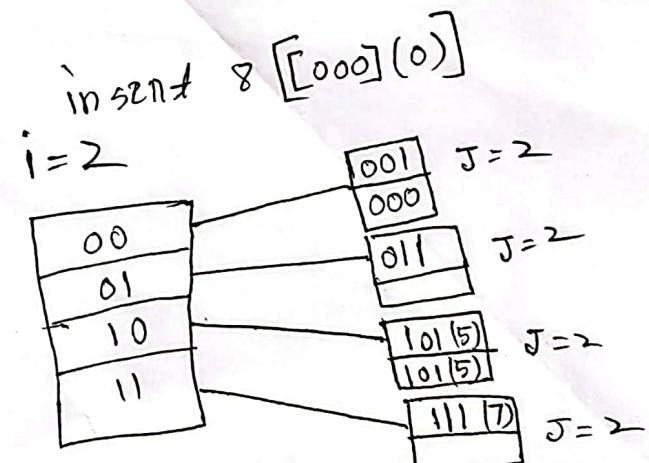
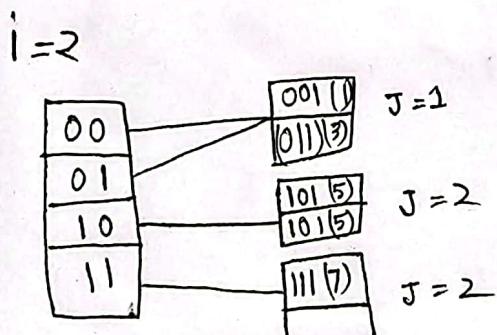
$$h(8) = (8 * 31) \% 8 = 0 \text{ (000)}$$

$$h(18) = (18 * 31) \% 8 = 6 \text{ (110)}$$

$$h(25) = (25 * 31) \% 8 = 7 \text{ (111)}$$



insert 35 ~~(10135)~~ { (101) 5 }



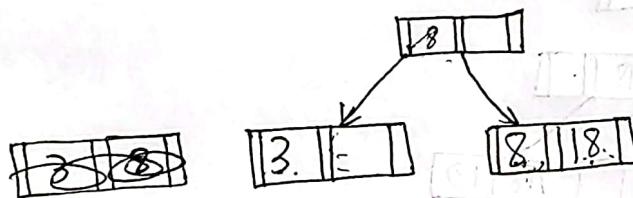
Spring 2024 (3)

insert 18, 3, 8, 16, 7, 19, 28, 31, 24, 6, 1, 50, 8, 74

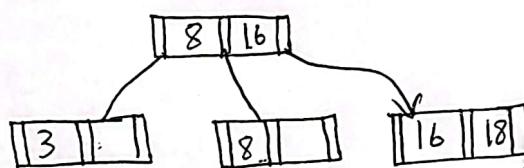
insert 18, 3



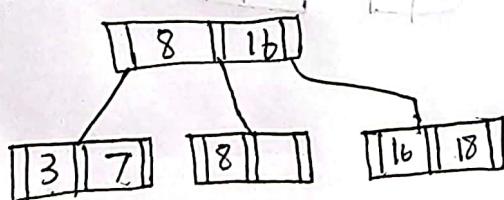
insert 8 :- 8 is overflow 3, 8, 18



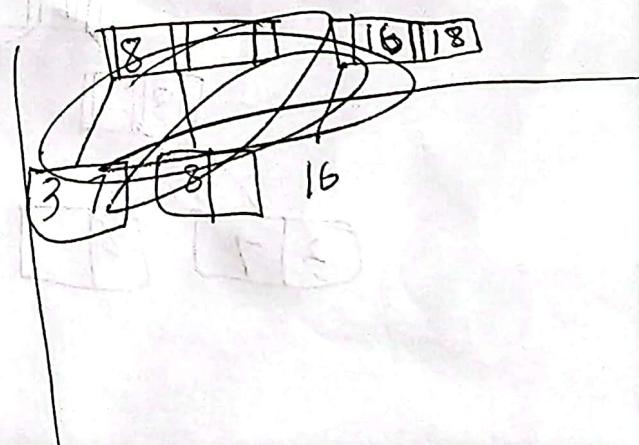
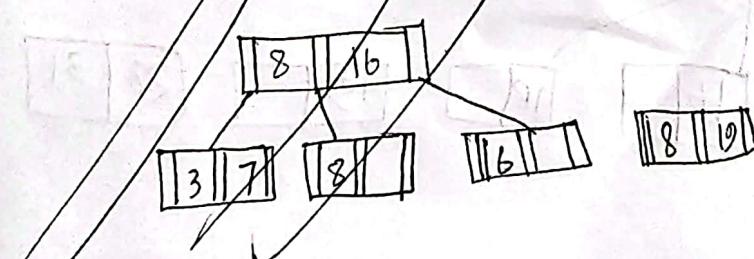
insert 16 :- 16 is overflow - 8 16 18



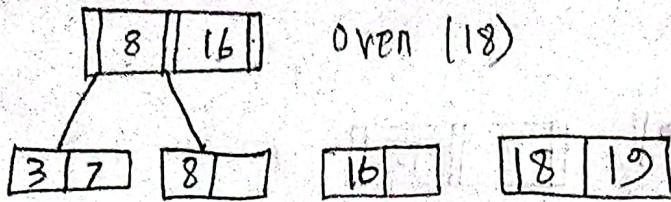
insert 7 :-



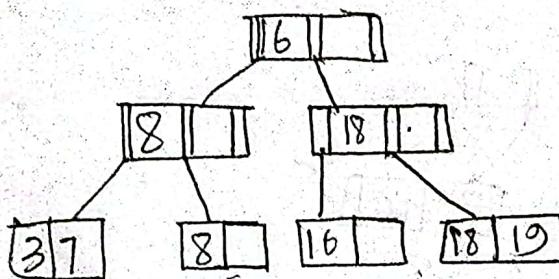
insert 19 :- overflow 16, 18, 19



insert 19 :- 16, 18, 19

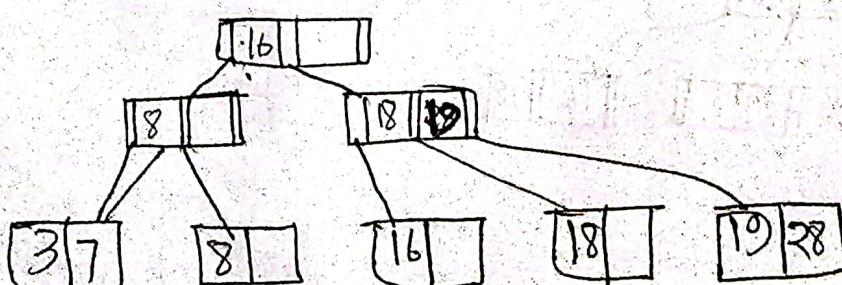


parent overflow 8 16 18

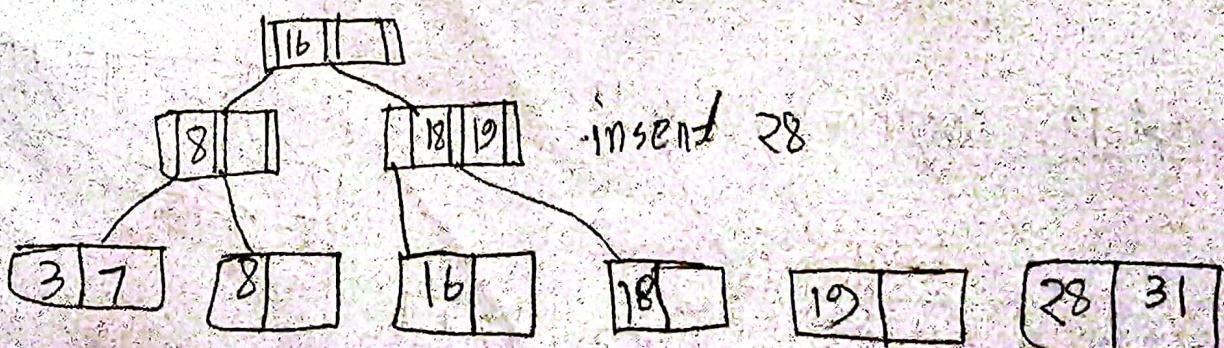


insert 28 :-

18 19, 28

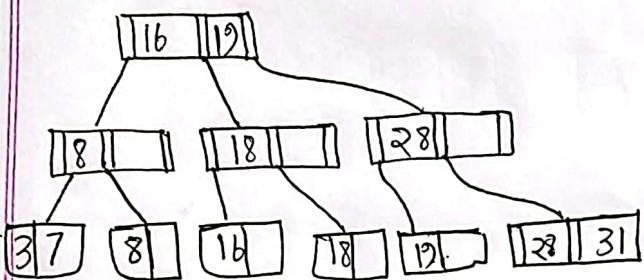


insert 31 :- 19, 28, 31

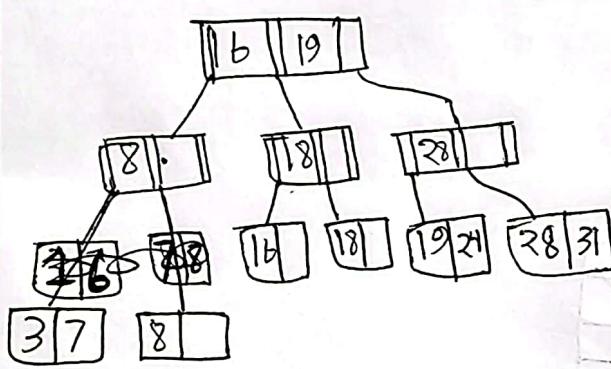


penent overflow

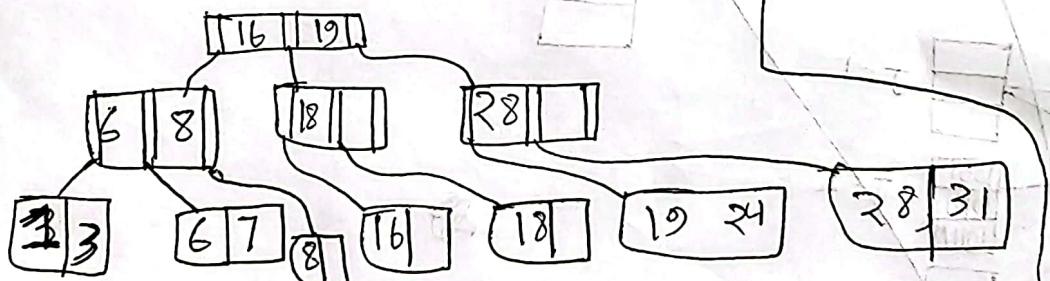
18 19 28



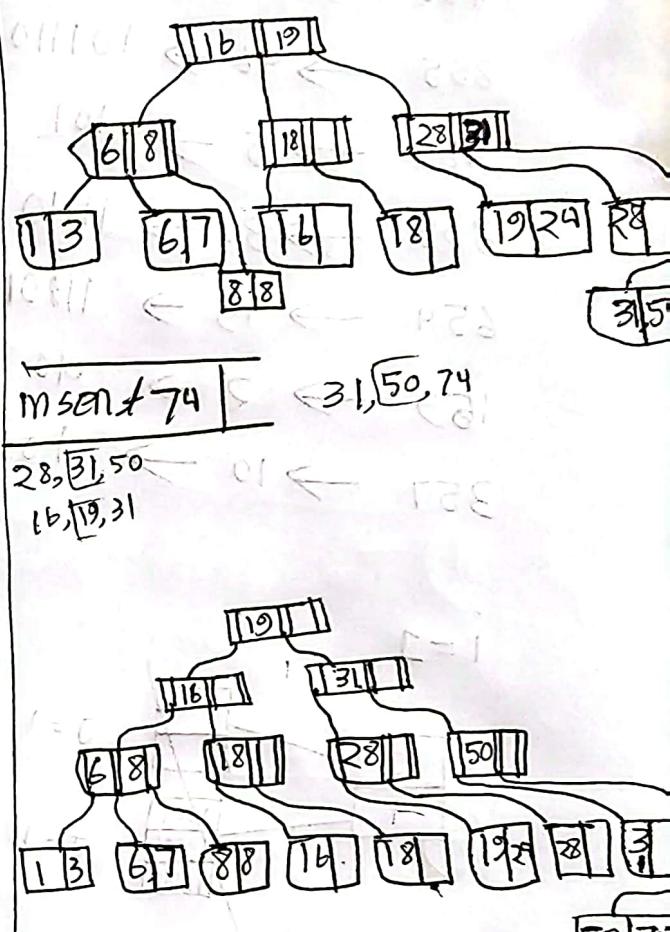
insert 24 ①, ②



insert 6,1:- 3,2,7



insert 50,8:- 28,31,50



{Summen 23 (3(b))}

$$845 \rightarrow 9 \rightarrow 1001$$

$$452 \rightarrow 21 \rightarrow 10101$$

$$855 \rightarrow 46 \rightarrow 101110$$

$$489 \rightarrow 5 \rightarrow \underline{101}$$

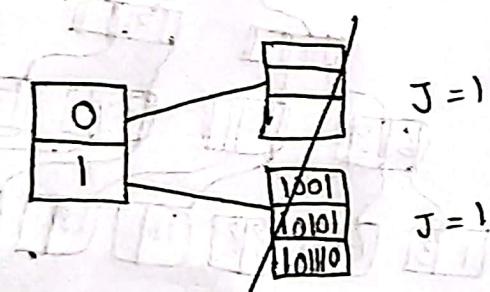
$$325 \rightarrow 30 \rightarrow 11110$$

$$654 \rightarrow 13 \rightarrow 11101$$

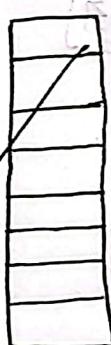
$$159 \rightarrow 2 \rightarrow 010$$

$$357 \rightarrow 10 \rightarrow 1010$$

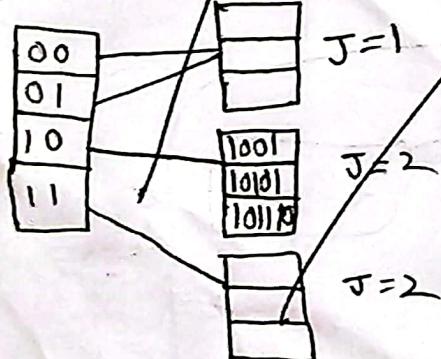
$i=1$

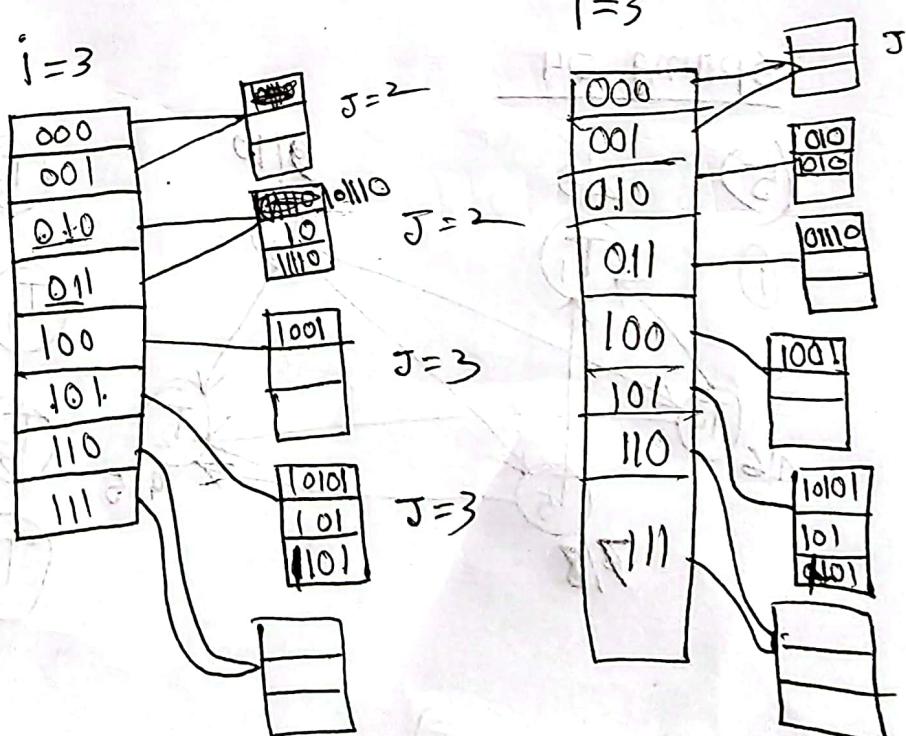
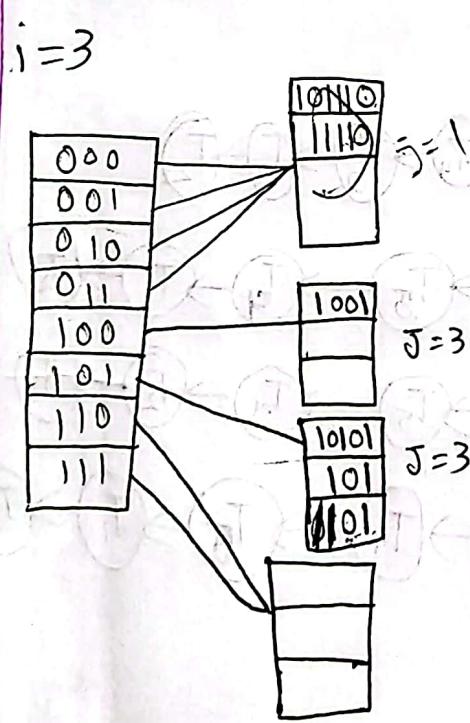
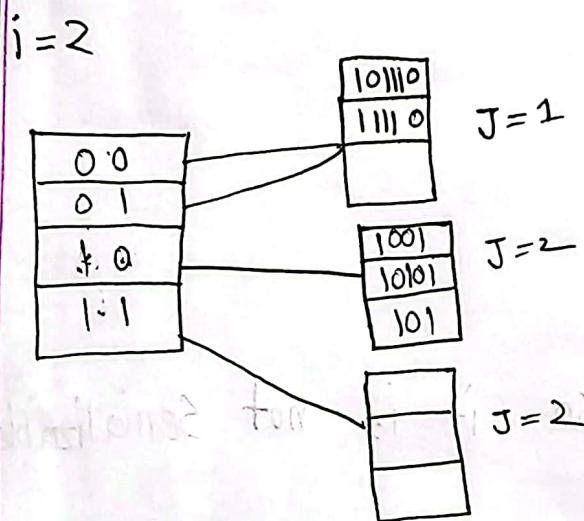
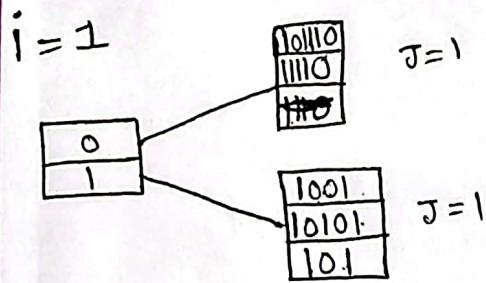


$i=3$



$i=2$

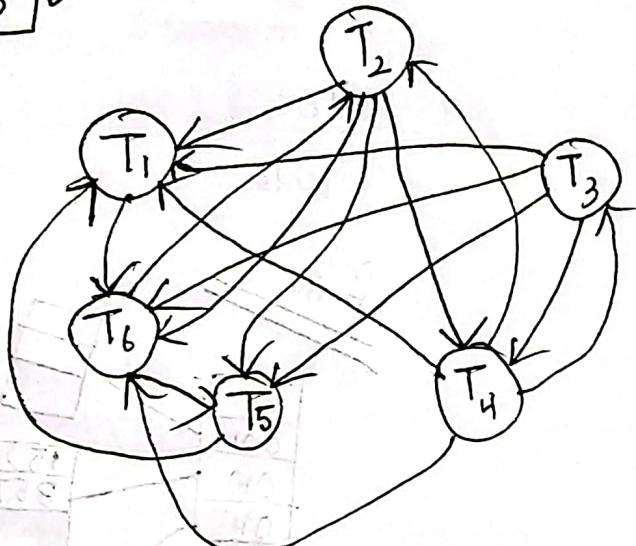




[Summer 23]

2.6 P

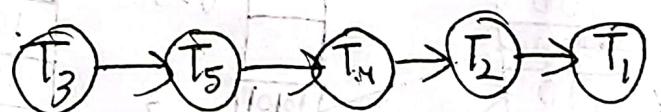
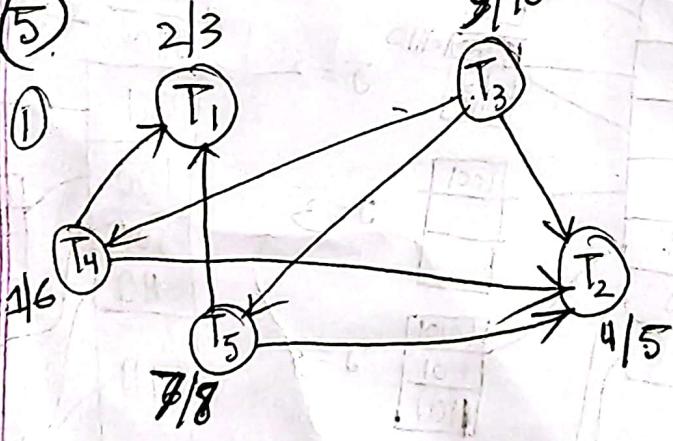
(I)



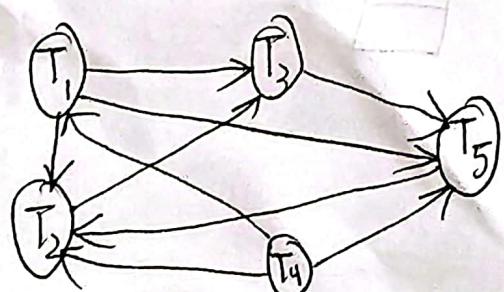
II) The graph have loop so it is not serializable

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(5)

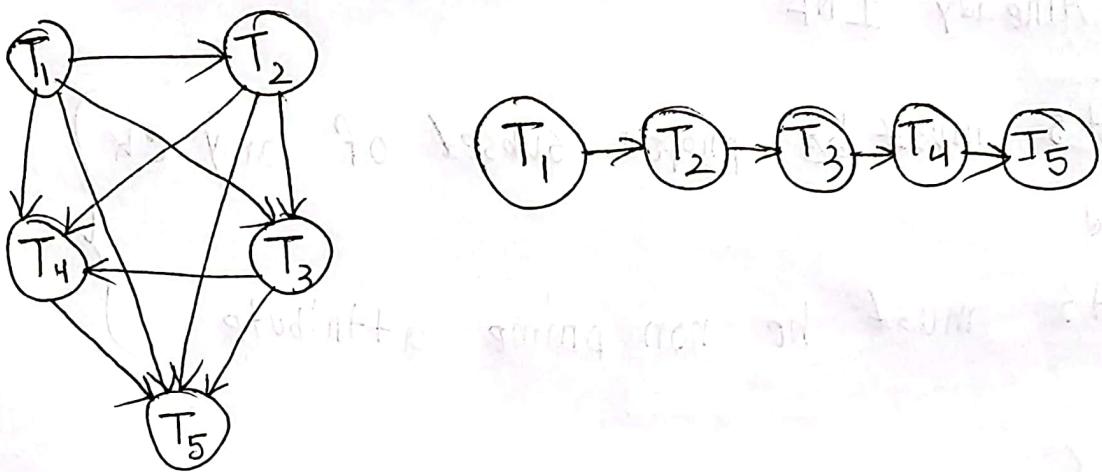


(II)



here is a loop the loop is

$$T_3 \rightarrow T_5 \rightarrow T_2 \rightarrow T_3$$



Summen 23

1) a) i) ID \rightarrow Name, rating, Number of book published

ii) ID, Rating \rightarrow Name

iii) ID, Rating \rightarrow Number of Book published

iv) ID, name \rightarrow Rating

$$b) R = \{A, B, C, D, E, I\}$$

$$FD = \{A \Rightarrow C, AB \Rightarrow C, C \Rightarrow DI, CD \Rightarrow I, EC \Rightarrow AB, FI \Rightarrow C\}$$

$$A^+ = ACDI \quad [\text{Not ck}]$$

$$E = CDIABE$$

$$B^+ = \{\emptyset\}$$

$$EA^+ = EACDIAB \quad [\text{ck}]$$

$$EB^+ = EB \quad [\text{Not ck}]$$

$$EC^+ = ECDIAB \quad [\text{ck}]$$

$$ED^+ = ED \quad [\text{Not ok}]$$

$$EI^+ = EICDIAB \quad [\text{ck}]$$

II) Already 1NF

L.H.S must be proper subset of any CK }
and }
R.H.S must be non prime attribute }

$$FD \left\{ \begin{array}{l} A \rightarrow C, AB \rightarrow C, C \rightarrow DI, CD \rightarrow I, EC \rightarrow AB, EI \rightarrow C \\ F \quad F \quad F \quad F \quad F \quad F \end{array} \right.$$

$$FD \quad FD \quad FD \quad FD \quad FD \quad FD$$

So this is 2 NF.

check 3 NF \Rightarrow

L.H.S must be a ck on R.H.S prime attribute

$$FD \Rightarrow \left\{ \begin{array}{l} A \rightarrow C, AB \rightarrow C, C \rightarrow DI, CD \rightarrow I, EC \rightarrow AB, EI \rightarrow C \\ F \quad T \quad F \quad T \quad F \quad F \end{array} \right.$$

Not in 3 NF

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1 a) $R\{A, B, C, D\}$

$$FD = \{BC \rightarrow A, AD \rightarrow B, CD \rightarrow B, AC \rightarrow D\}$$

$$CA^+ = CADB$$

$$CB^+ = CBAD$$

$$CD^+ = CDBA$$

ck {CA, CB, CD}

b) $A \rightarrow B$ Not satisfied

$A \rightarrow CD$ satisfied

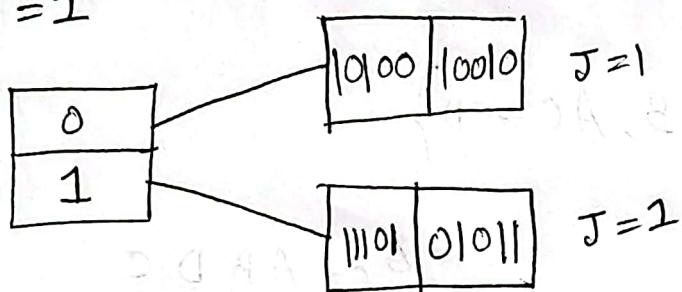
$BD \rightarrow AC$ satisfied

$AD \rightarrow BC$ Not satisfied

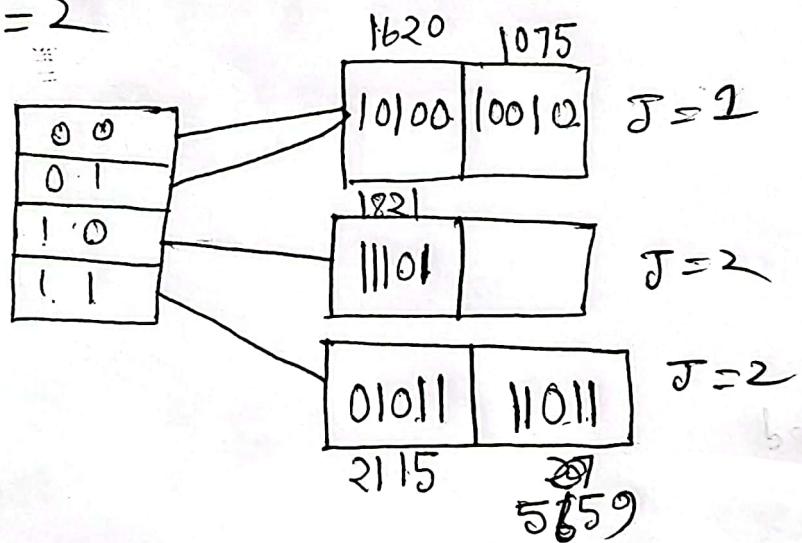
Spring 22

2(b)

$i=1$



$i=2$



3] q] when $n = 6$

minimum keys = 1

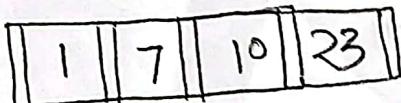
n pointer = 2

internal n keys = 2 $(n/2) - 1$

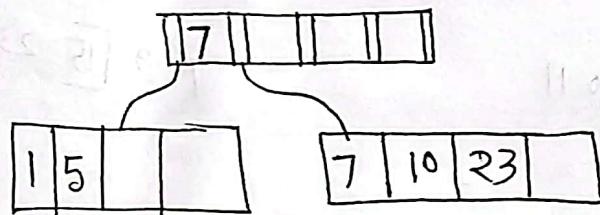
n pointer = 3 $(n/2)$

$$\text{b) } n=5 \quad \text{key} = 11-1 \\ = 5-1 \\ = 4$$

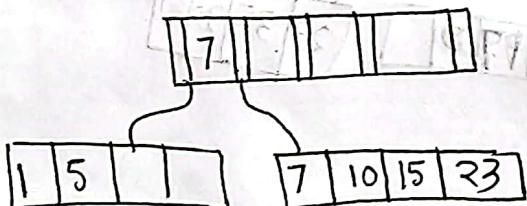
insert 7, 10, 1, 23



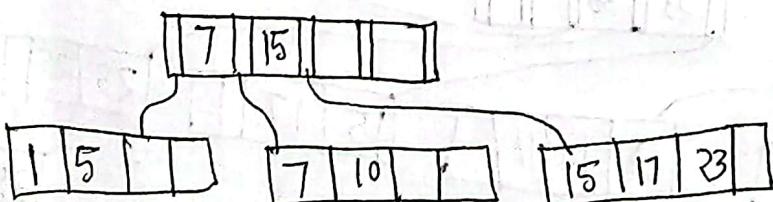
insert 5 : overflow 1 5 [] 10 23



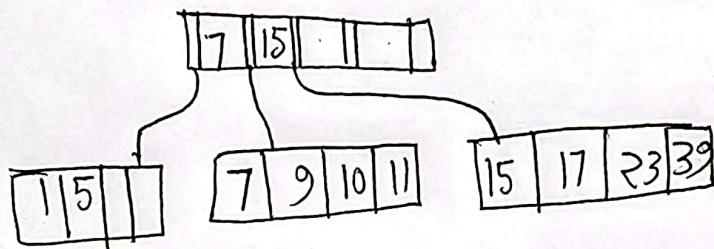
insert 15 :-



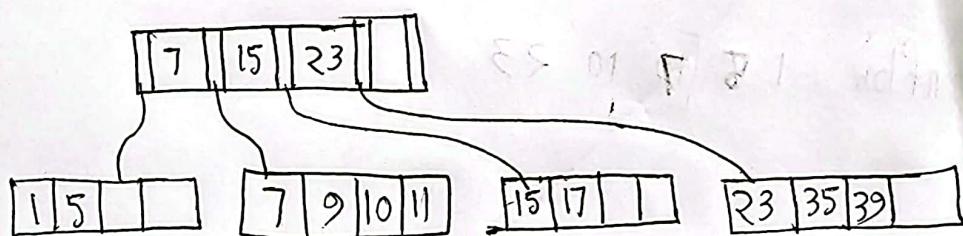
insert 17 : overflow 7 10 15 17 23



Insert ~~9~~ 9, 11, 39 :-

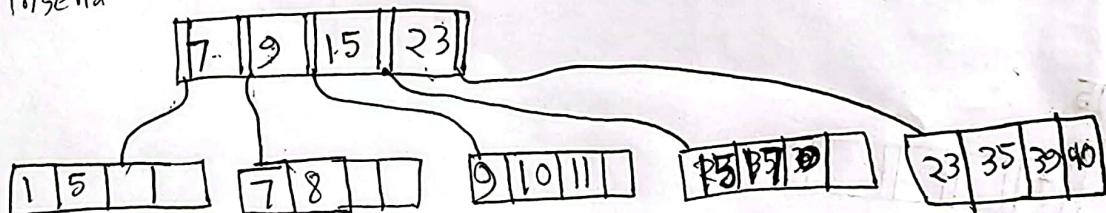


Insert 39 :- overflow (15 17 23 35 39)



insert 8 :- overflow (7 8 [9 10 11]

insert 90 :-



insert 25 :- 23 25 [35 39 40

