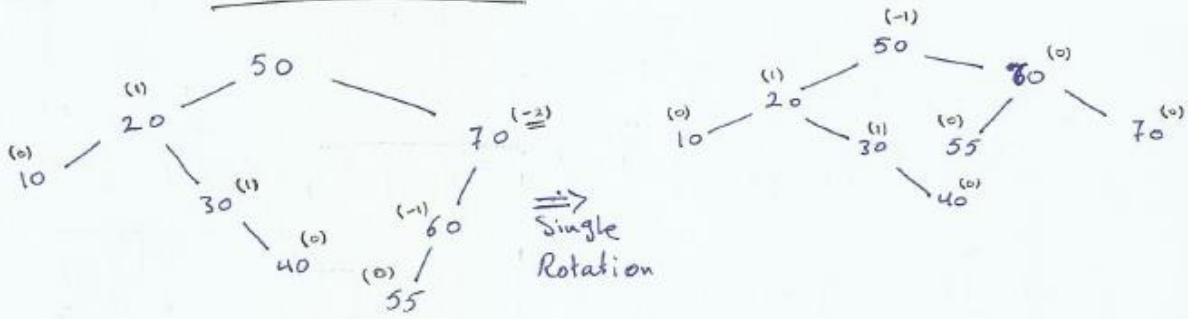
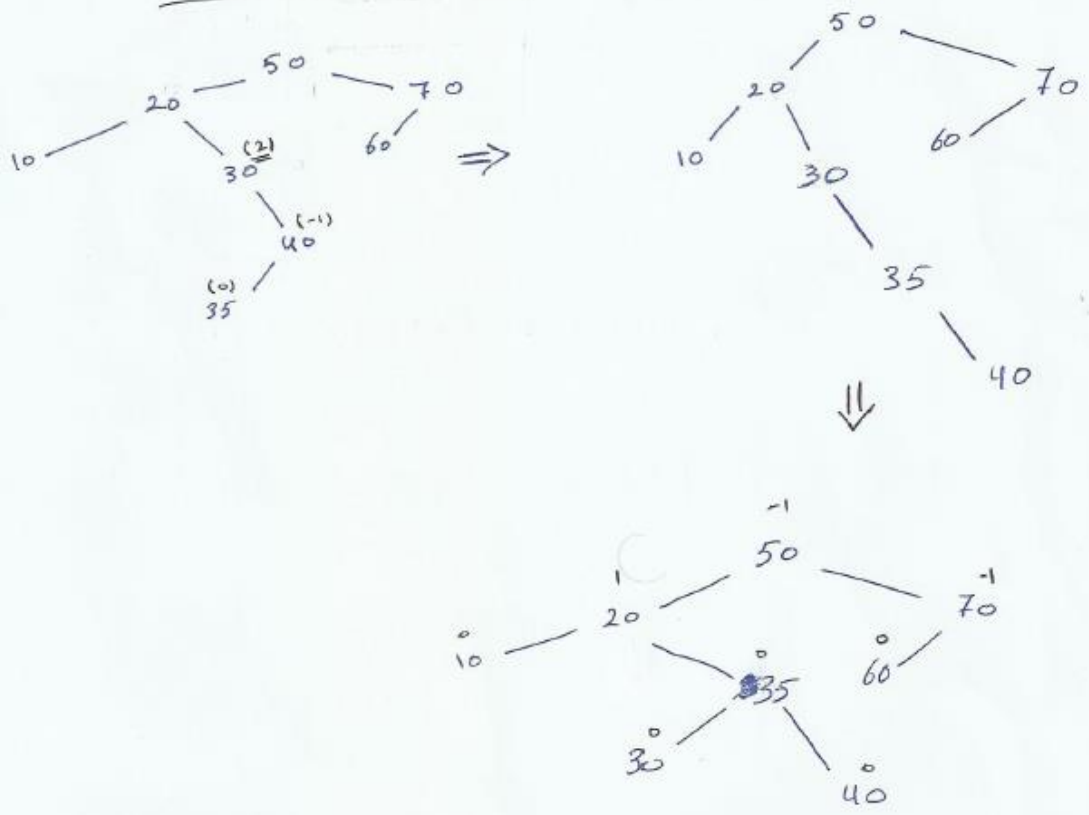
Problem 1:

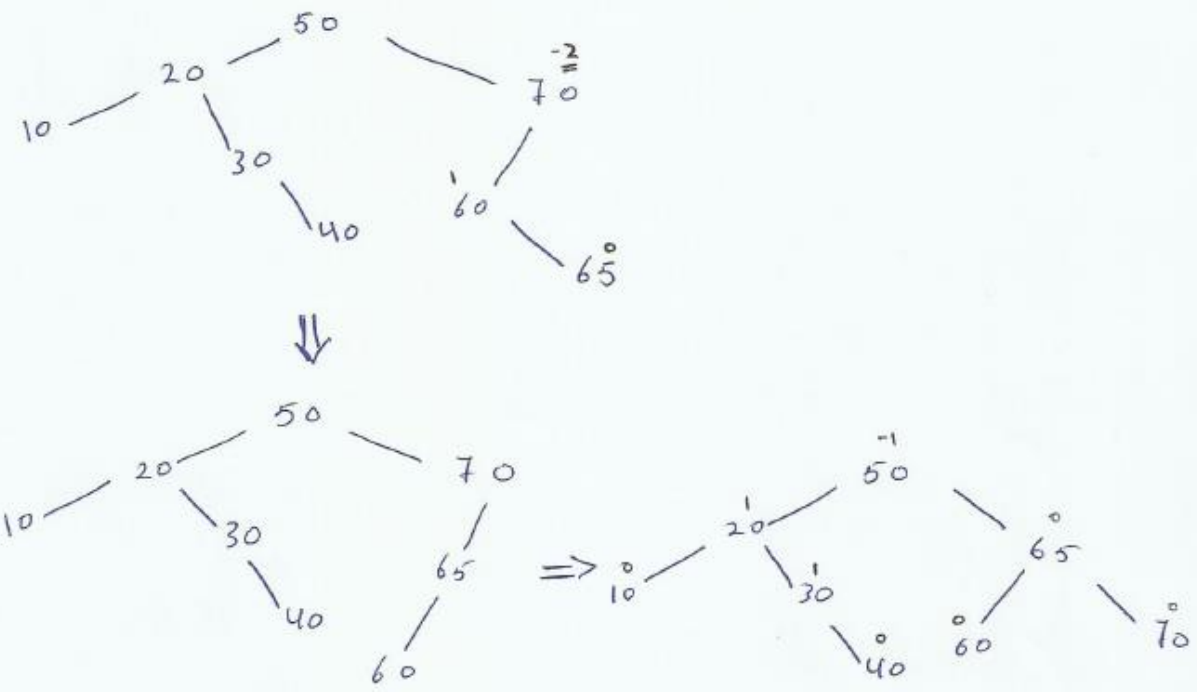
Insert 55 : Single Rotation



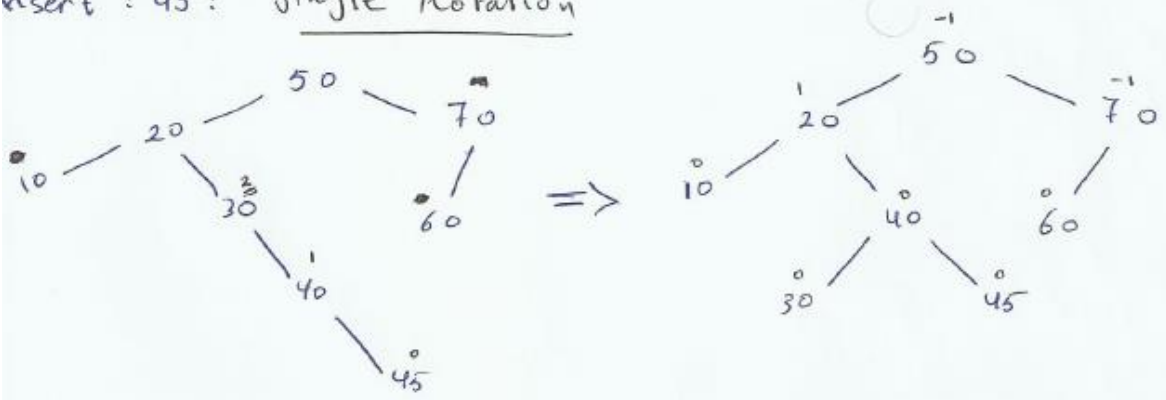
Insert 35 : Double Rotation



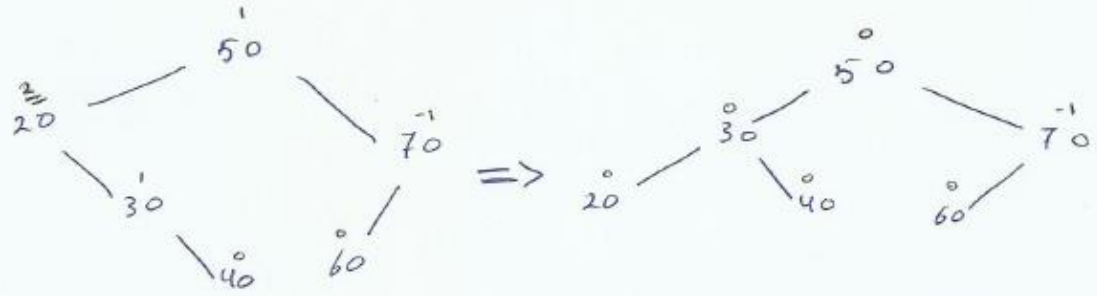
Insert 65 : Double rotation



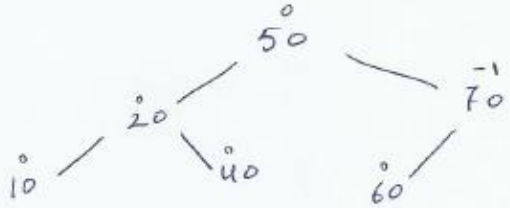
Insert : 45 : Single Rotation



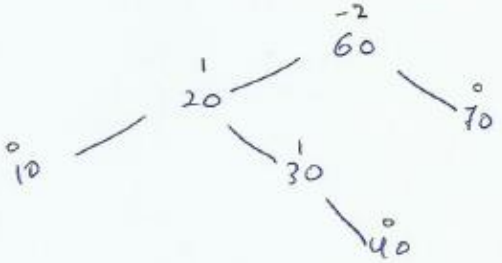
Delete 10 : Single Rotation

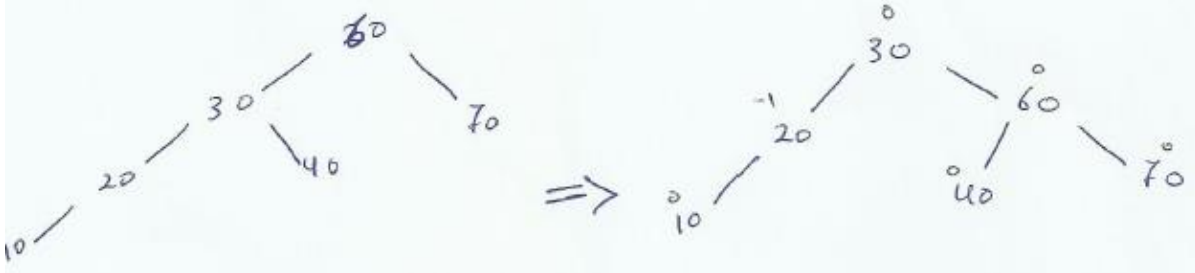


Delete 30: None



Delete 50 : Double Rotation



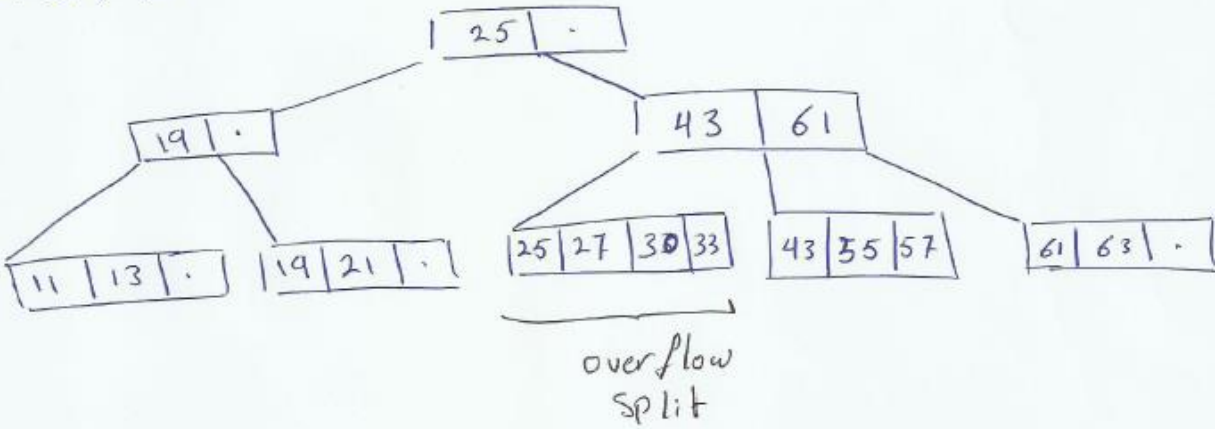


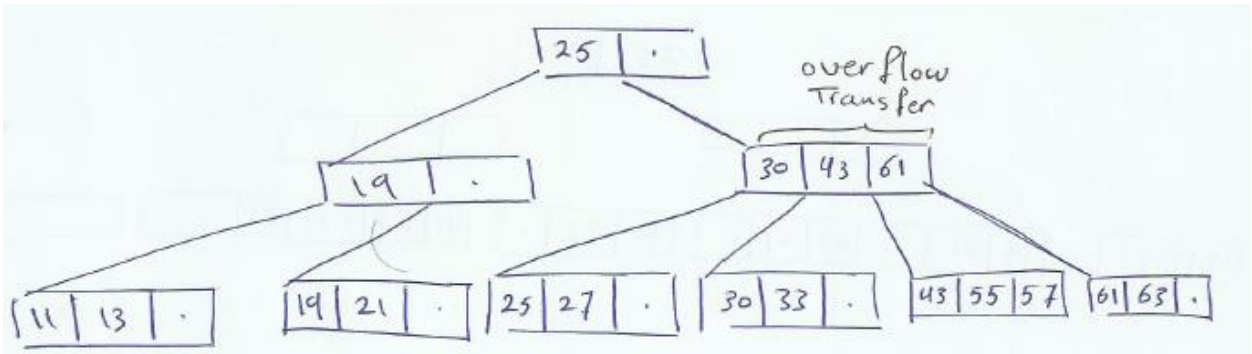
Problem 2:

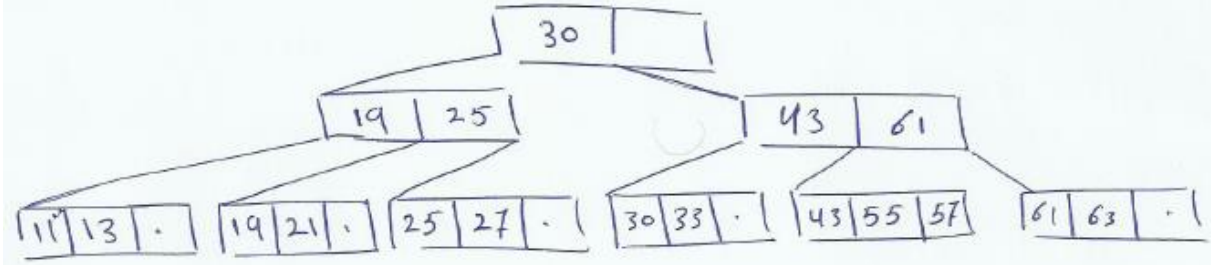
Case	Initial Balance	Rotation	Resulting Balance
a	$Bal_o(A) = -2$, $Bal_o(B) = -1$	R (A)	Bal (A) = 0, Bal (B) = 0
aa	$Bal_o(A) = -2$, $Bal_o(B) = 0$	R (A)	Bal (A) = -1, Bal (B) = 1
b	$Bal_o(A) = 2$, $Bal_o(B) = 1$	L (A)	Bal (A) = 0, Bal (B) = 0
c	$Bal_o(A) = -2$, $Bal_o(B) = 1$ $Bal_o(c) = -1$	L (B), R (A)	Bal (A) = 1, Bal (B) = 0 Bal (c) = 0
d	$Bal_o(A) = 2$, $Bal_o(B) = -1$ $Bal_o(c) = 0$	R (B), L (A)	Bal (A) = 0, Bal (B) = 0 Bal (c) = 0

Problem : 3 :

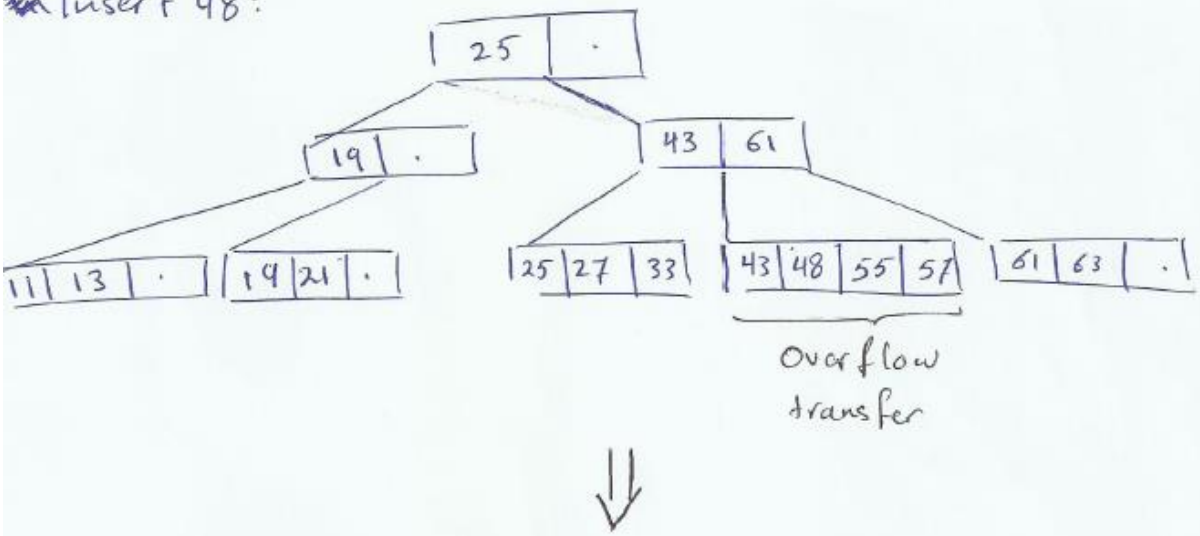
Insert 30 :

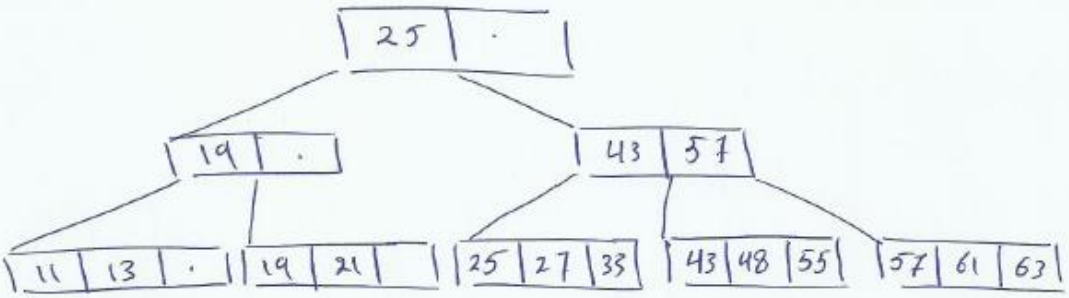



25 .
overflow
Transfer
19 .
30 43 61
11 13 .
19 21 .
25 27 .
30 33 .
43 55 57
61 63 .

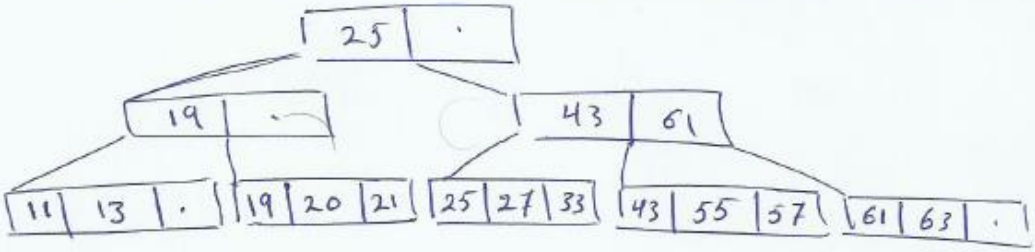

30
19 25
43 61
11 13 .
19 21 .
25 27 .
30 33 .
43 55 57
61 63 .

Insert 48:

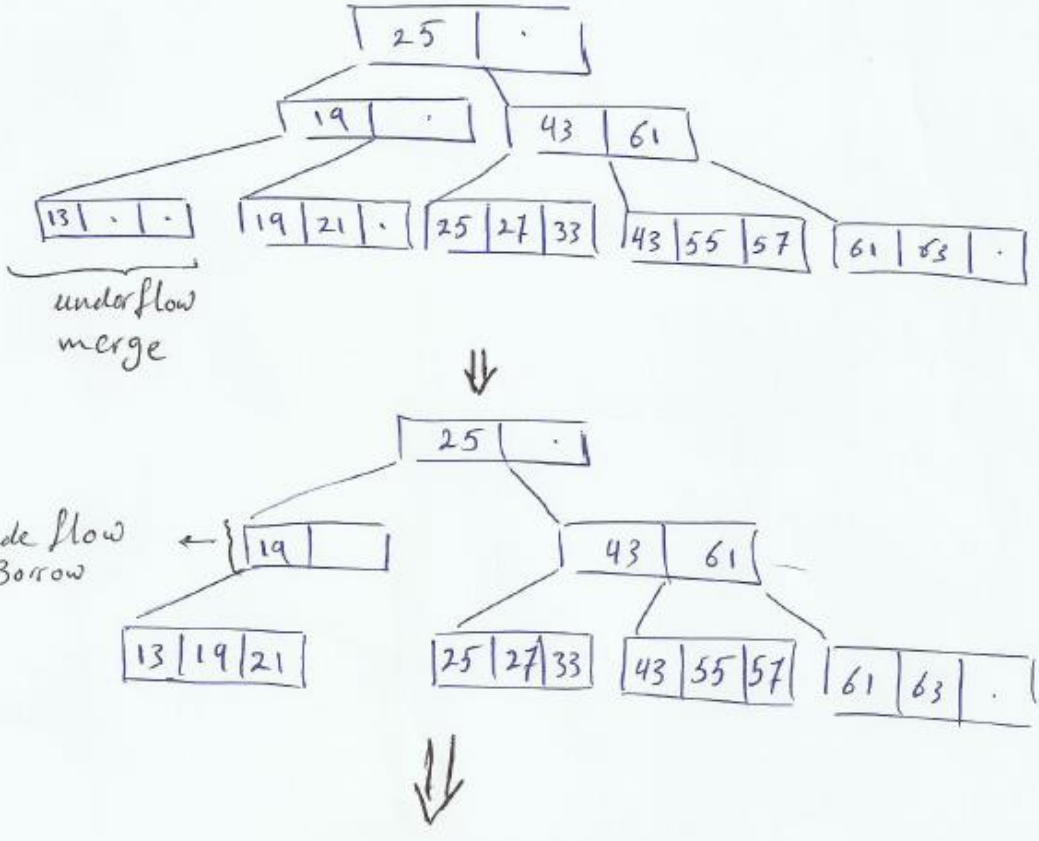

25 .
19 .
43 61
11 13 .
19 21 .
25 27 33
43 48 55 57
61 63 .
Overflow
transfer

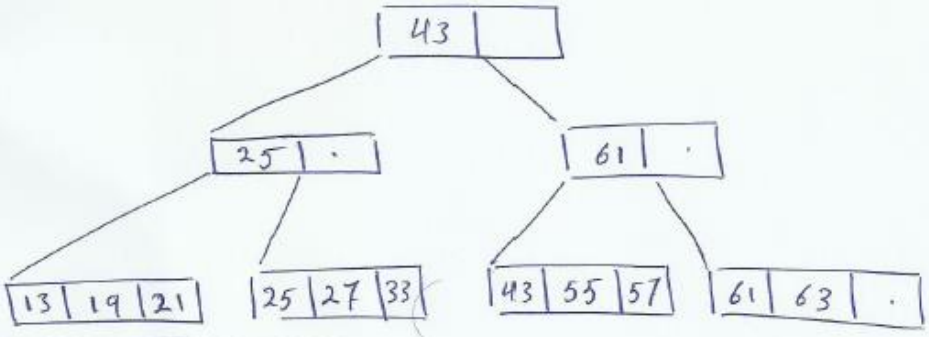


Insert: 20:

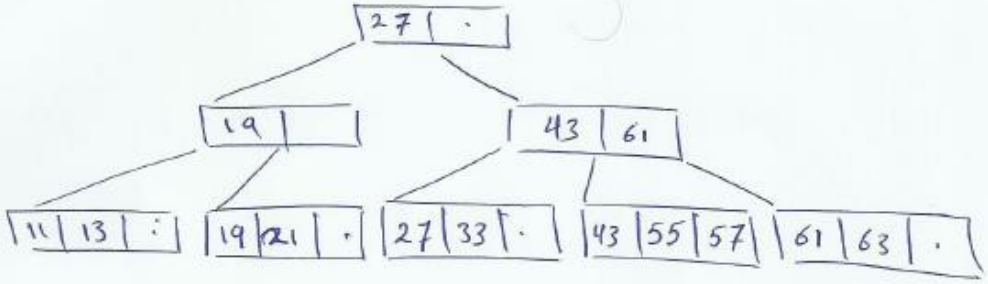


Delete: 11:

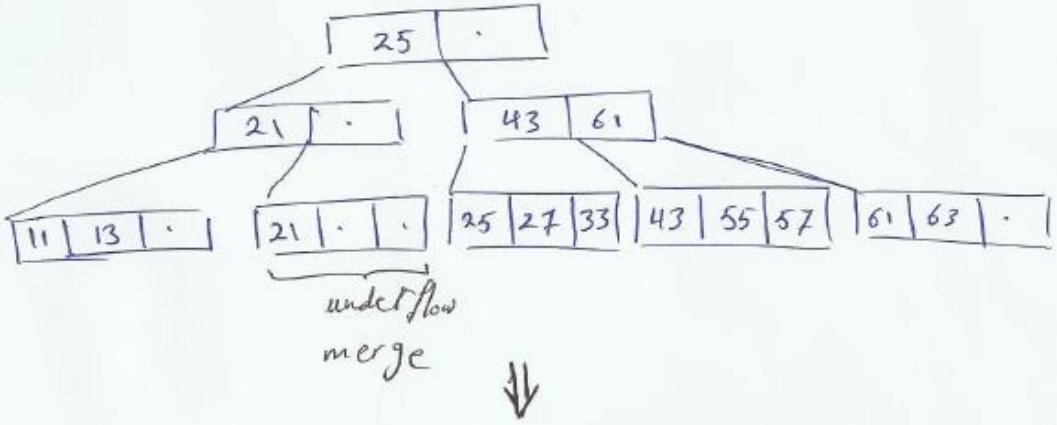


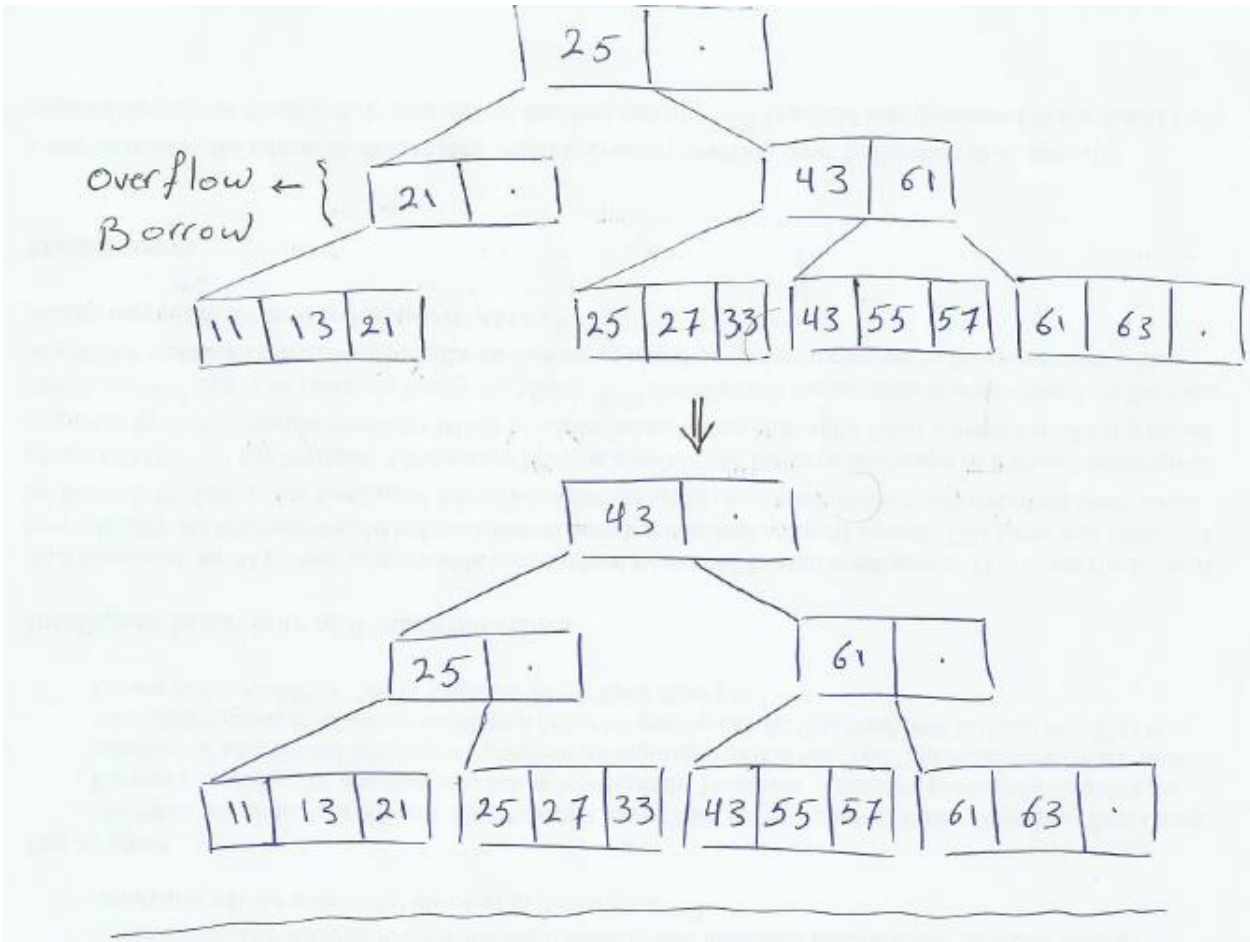


Delete : 25 :



Delete 19:





Problem 4:

(1)

		Probe
0	407	1
1	801	1
2	814	2
3	815	2
4	704	1
5	935	7
6	721	4

Insertion:

(407 % 100) % 7 = 7 % 7 = 0

(801 % 100) % 7 = 1 % 7 = 1

(815 % 100) % 7 = 15 % 7 = 1

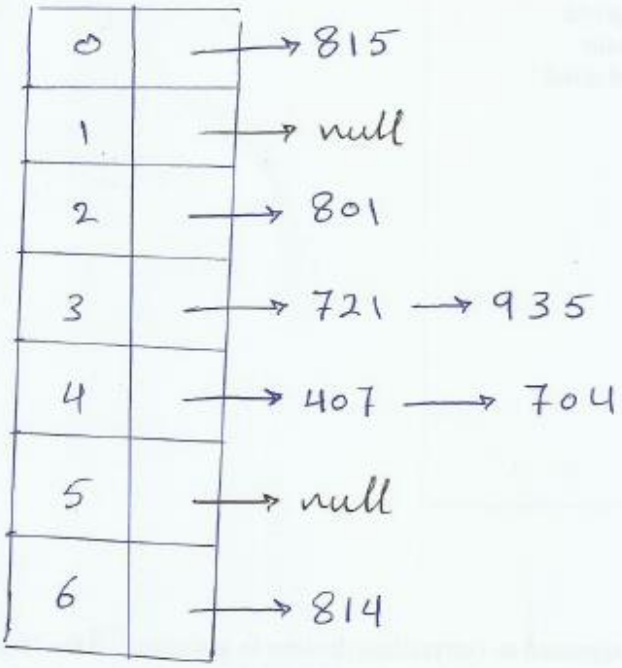
(704 % 100) % 7 = 4 % 7 = 4

(814 % 100) % 7 = 14 % 7 = 0

(721 % 100) % 7 = 21 % 7 = 0

(935 % 100) % 7 = 35 % 7 = 0

(2)



Insertion :

$(4+0+7) \% 7 = 11 \% 7 = 4$

$(8+0+1) \% 7 = 9 \% 7 = 2$

$(8+1+5) \% 7 = 14 \% 7 = 0$

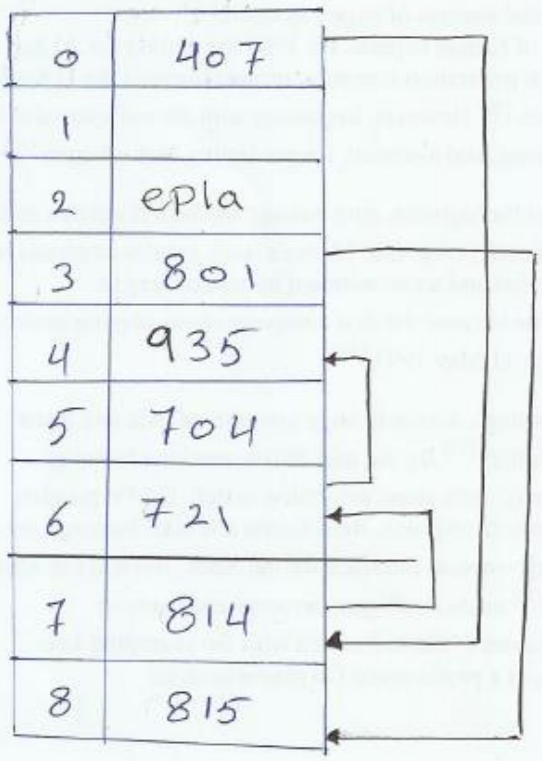
$(7+0+4) \% 7 = 11 \% 7 = 4$

$(8+1+4) \% 7 = 13 \% 7 = 6$

$(7+2+1) \% 7 = 10 \% 7 = 3$

$(9+3+5) \% 7 = 17 \% 7 = 3$

(3)



Insertion :

$(3(407\%100))\%7 = (3\times7)\%7 = 21\%7 = 0$

$(3(801\%100))\%7 = (3\times1)\%7 = 3\%7 = 3$

$(3(815\%100))\%7 = (3\times15)\%7 = 45\%7 = 3$

$(3(704\%100))\%7 = (3\times4)\%7 = 12\%7 = 5$

$(3(814\%100))\%7 = (3\times14)\%7 = 42\%7 = 0$

$(3(721\%100))\%7 = (3\times21)\%7 = 63\%7 = 0$

$(3(935\%100))\%7 = (3\times35)\%7 = 105\%7 = 0$

Problem 5:

		Probe
0	9	1
1	1	1
2	11	1
3	3	1
4	12	2
5	14	1
6	6	1
7	5	3
8	28	8

$\Rightarrow$ number of collision

$$= \sum_{i=0}^{8} (\text{Probe}_i - 1)$$

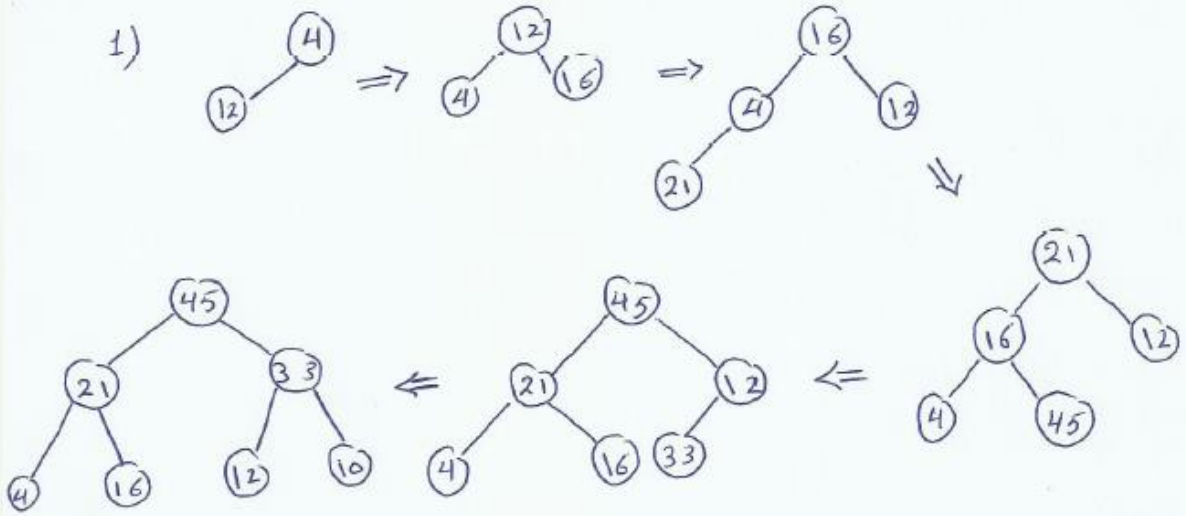
$$= (1-1) + (1-1) + (1-1) + (1-1) + (2-1) + (1-1) + (1-1) + (3-1) + (8-1)$$

$$= 1 + 2 + 7 = 10$$

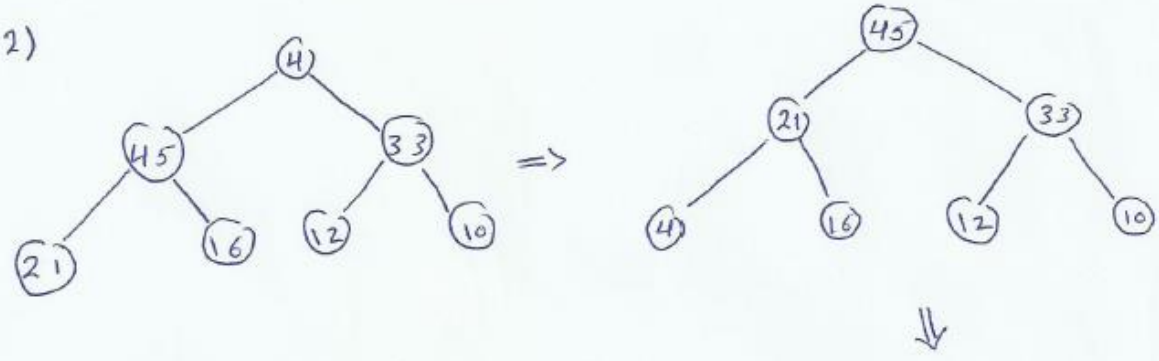
Homework 06
Solution

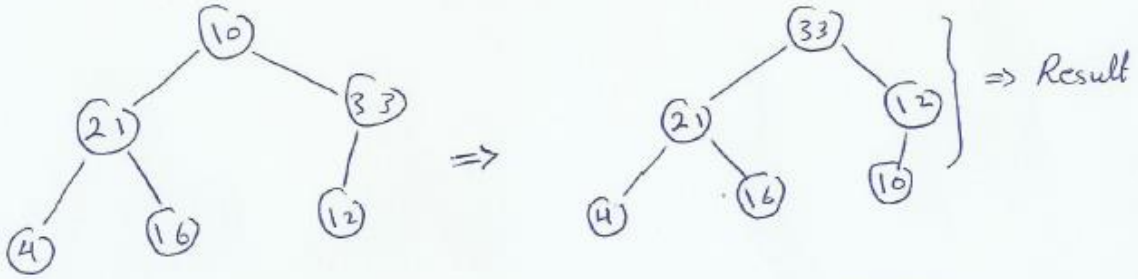
Problem 1:

1)



2)





3) (a) we will use min heap

(b)

0	1	2	3	4	5	6
-	12	20	15	23	28	18

(c) Delete:

0	1	2	3	4	5	6
-	18	20	15	23	28	-

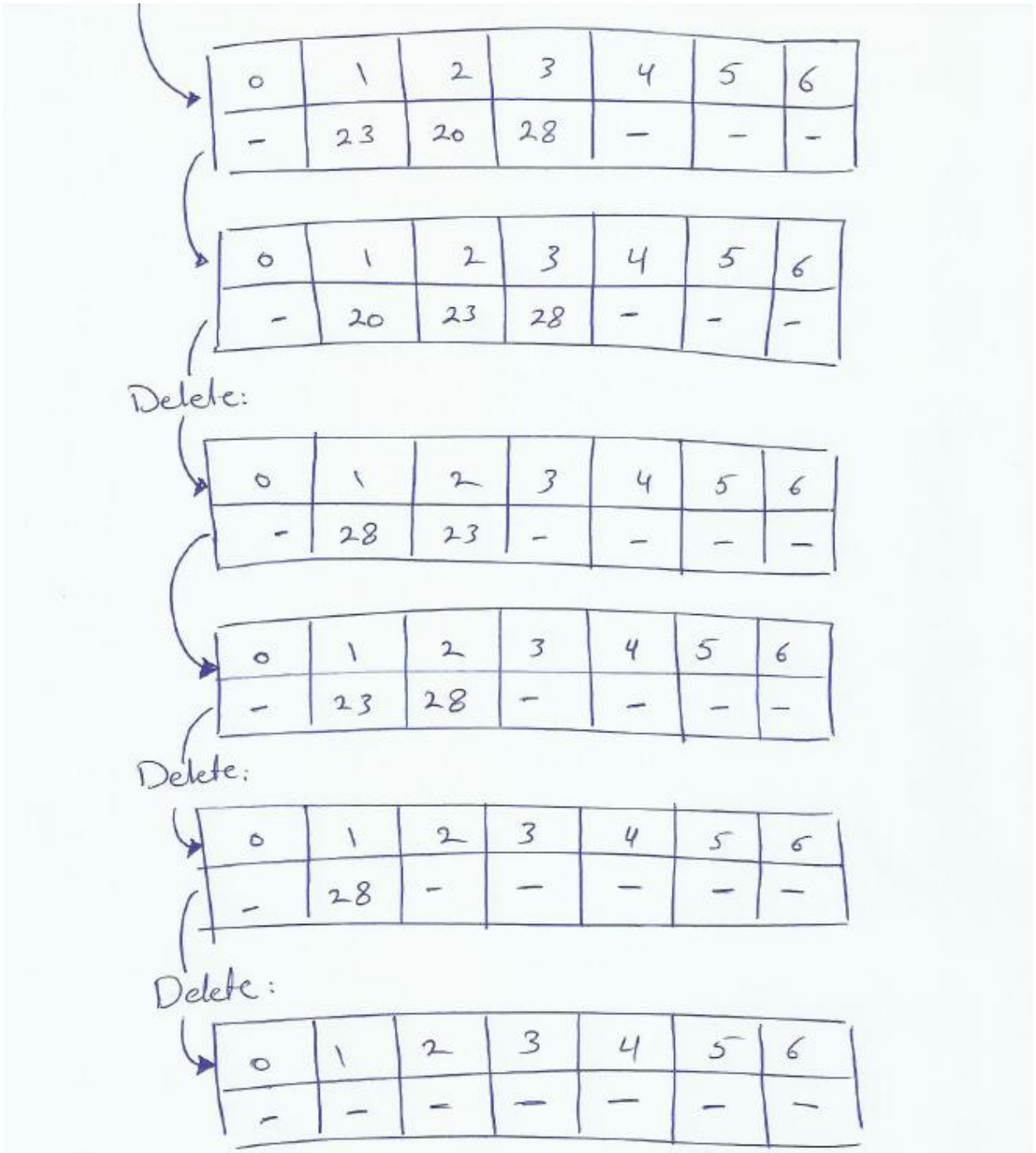
0	1	2	3	4	5	6
-	15	20	18	23	28	-

Delete:

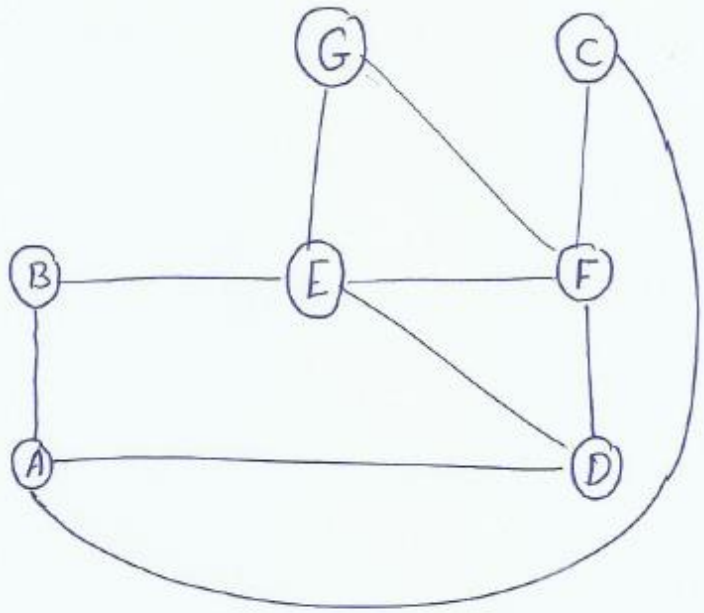
0	1	2	3	4	5	6
-	28	20	18	23	-	-

0	1	2	3	4	5	6
-	18	20	28	23	-	-

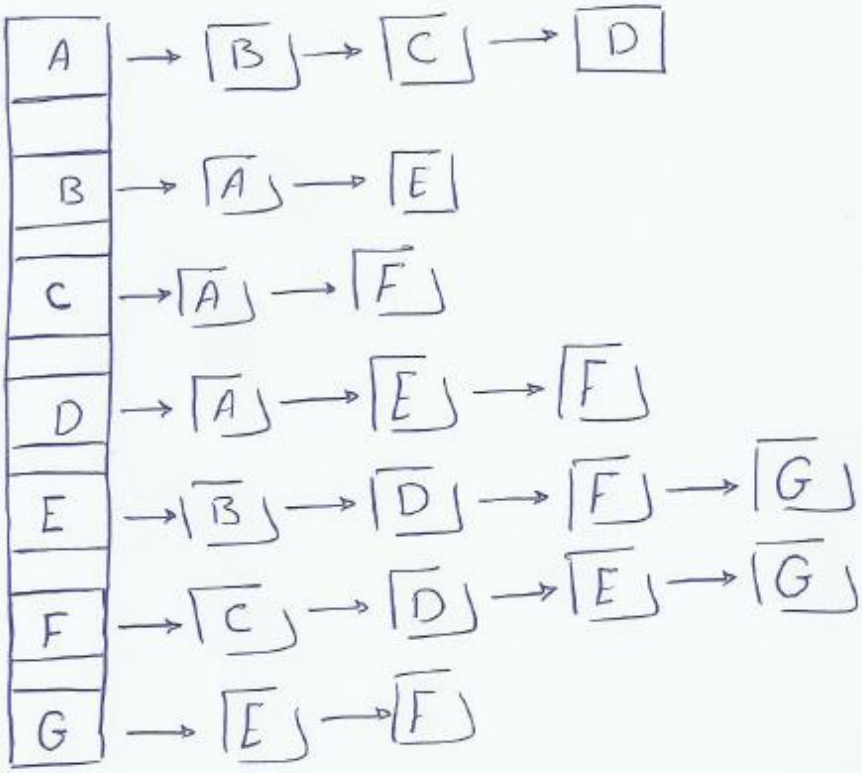
Delete:


0 1 2 3 4 5 6
- 23 20 28 - - -
0 1 2 3 4 5 6
- 20 23 28 - - -
Delete:
0 1 2 3 4 5 6
- 28 23 - - - -
0 1 2 3 4 5 6
- 23 28 - - - -
Delete:
0 1 2 3 4 5 6
- 28 - - - - -
Delete:
0 1 2 3 4 5 6
- - - - - - -

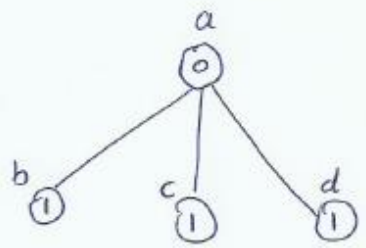
Problem 2:1:



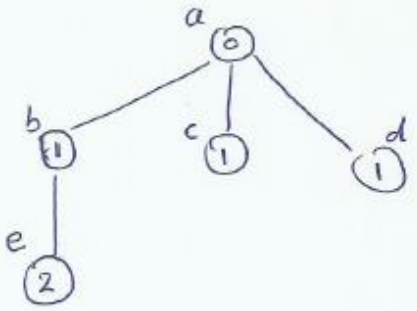
2:



3: BFS:



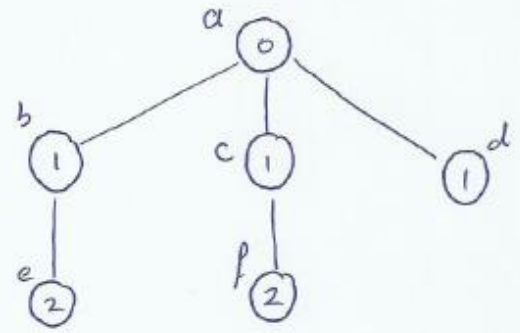
b



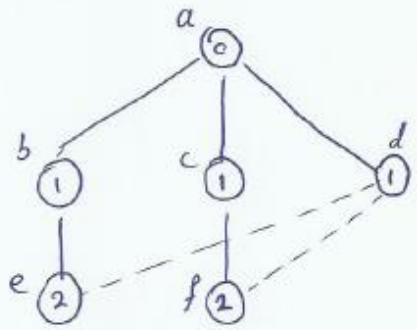
Q: b, c, d

Q: c, d, e

c



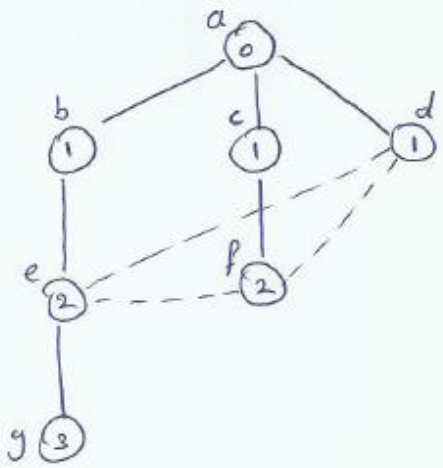
d



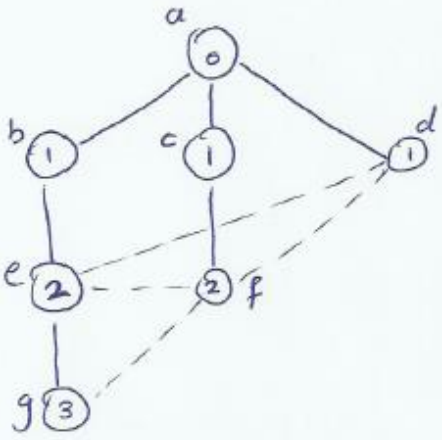
Q : e, f

Q : d, e, f

e



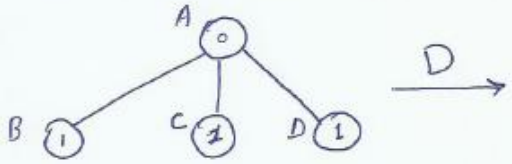
f, g



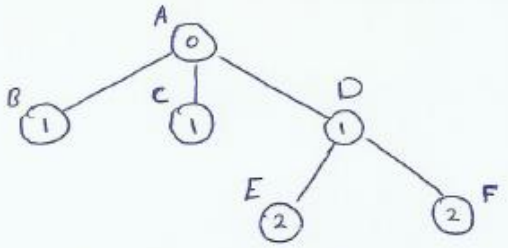
Q : f, g

Q :

DFS:



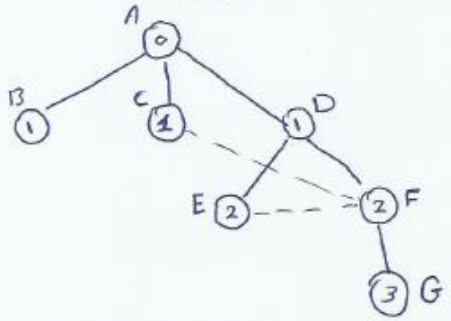
D



S: B, C, D

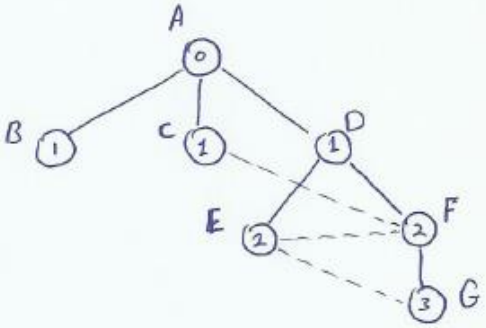
S: B, C, E, F

F



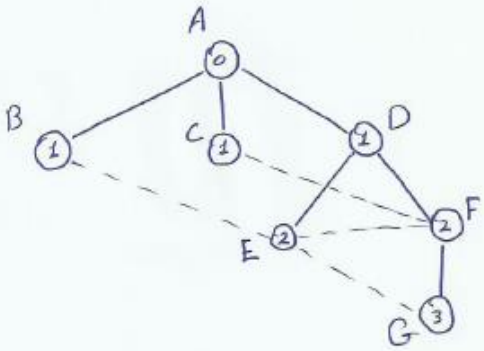
G

S: B, C, E, G

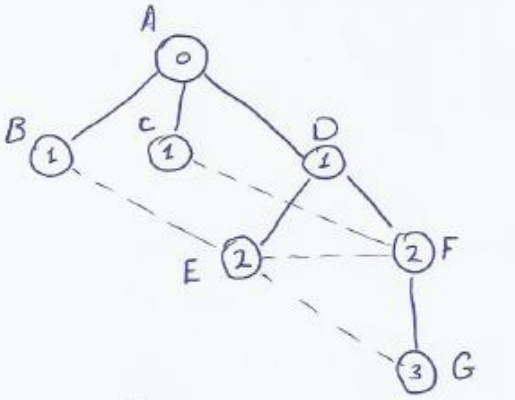


S: B, C, E

E



B, C



S: B, C

S: