

1.1.1 →

a) $\frac{1024}{100} \rightarrow 10 \text{ records / block.}$

b) $\frac{1}{10} \times 10000 \phi$
10,000 blocks

c) 25 blocks per surface block.

Double side $\rightarrow \frac{25 \times 3 \times 2}{250} \text{ blocks.}$

Total $\rightarrow 10000 \text{ blocks.}$

we need $\rightarrow \frac{10,000}{250}$

= 40 cylinders

= 10 surfaces to store the file.

d) 100 bytes \rightarrow 1 record.

$$\begin{aligned} &= 2000 \times 2 \times 25 \times 5 \\ &= 500,000 \text{ total blocks} \\ &= 500,000 \times 10 \\ &= 5,000,000 \text{ records.} \end{aligned}$$

e) 1 track \rightarrow 50 sectors \rightarrow 25 blocks
So, 25 pages on 1 track.

So, 26 would be on block 1
of track 1 on the next disk surface.

f.) 1st 10 pages on block 1 of
track 1 of all 10 surfaces.

- Block 2 on block 1 of track 1
on next surface.

Part 1.2 SOL: \rightarrow

1.2.1 \rightarrow

select sname
from Suppliers as S join Catalog as C
on S.sid = C.sid
join Parts as P
on C.pid = P.pid
where P.color = 'red'

$\pi_{sname}(\pi_{sid}((\pi_{pid}(\pi_{color} = 'red', Parts) \bowtie Catalog) \bowtie Suppliers))$

1-2-2 : →

select sid

from Catalog as C join Parts as P
on C.pid = P.pid

where color = 'red' or

color = 'green'.

$\pi_{sid}(\pi_{pid}(\pi_{color='red' \vee color='green'} Parts) \bowtie Catalog)$

1-2-3 : →

select sid

from Suppliers as S join Catalog as C
on S.sid = C.sid

join Parts as P

on C.pid = P.pid

where P.color = 'red' OR

S.address = "10 West 31st Ave"

$P(R1, \pi_{sid}((\pi_{pid} \sigma_{color='red'} Parts) \bowtie Catalog))$

$P(R2, \pi_{sid} \sigma_{address='10 West 31^{st} Ave'} Suppliers)$

R1 ∪ R2.

1-2.4 : →

(select C.sid
from Catalog as C join Parts as P
on C.sid = P.pid
where P.color = 'red')

INTERSECT

(select C1.sid
from Catalog as C1 join Parts as P1
on C1.sid = P1.sid
where P1.color = 'green')

$P(R1, \pi_{sid}((\pi_{pid \cap color='red'} Parts) \bowtie_{Catalog}))$

$P(R2, \pi_{sid}((\pi_{pid \cap color='green'} Parts) \bowtie_{Catalog}))$

$R1 \cap R2$

1-2.5 : →
select C1.sid, C2.sid
from Catalog C1, Catalog C2
where C1.pid = C2.pid
and C1.sid <> C2.sid
and C1.cost > C2.cost

$P(R1, Catalog)$

$P(R2, Catalog)$

$\pi_{R1.sid, R2.sid} (R1.pid = R2.pid \wedge R1.sid = R2.sid \wedge R1.cost > R2.cost ((R1 \times R2)))$

1-2-6 : →

select c.pid
from Catalog c
where exists (select cl.sid
from Catalog cl
where cl.pid = c.pid
and cl.sid <> c.sid)

~~people~~

1-2-7 : →

select c.pid
from Catalog as C join Suppliers as S
on c.sid = s.cid
where s.sname = 'Yosemite sham'
and c.cost > ALL (select c2.cost
from Catalog as C2 join Suppliers
as S2 on c2.sid = s2.cid
where s2.sname = 'Yosemite sham').

(Catalog, 12) 9
(Supplier, 8) 3

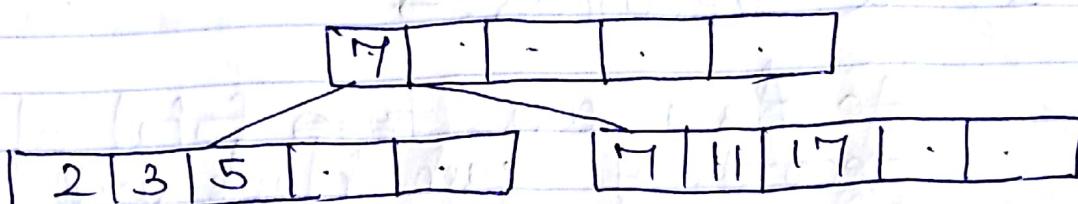
1 - 3 - 1 : →

a) $6 \rightarrow$ pointers so 5 keys: →

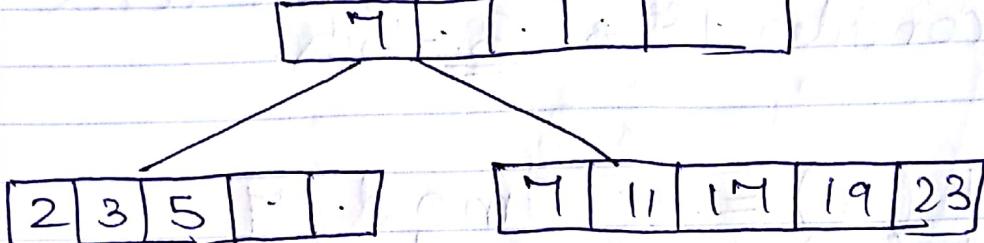
(i)



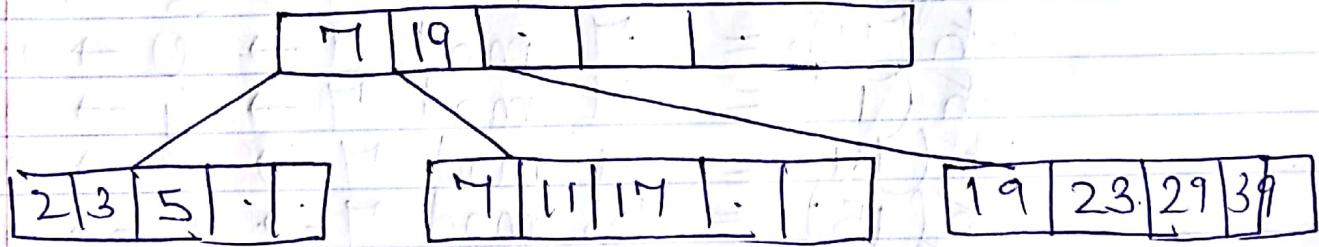
(ii)



(iii)

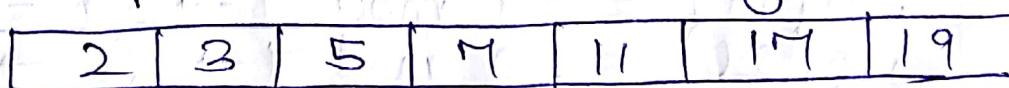


(iv)



b) $8 \rightarrow$ pointers so 7 keys: →

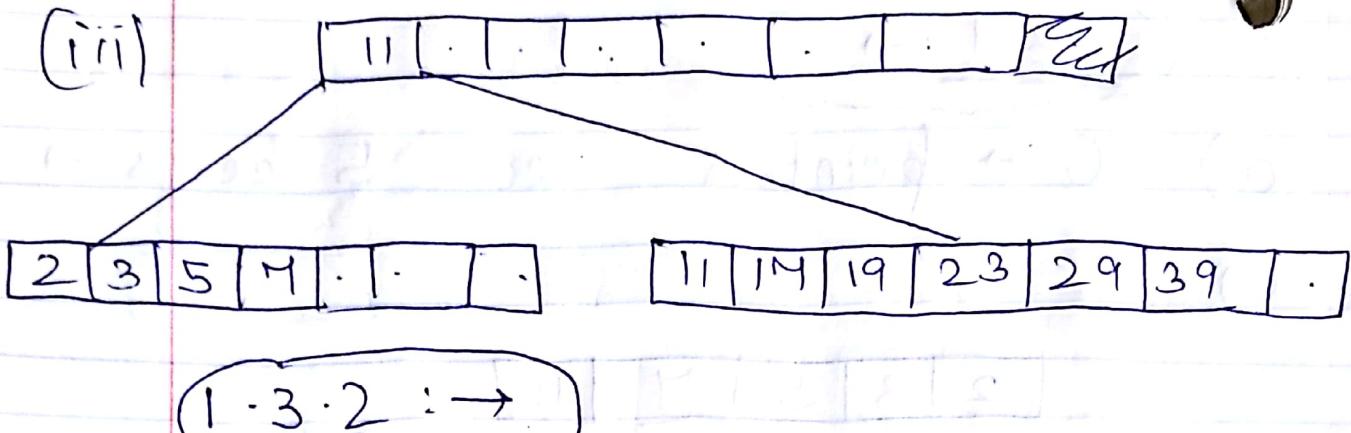
(i)



(ii)



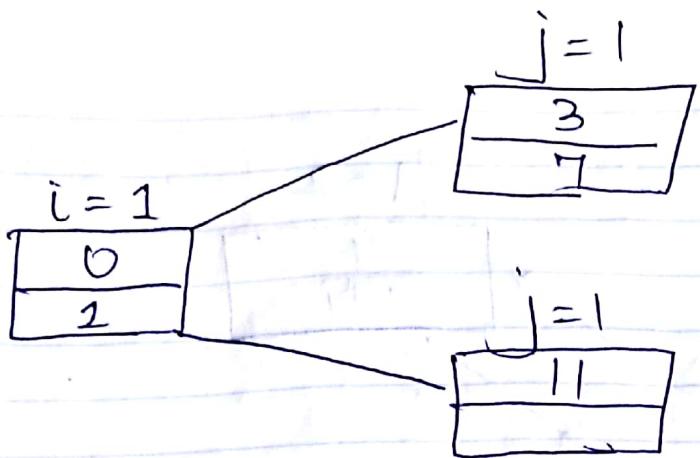
(iii)



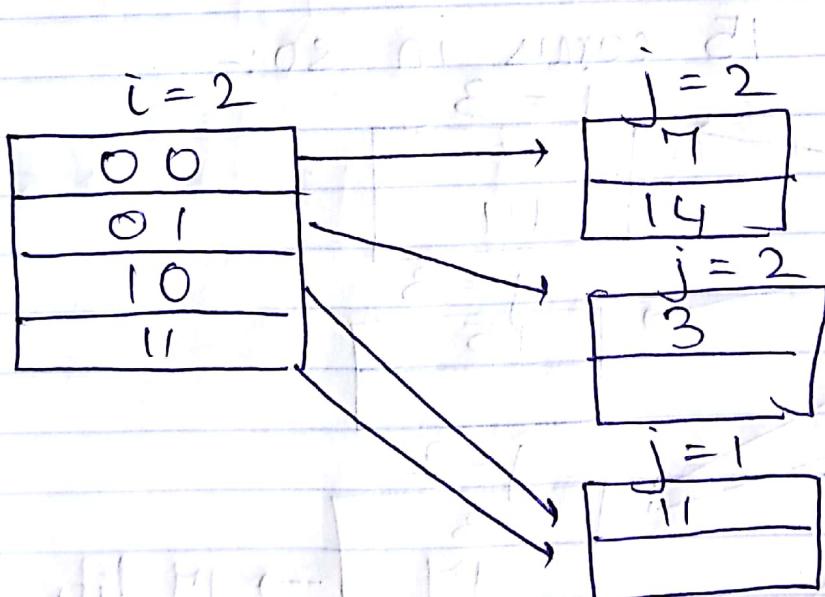
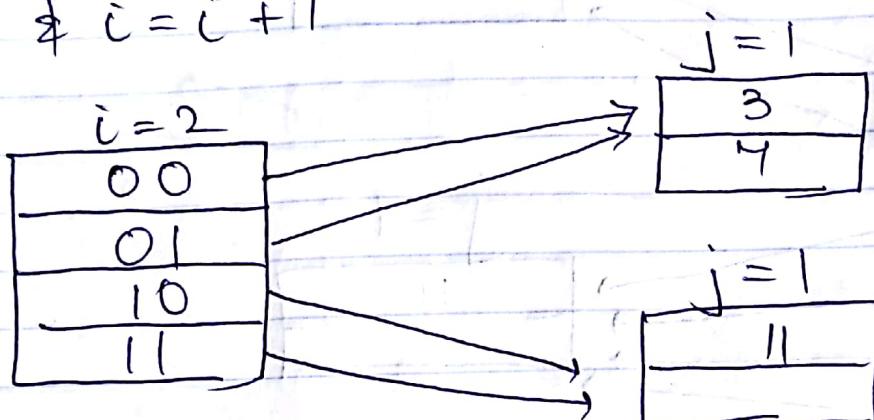
a) 2 records :→

As there are ~~total~~ total of 12 records & each block will have 2 records. & so, we will consider 1st 3 bits.

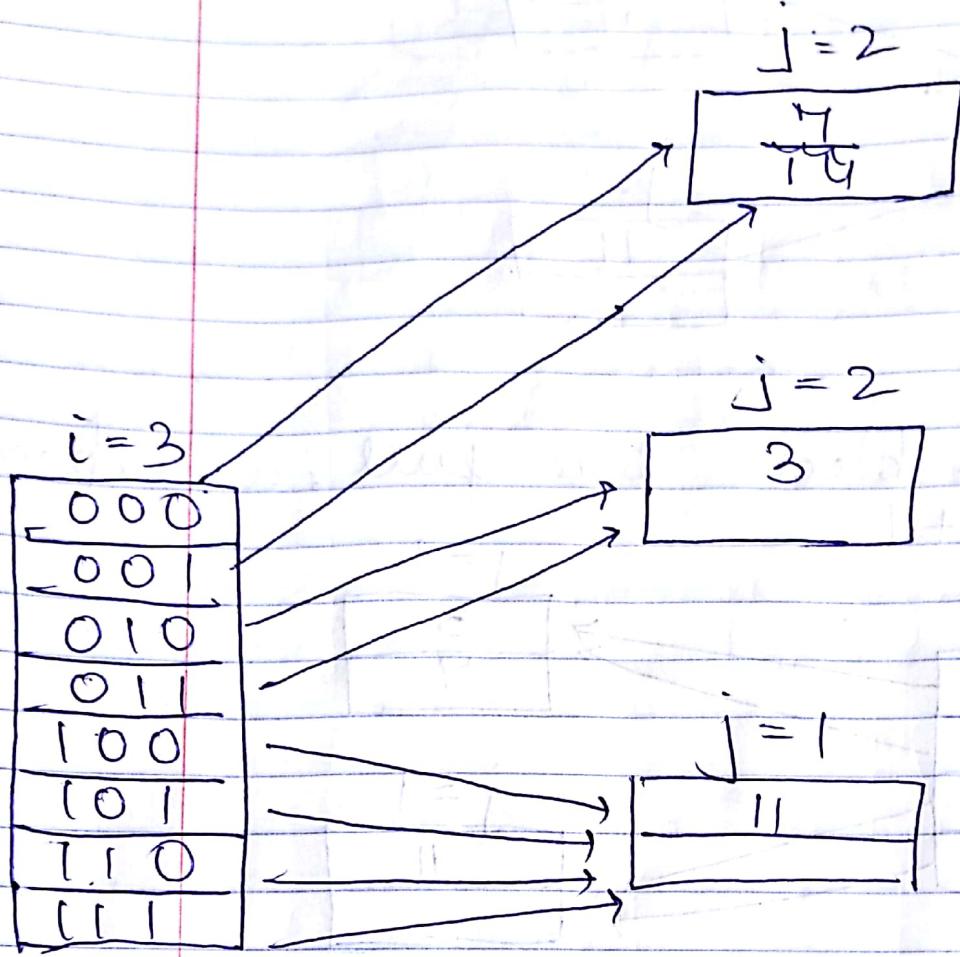
$$\begin{aligned} h(x) &= x \bmod 7 \\ h(3) &= 3 \bmod 7 \rightarrow 3 \rightarrow 0011 \checkmark \\ h(4) &= 4 \bmod 7 \rightarrow 0 \rightarrow 0000 \checkmark \\ h(11) &= 11 \bmod 7 \rightarrow 4 \rightarrow 0100 \checkmark \\ h(14) &= 14 \bmod 7 \rightarrow 0 \rightarrow 0000 \checkmark \\ h(15) &= 15 \bmod 7 \rightarrow 1 \rightarrow 001 \\ h(17) &= 17 \bmod 7 \rightarrow 2 \rightarrow 010 \checkmark \\ h(18) &= 18 \bmod 7 \rightarrow 4 \rightarrow 000 \checkmark \\ h(19) &= 19 \bmod 7 \rightarrow 5 \rightarrow 01001 \\ h(20) &= 20 \bmod 7 \rightarrow 6 \rightarrow 110 \\ h(33) &= 33 \bmod 7 \rightarrow 5 \rightarrow 101 \\ h(43) &= 43 \bmod 7 \rightarrow 1 \rightarrow 001 \\ h(44) &= 44 \bmod 7 \rightarrow 2 \rightarrow 0010 \checkmark \end{aligned}$$



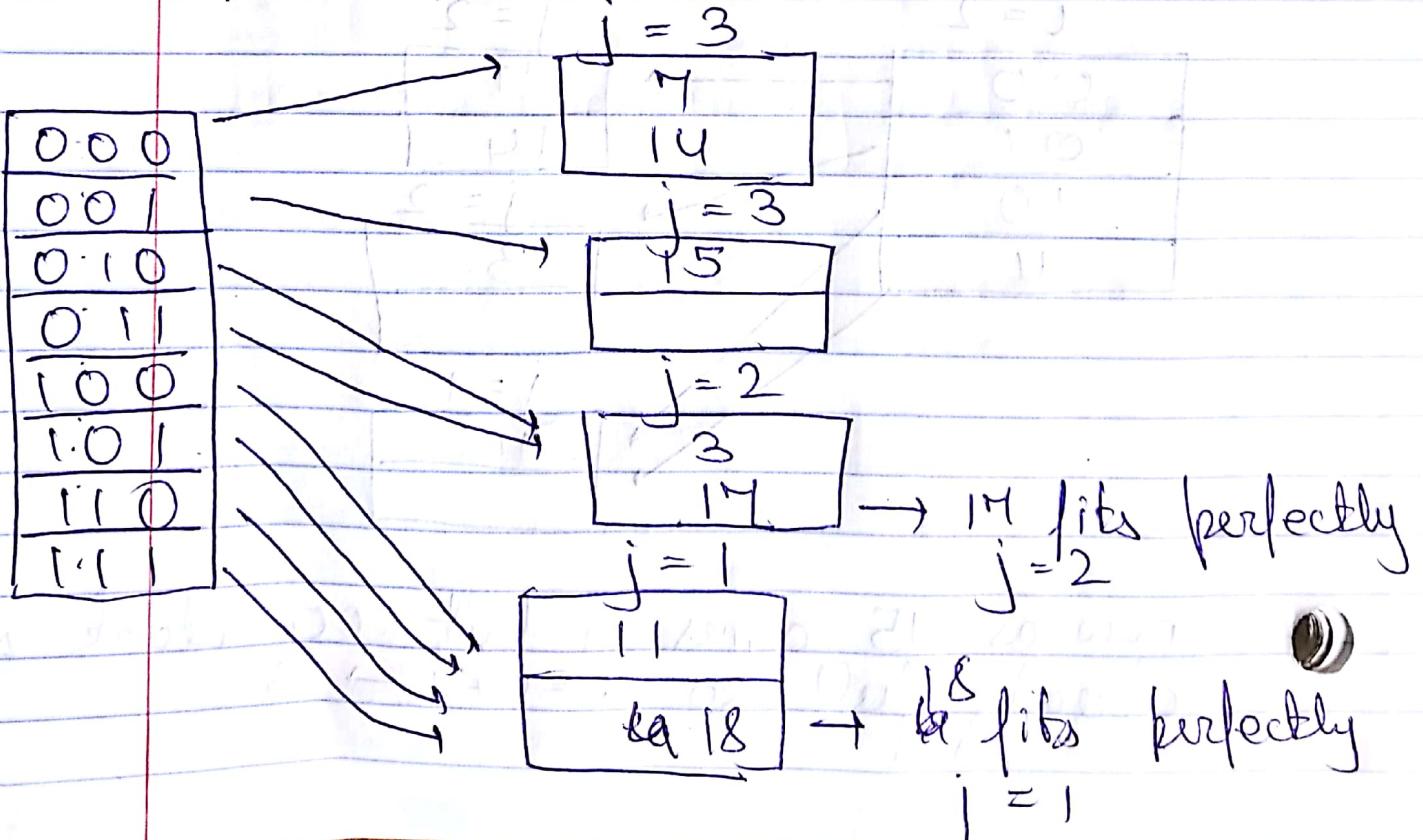
now as block 1 is full, we expand
 $\& i = i + 1$



now as 15 comes in but 00 block is
already full so $i = i + 1 \rightarrow 3$



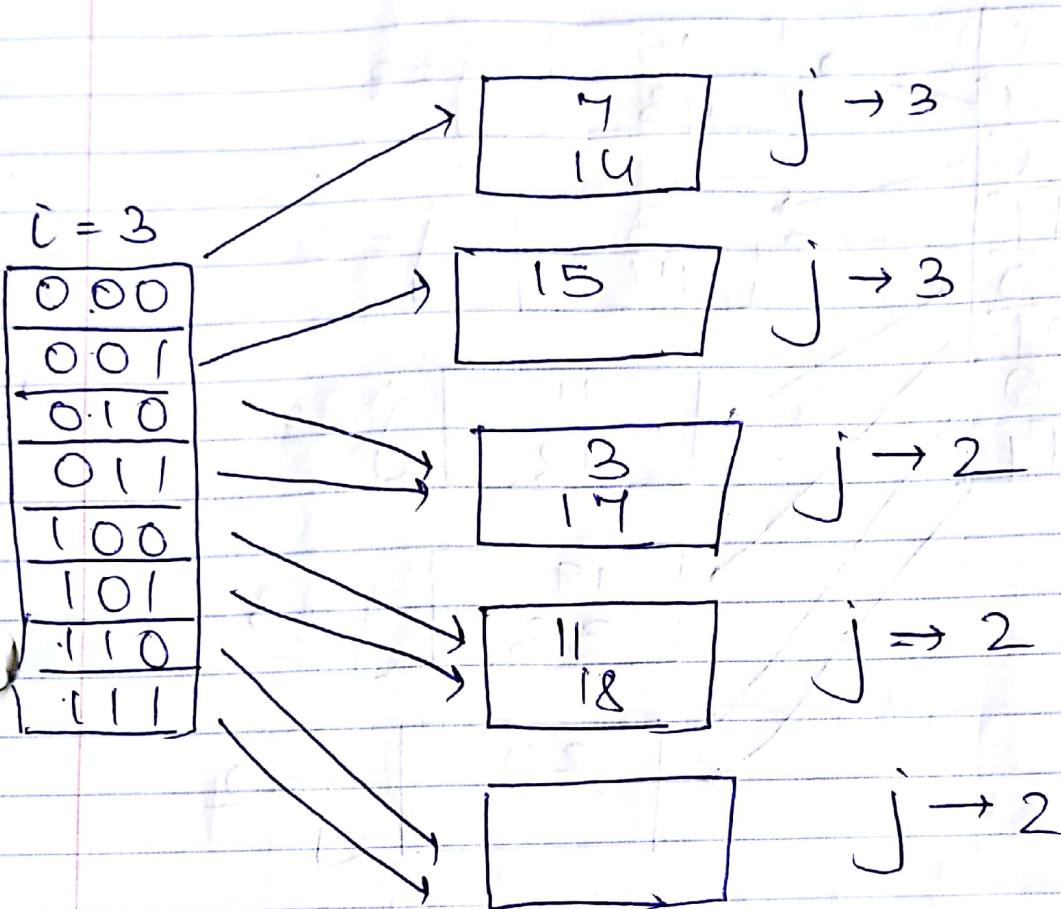
Now 15 comes in so:-



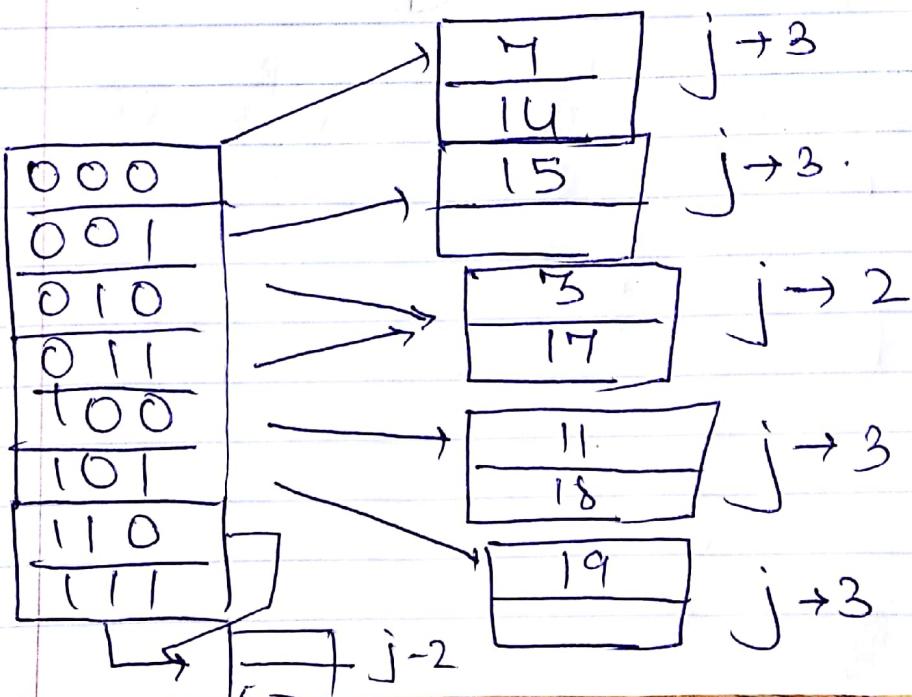
\rightarrow 14 fits perfectly

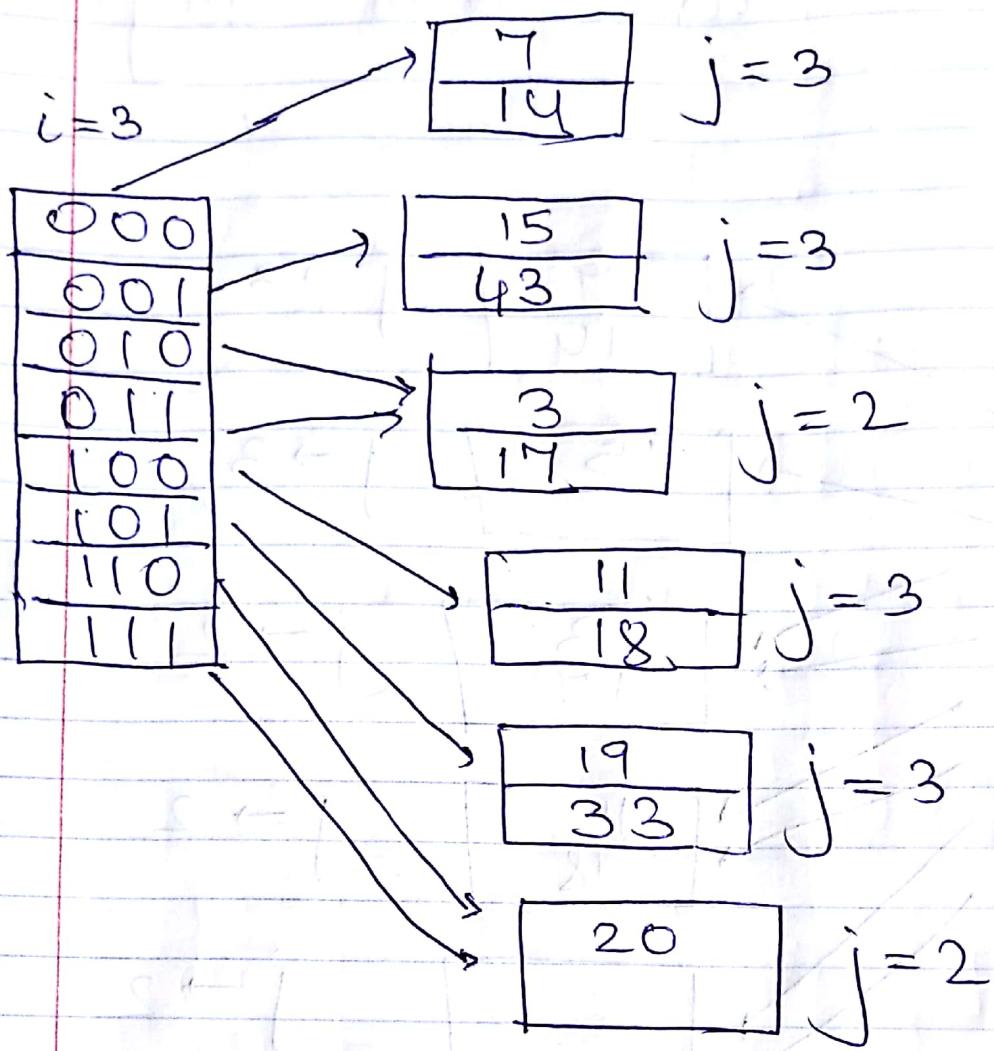
\rightarrow 18 fits perfectly

Now 19 comes in so $j = 1 + 1 \rightarrow 2$



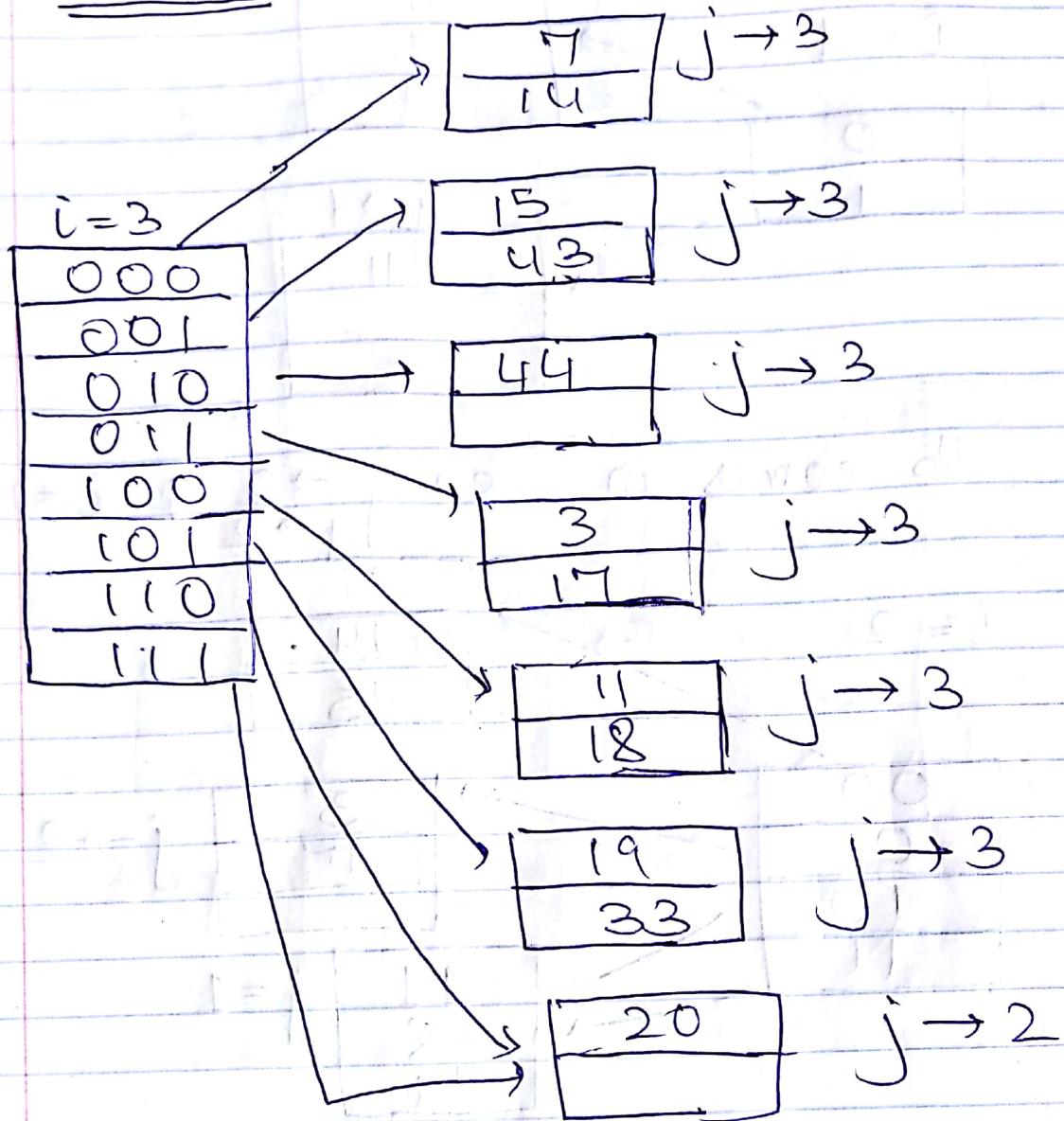
Still no place for 19 so $j = 2 + 1 \rightarrow 3$





Now 43 comes in $j = 2+1 \rightarrow 3$

Answer: →



record $\rightarrow 3 \rightarrow$

$i = 1$

0
18

$j \rightarrow 1$

3
14

$j \rightarrow 1$

15 comes in so $j \rightarrow 2 \neq i = 1 + 1$

$i = 2$

00
01
10
11

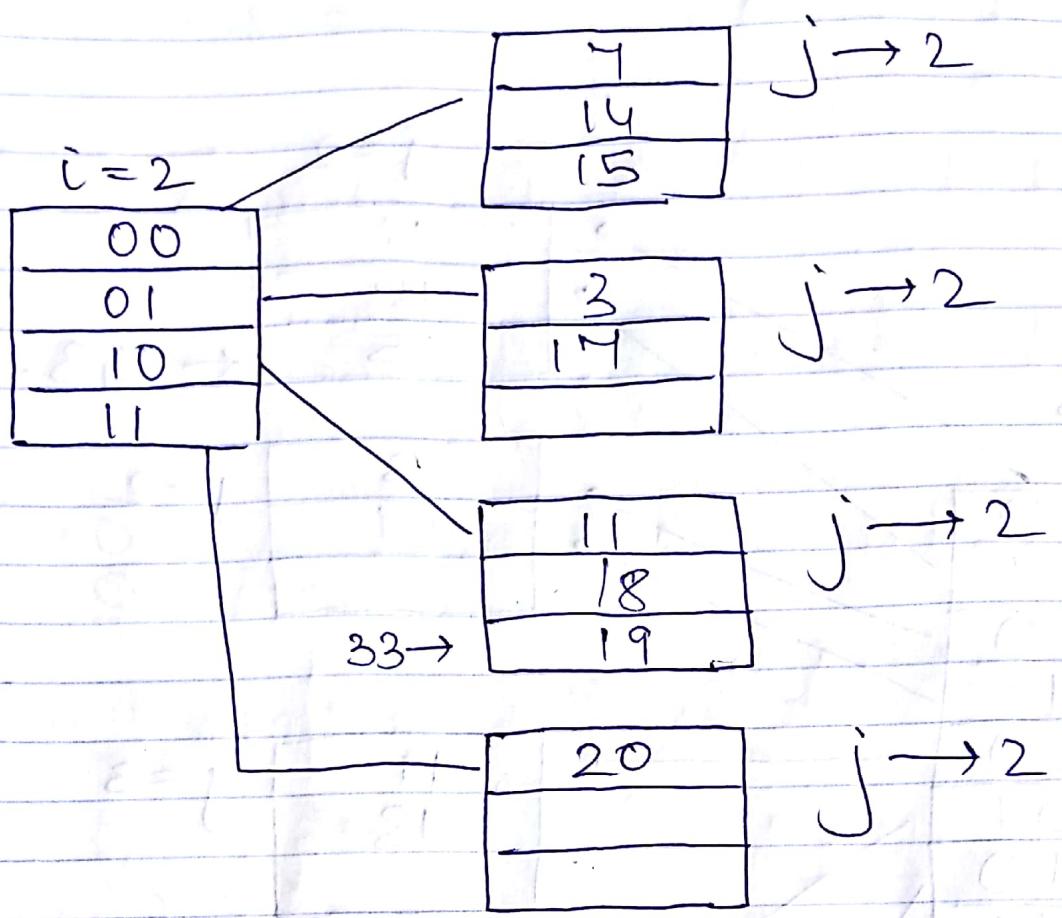
7
14
15

$j \rightarrow 2$

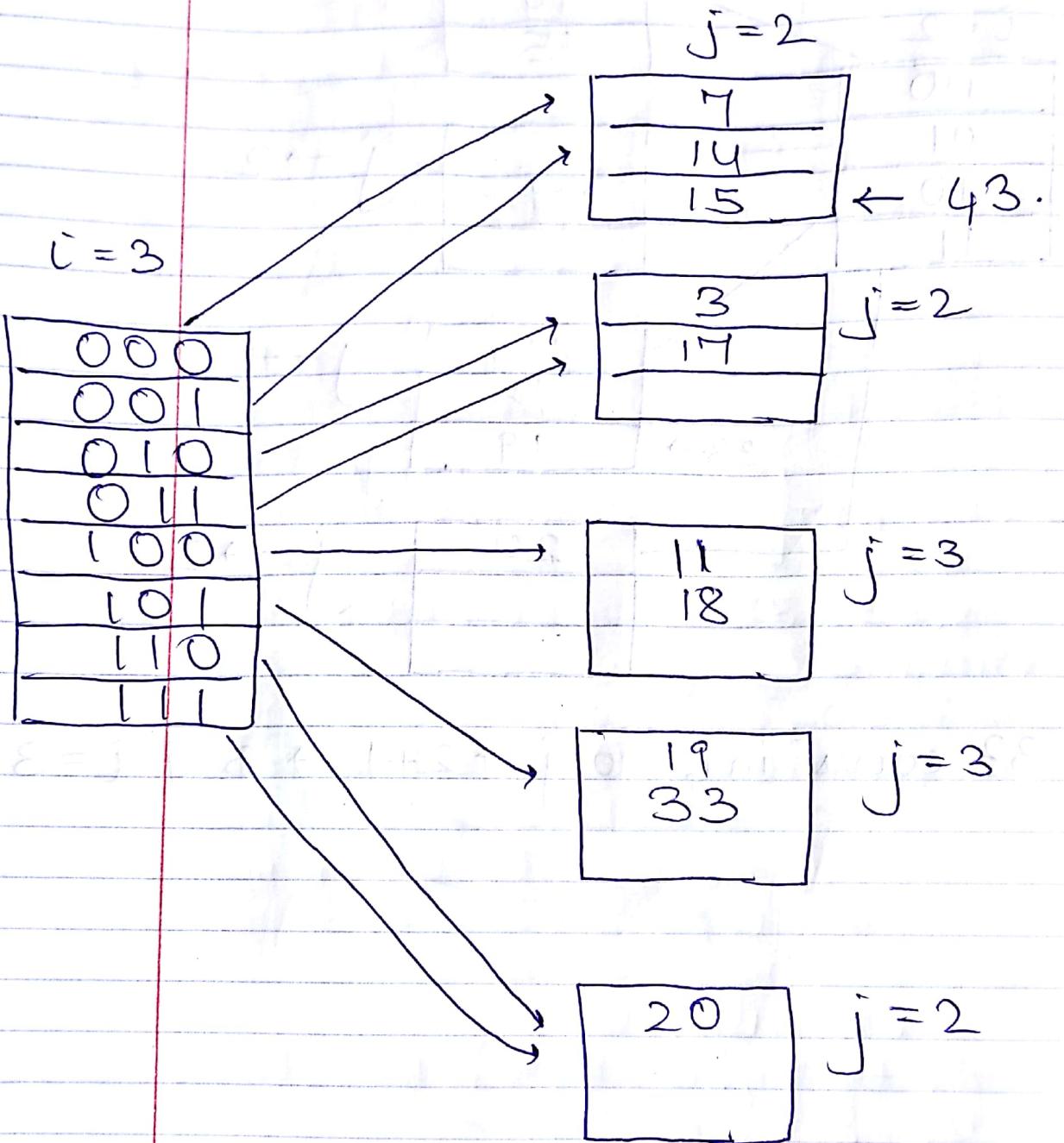
11
18
19

$j = 1$

now 20 comes in so $j = 1 + 1 \rightarrow 2$



33 comes in, so $j \rightarrow 2 + 1 \rightarrow 3 \neq i = 3$.



Answer :-

$j = 3$

7
14

15
43

$j = 3$

$i \rightarrow 3$

000
001
010
011
100
101
110
111

5
14
44

$j = 2$

11
18

$j \rightarrow 3$

19
33

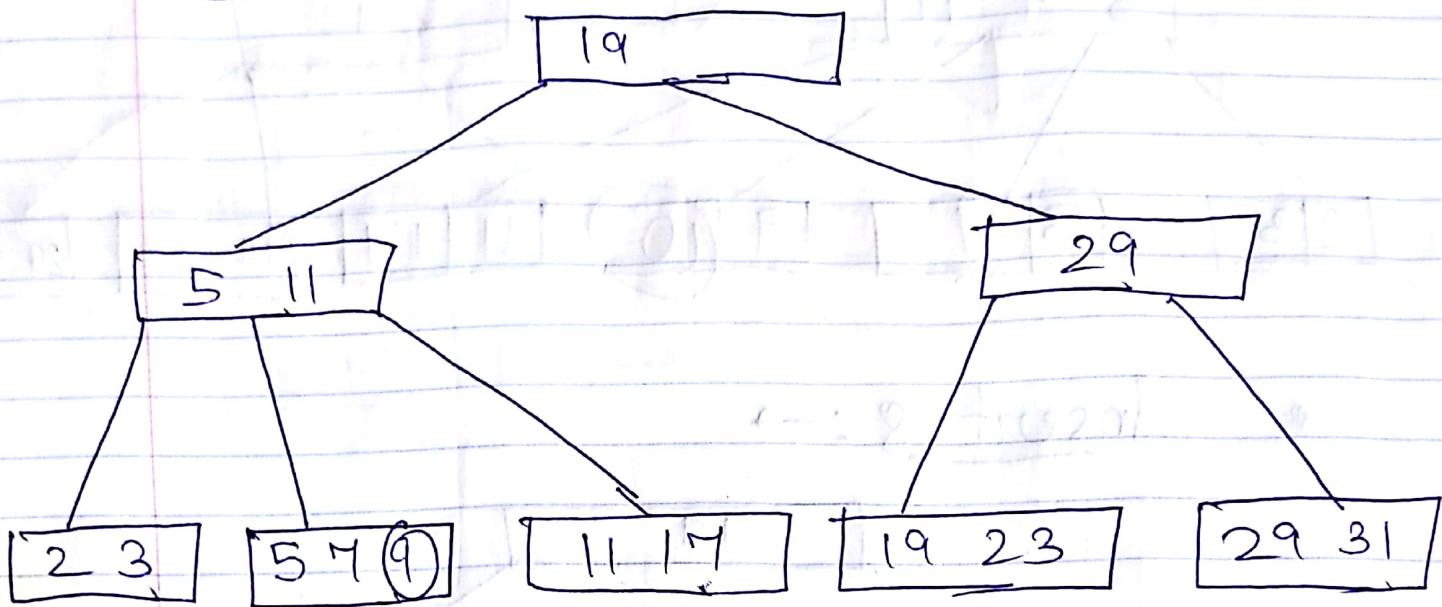
$j \rightarrow 3$

20

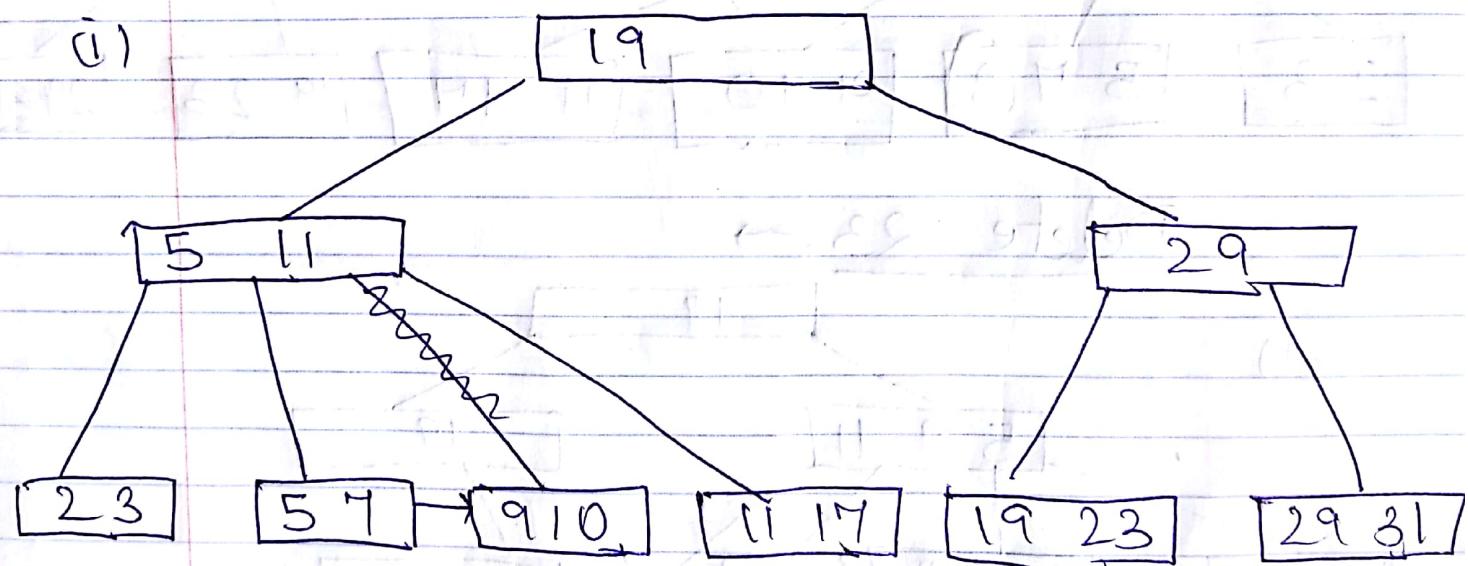
$j \rightarrow 2$

1. 3. 3 : →

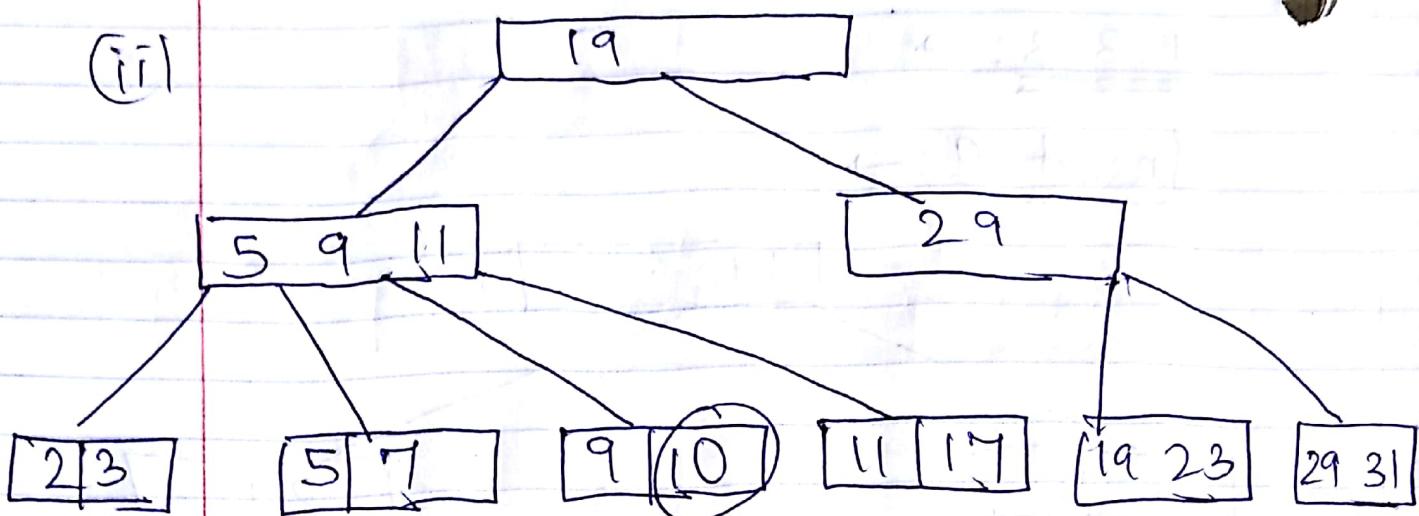
Insert 9 : →



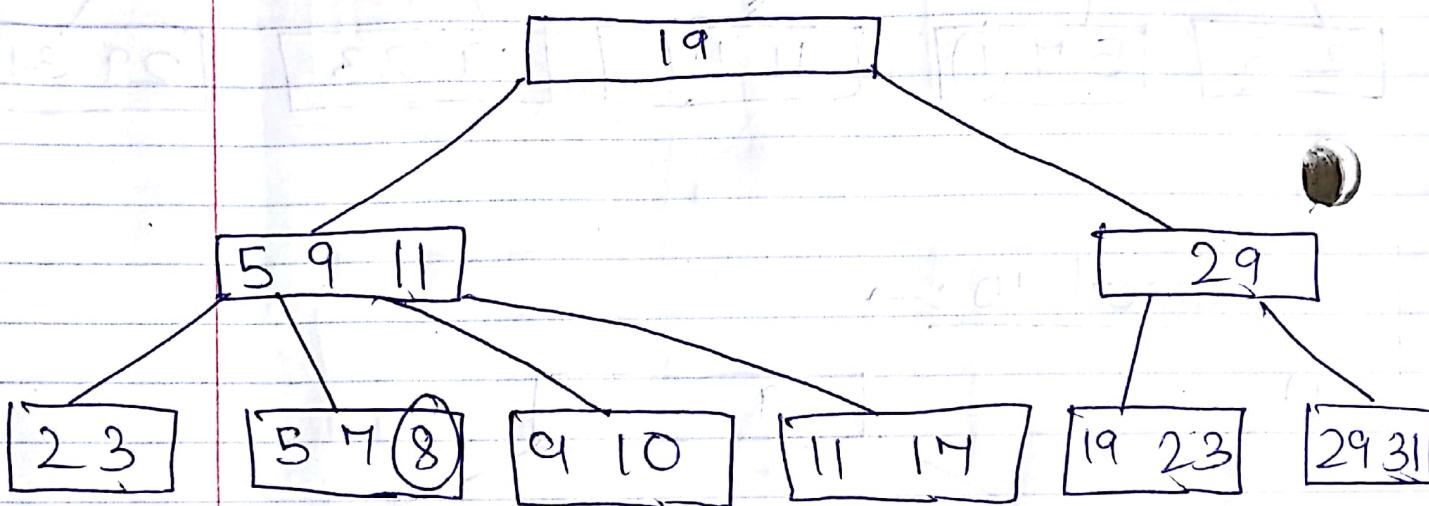
Insert 10 : →



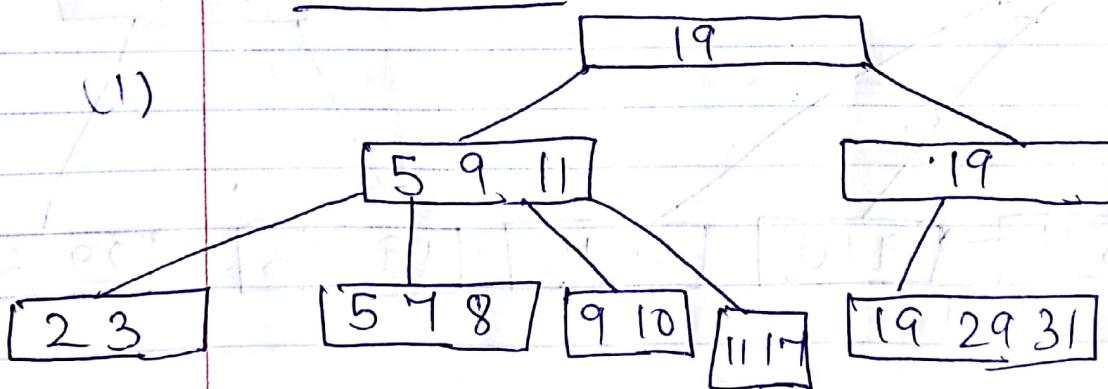
(ii)



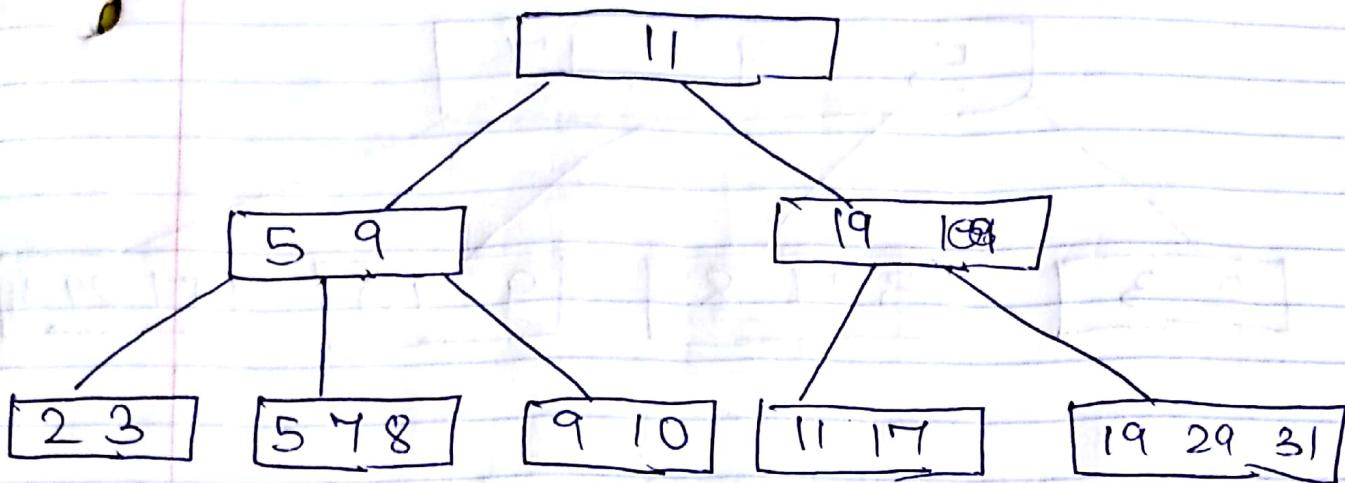
Insert 8 →



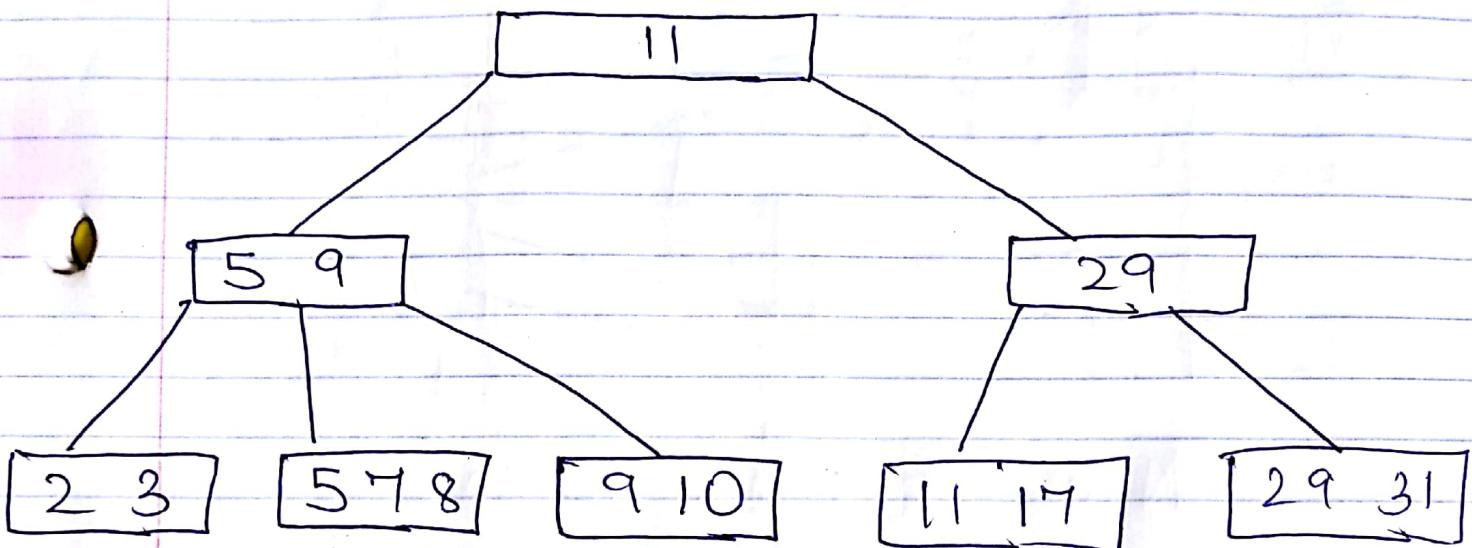
Delete 23: →



NOT BALANCED

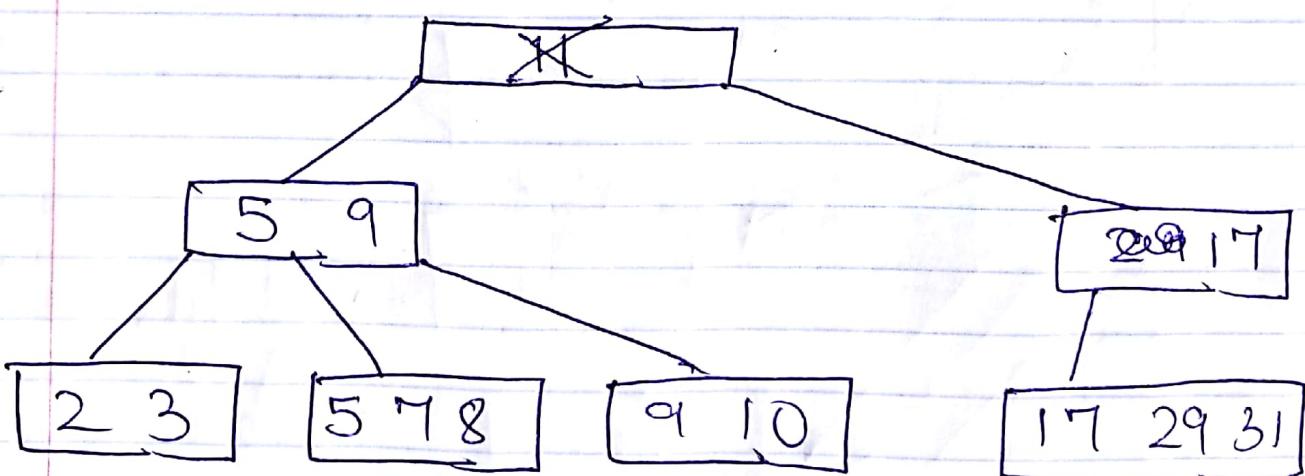


Delete 19 : →



Delete 11 : →

(i)



NOT BALANCED

