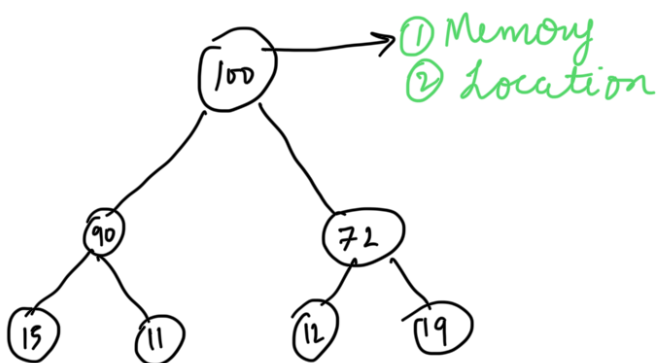


Free Memory Management System

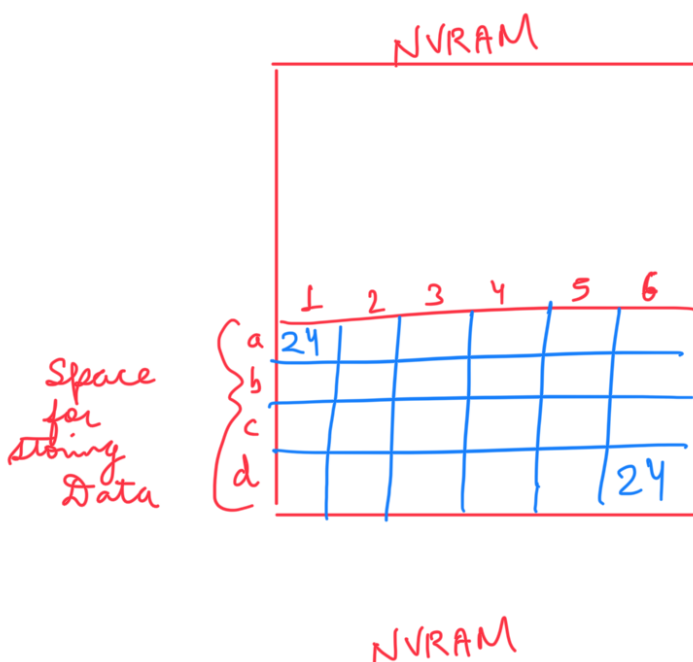
⇒ components: ① Heap
② Prefix Sum and ^{heap pointer} storing in NVRAM

Max Heap



Time Complexities
for Structure

- ① Insert: $O(\log(N))$
- ② Delete: $O(\log(N))$
- ③ Increase Key: $O(\log(N))$



① Initial Heap



② System Asks for 5 units of storage.

③ heap

Space
for
storing
Data

	1	2	3	4	5	6
a						19
b						
c						
d						19

19
a6

(4) System asks 4 units

Heap

15
b4

Space
for
storing
Data

NVRAM

	1	2	3	4	5	6
a						
b				15		
c						
d						15

(5) Free 2 unit from a1

Heap

15
b4
2
a1

Space
for
storing
Data

NVRAM

	1	2	3	4	5	6
a	2	2				
b				15		
c						
d						15

(6) Free 2 units from
a4

Heap

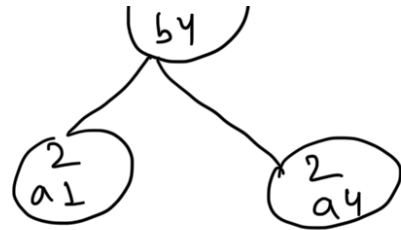
15

NVRAM

	1	2	3	4	5	6
a						
b						
c						
d						

Space
for
storing
Data

	1	2	3	4	5	6
a	2	2		2	2	
b				15		
c						
d						15



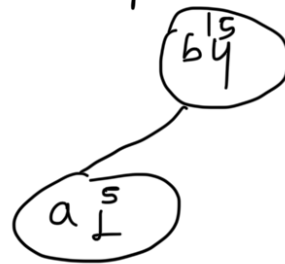
(7) Free 1 unit at
a3

→ Check left and right
for free memory
and merge them
and delete the
entry from heap.

→ a1 will increase to
5

→ a4 entry will be
deleted.

Heap



Hence Instead of garbage
value we can store something
Useful to operate.

Multiple heaps can be used

NVRAM

Space
for
storing
Data

	1	2	3	4	5	6
a	5				5	
b				15		
c						
d						15

this also
pointed
to a4