Hash maps

↳ Collection of key and Value pair

Name - marks
String Integer

Hashmap

Key	Value
Tanmay	~~80~~ 90
ALam	90
Shubham	100
Kunal	95
Abdul	85

Entry

Tanmay , 80
Shubham 100
Kunal 95
ALam 90
Abdul , 85

Search	Add	Get	Remove
Array	O(1)	O(n)	O(1)
Arraylist	O(1)	O(n)	O(1)
LL	O(1)	O(n)	O(n)
Hashmap	O(1)	O(1)	O(1)

[90 | 100 | 95 | 85]

Note
Order is not maintained in hash map / hash set

hashmap has a lot of Entries

map.entrySet()

↳ Collection of Entries in iterable manner

```
for ( Map.Entry<S,I> entry : map.entrySet())
{

}
```

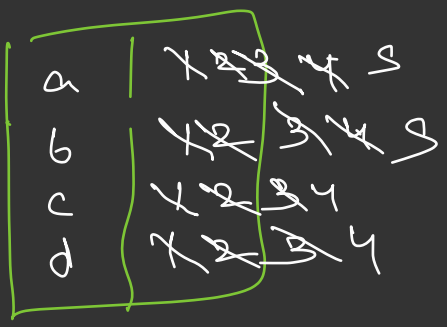
Ques Find char with max frequency

"Newton School" O(n²)

⇒ o 3

Char	freq
n	2
e	1
w	1
t	1
o	3
S	1
c	1
h	1
l	1

"aabbccddbacdbcbddcaab"



max = 5
char = a

Ques Remove Duplicates

(1) Normally $O(n^2)$

(2) Sort $O(n \log n)$

(3) Hash set $O(n)$

[1, 5, 4]

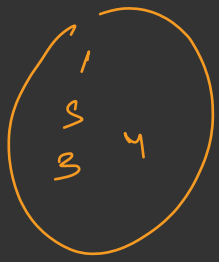
Ques Common elements (unique)

arr1 → 1, 5, 3, 1, 2, 4 n

arr2 → 2, 6, 7, 1, 5 m

[1, 5, 2]

(1) $O(n^2)$



2

Ques Common elements 2

arr 1 1, 5, 3, 1, 2, 3, 5, 5, 5

arr 2 1, 1, 1, 3, 7, 5

Output 1, 1, 3, 5

Ques Un common elements

arr 1 1, 3, 1, 2, 5

arr 2 2, 3, 7

⇒ 1, 5, 7