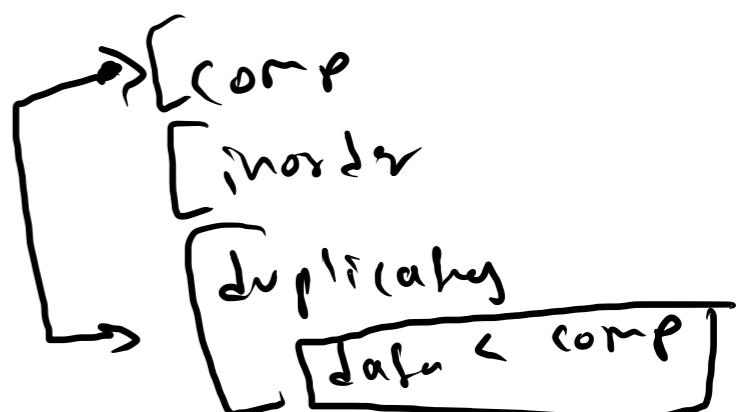
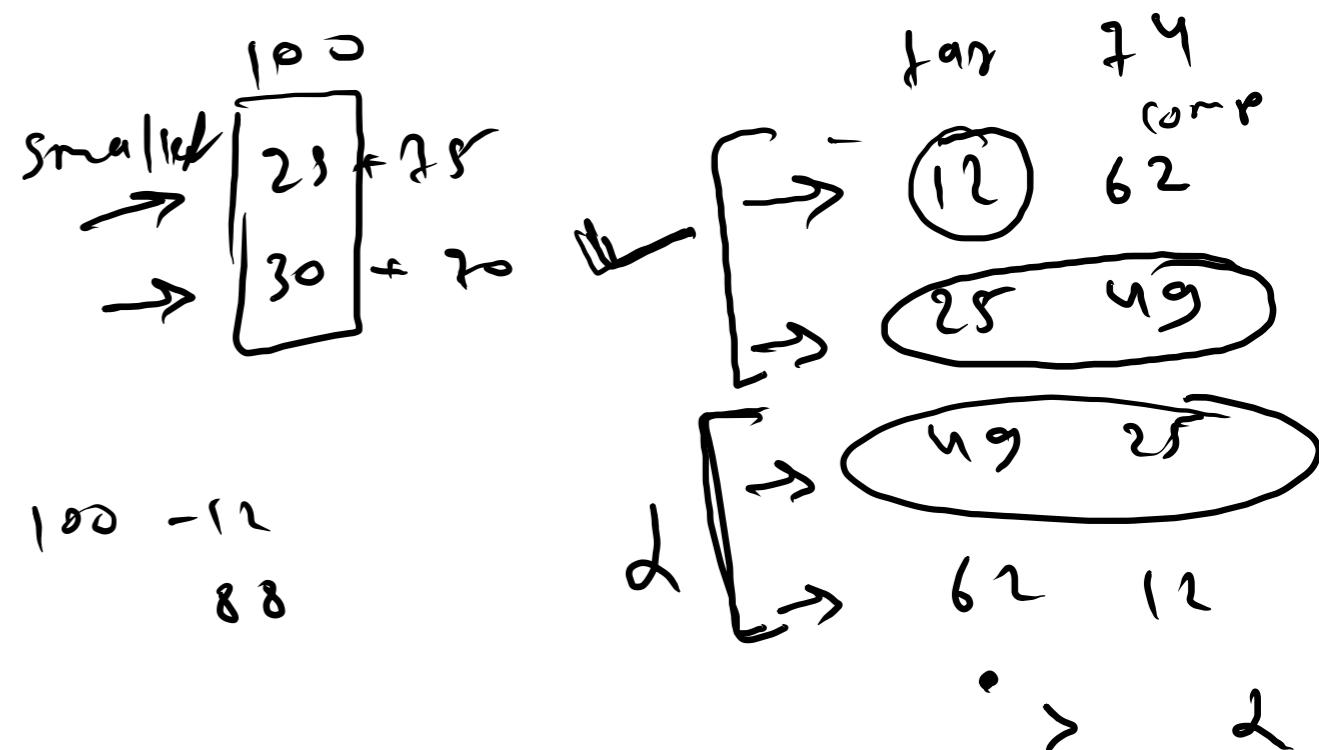
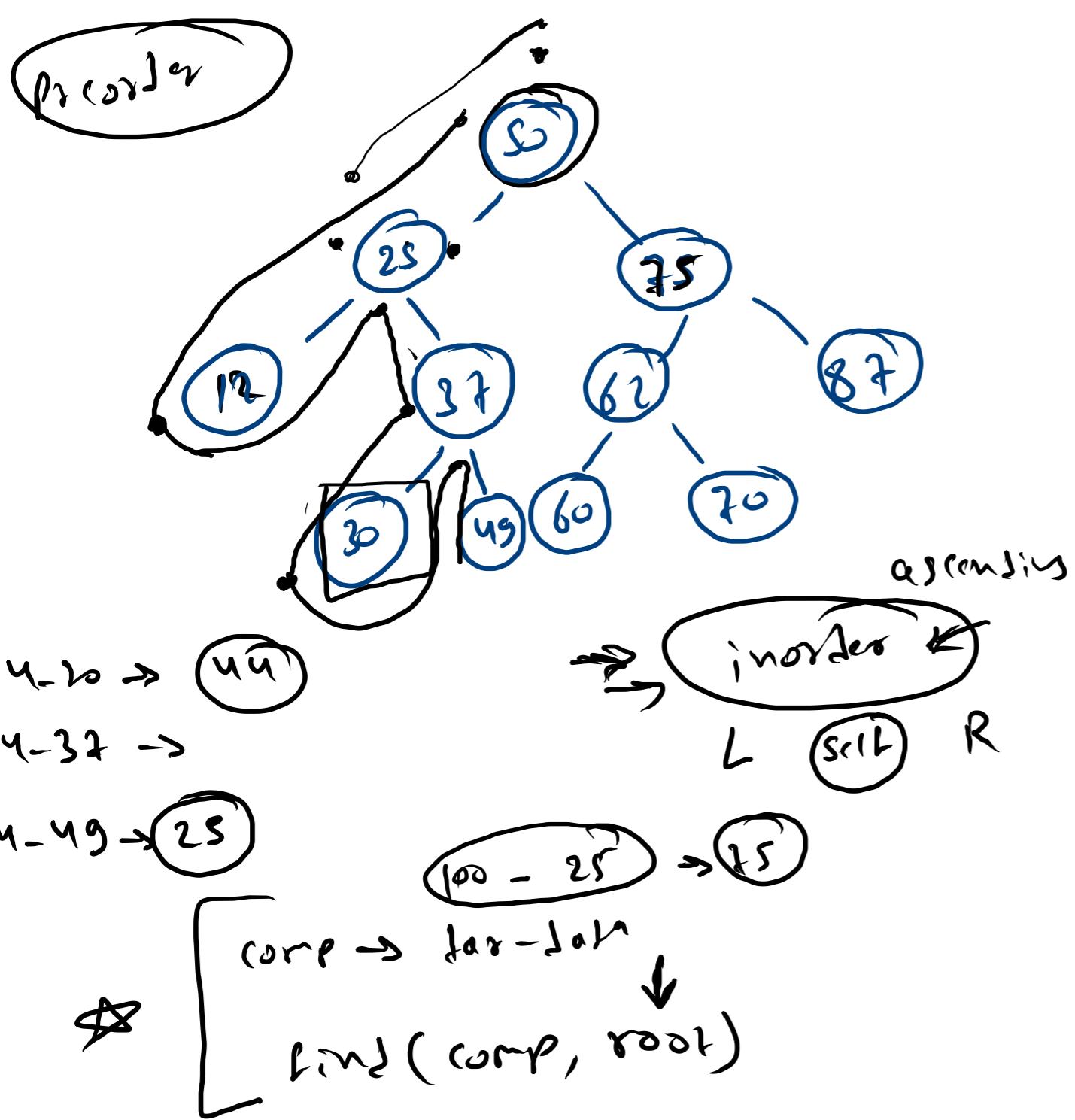
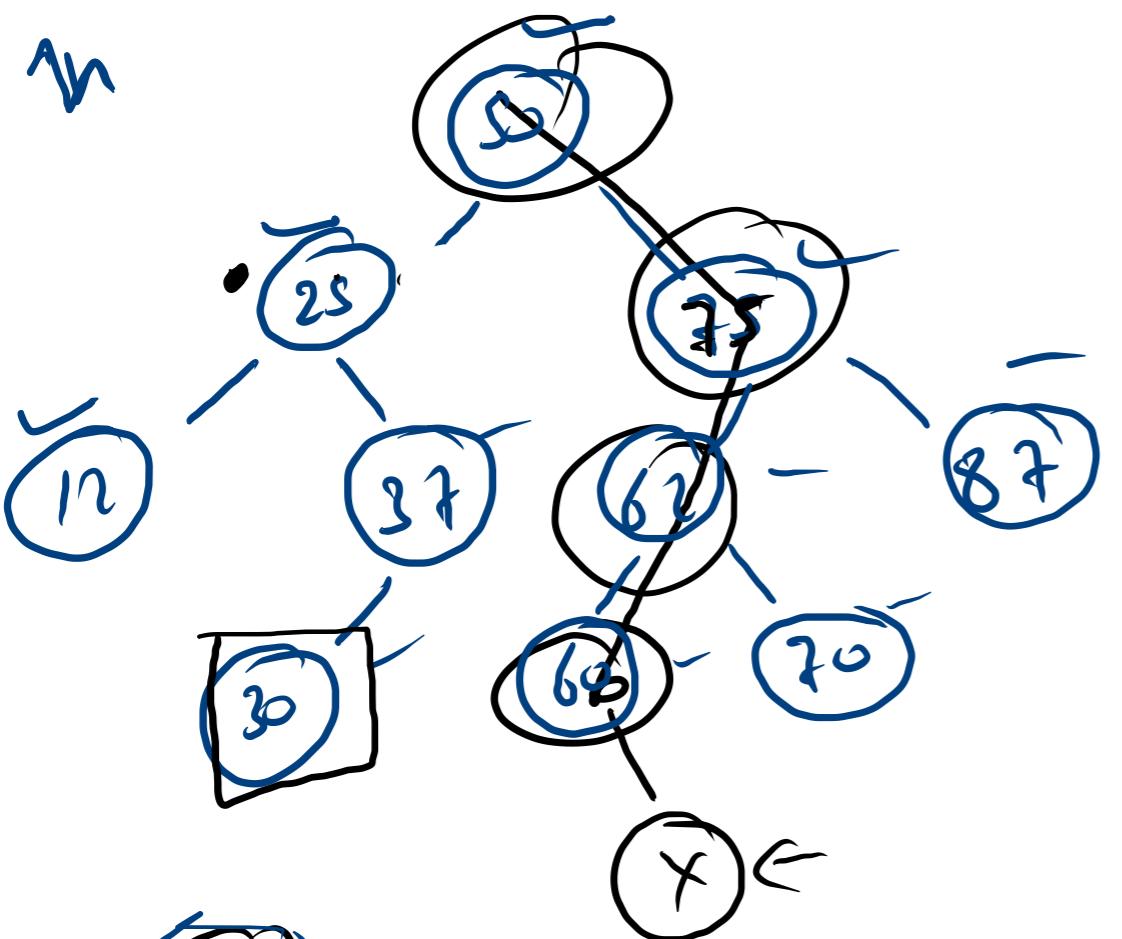
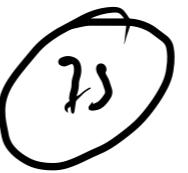


21
50 25 12 n n 37 30 n n n 75 62 60 n n 70 n n 87 n n
100





61



$\text{find}(25) \rightarrow O(n)$



10
8

$\text{find} \rightarrow O(n)$



Int → -

int → value

0
1
2
3

"India" → 120

"China" → 200

HashMap

key → value

unordered

key not exist → null

HashMap<String, Integer> hm = new HashMap<>()

put(key, value) → O(1)

get(key) → O(1)

containsKey(key) → O(1)

keySet → n

ar[key] = value

n = ar[index]

zmszeqxliz vheqwrofgcuntypejcxovtaqbnnqyqlmrwic

q → 1
e → 1
z → + 2 3
m → 1
s → 1
x → 1
l → 2

(2)

HashMap

HashMap<String, Integer> hm = new HashMap<>()

put (key, value) → O(1)
get (key) → O(1)
containsKey (key) → O(1)

ar[key] = value
n = ar[index]

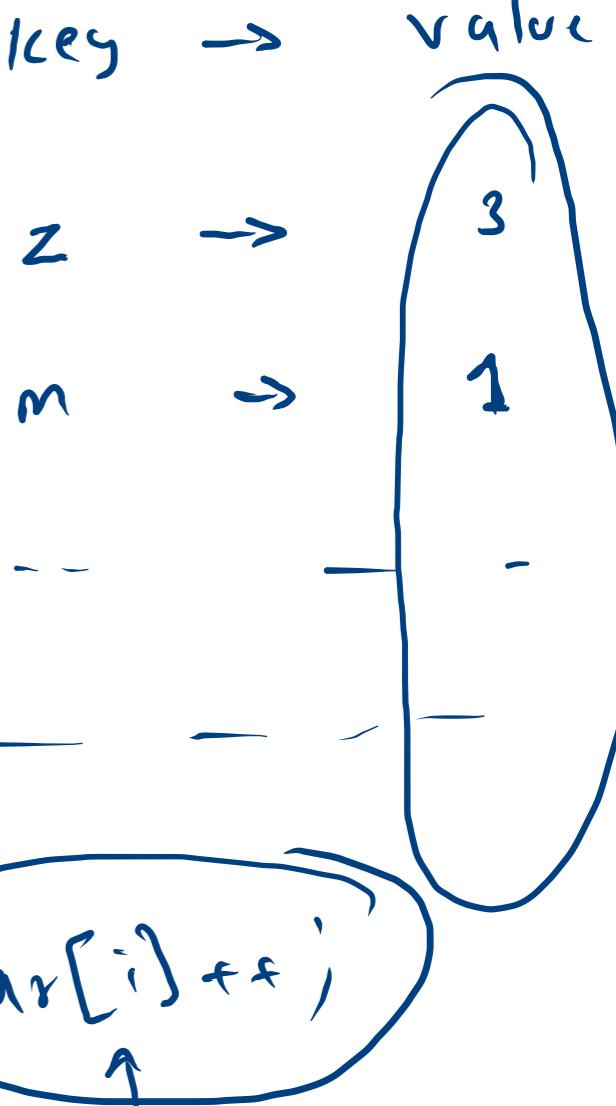
Set<String> key = hm.keySet();

zmszeqxiliz

Character	Integer value
z	23
m	1
e	1
g	1
x	1
i	22

int → Integer
char → Character

ch → str.charAt(i) 'z'
if (hm.containsKey(ch) == false)
hm.put(ch, 1)
else
fre → hm.get(ch)
hm.put(ch, fre + 1);
3



higher freq

keySet

maxCh \rightarrow x & t

maxFre \rightarrow x & z

2

3

z	23
m	1
e	1
g	1
x	1
l	2

maxCh \rightarrow l
maxFre \rightarrow 0
Set<(Character)> keys = hm.keySet();

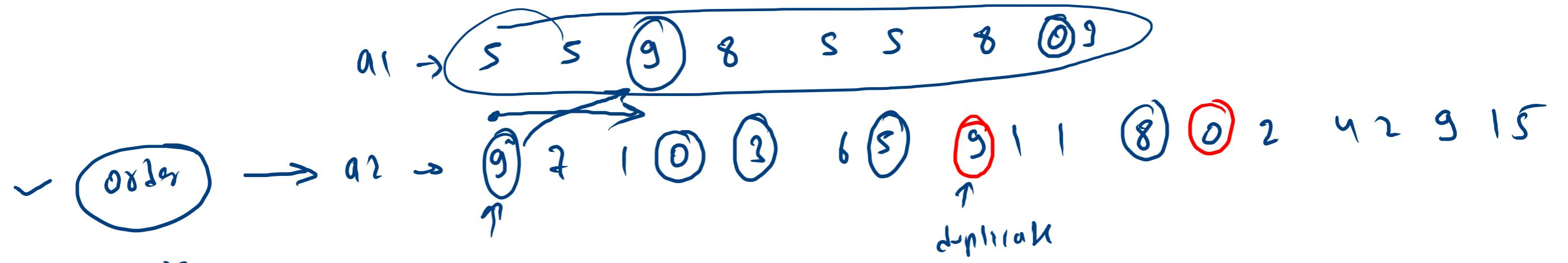
for (Character key : keys) {
 Integer freq = hm.get(key);

if (freq > maxFre) {
 maxFre = freq;

maxCh = key;

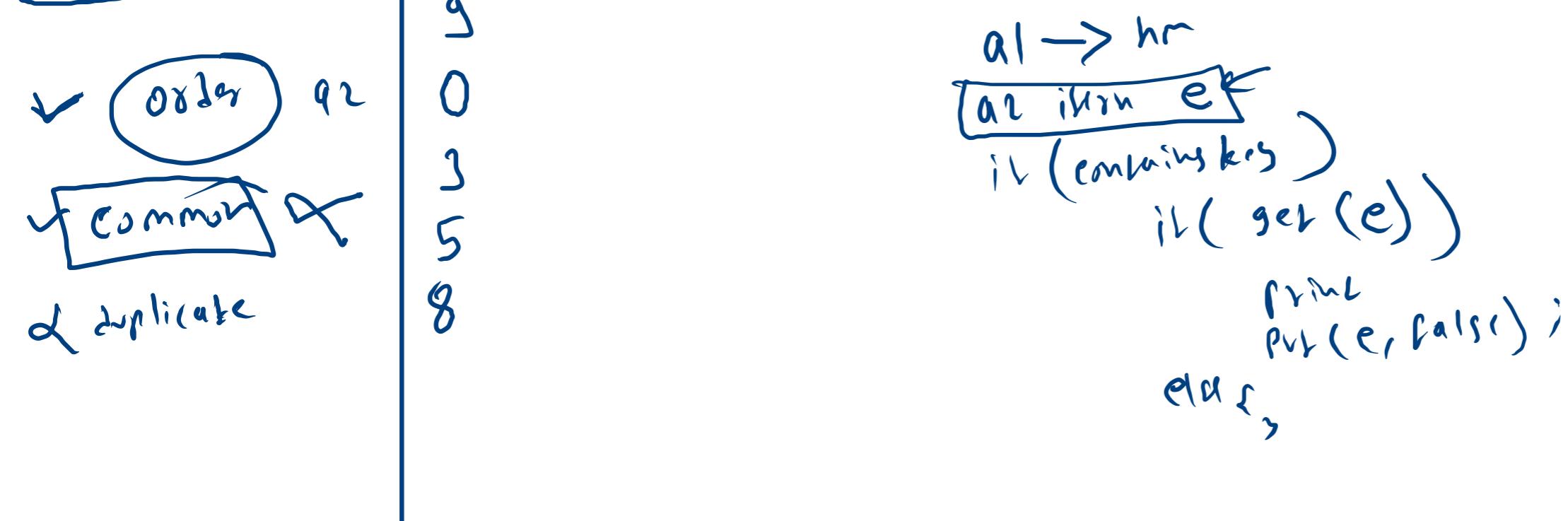
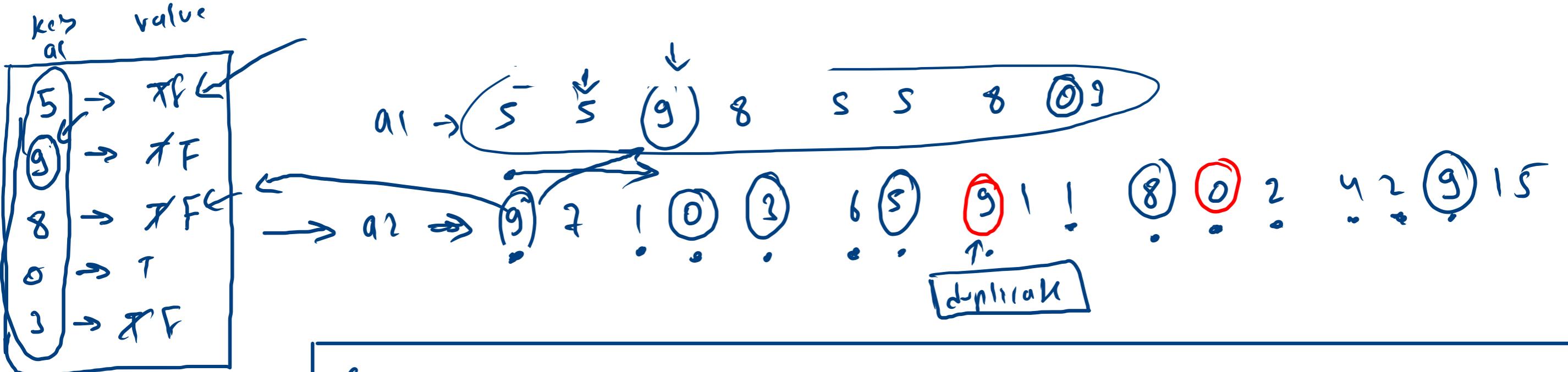
}
maxCh

maxCh \rightarrow x & z
maxFre \rightarrow 2

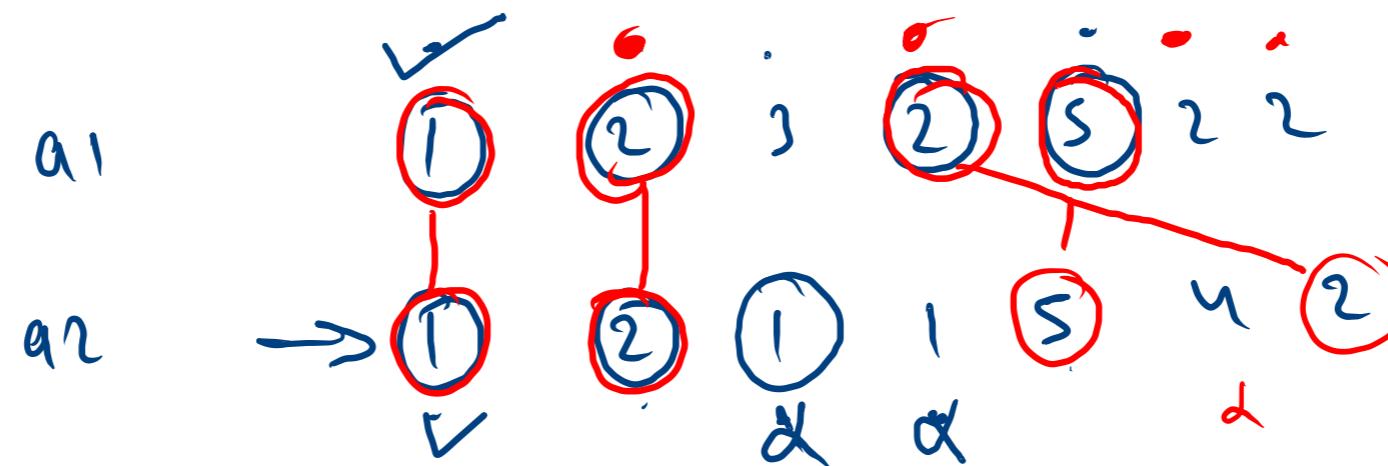


9	5	5	9	8	5	5	8	
0	3	1	8	9	7	1	0	3
6	5	9	1	1	8	0	2	
4	2	9	1	5	Sa			

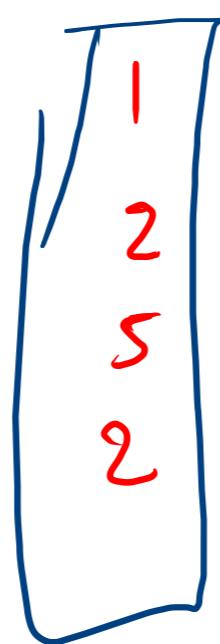
g ←
 0
 3
 5
 8



key	value
1 →	10
2 →	482
3 →	1
5 →	10



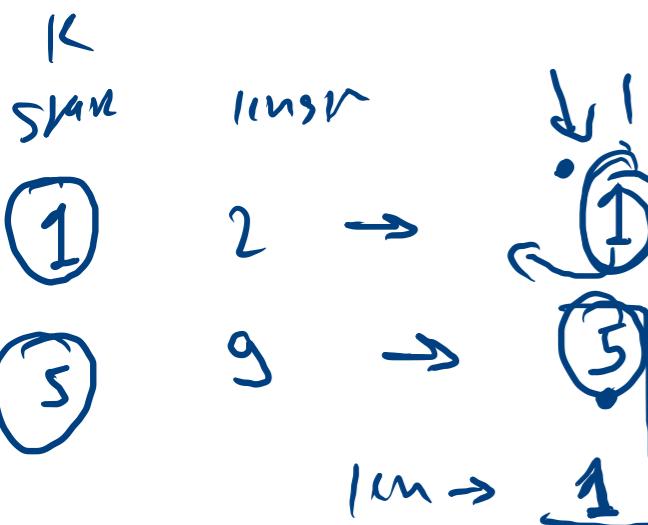
(common
duplicates)
intersection



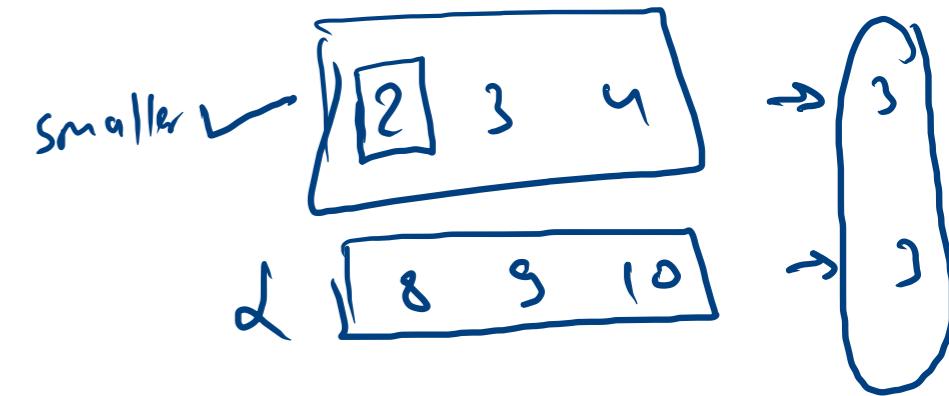
frequencies
a1
a2 100%
contains key
freq
if (freq > 0)
print
freq --

a →

12 5 1 2 10 2 13 7 11 8 9 11 8 9 5 6 11



2 3 4
S+1 S+2 S+3 S+4 S+5 S+6 S+7 S+8 S+9



int start = 0, mlength = 0;

for (k : keys) {

if (hm.containskey(k-1) == false) {
length = 1
while (hm.containskey(k+length))
length++;
if (mlength < length) { length = length,
start = k
}

12 → T	11 T
5 → T	8 T
1 → T	9 T
2 → T	6 T
10 → T	
13 T	
7 T	

3

