

$$ar \rightarrow [0.2.1.0.1.2.0.2.1.1.0.1]$$

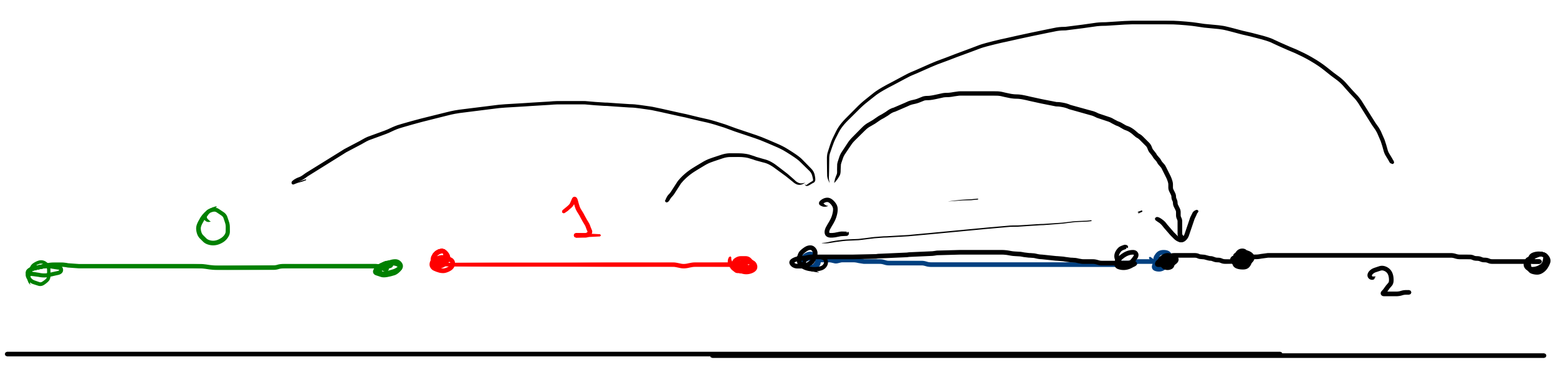
$$\boxed{0.1.2}$$

$$0 \dots 1 \dots$$

$$0 \dots 1 \dots 2$$

$$\downarrow$$

$$[0.0.0.0.1.1.1.1.1.2.2.2]$$



$[0 \ 2 \ 1 \ 0 \ 1 \ 2 \ 0 \ 2 \ 1 \ 1 \ 0 \ 1]$

$i \rightarrow 0$
 $j \rightarrow 0$
 $k \Rightarrow n-1$

$n.k \rightarrow O(n)$

$i == k$

$i > k \quad \times$
 $i < k \quad \checkmark$

j k i
 $0 \ 0 \ 0 \ 0 \ 1 \ 1 \ 1 \ 1 \ 1 \ 2 \ 2 \ 2$

$0 \dots j-1 \quad 0$
 $i \rightarrow \text{unknown}$
 $j \dots i-1 \quad 1$
 $k+1 \dots n-1 \quad 2$

1	0	2
$i++$ $O(1)$	$\text{swap}(i, j)$ $j++$ $i++ \quad O(1)$	$\text{swap}(i, k)$ $k--$ $O(1)$

12 [9 -48 100 43 84 74 86 34 -37 60 -29 44]
160 _{0 2 1 - 4 5 6 7 8 9 10 11}

60 100
74 86

74 86
⇒ (60) 100 2

-48 -37 -29 9 34 43 44 60 74 84 86 100

-48 -32 -29 9 34 43 44 60 74 84 86 100 101

i
j

target = 160

100 - 48

sum = 52

100 - 32
68

$sum < 160$ $i++$	$sum > 160$ $j--$	$sum == 160$ print
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60 100
74
+ 86

160

3 7 5 3'' 8 4 7' 5' 8' 7'' n

frequency arr
 $\Rightarrow \begin{cases} \text{min} = 3 \\ \text{max} = 8 \end{cases}$

val - min
 $\text{ind} = \text{val} - \text{min}$
 size $\rightarrow \text{max} - \text{min} + 1$

$k \leq n$

pre2

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

prelix sum

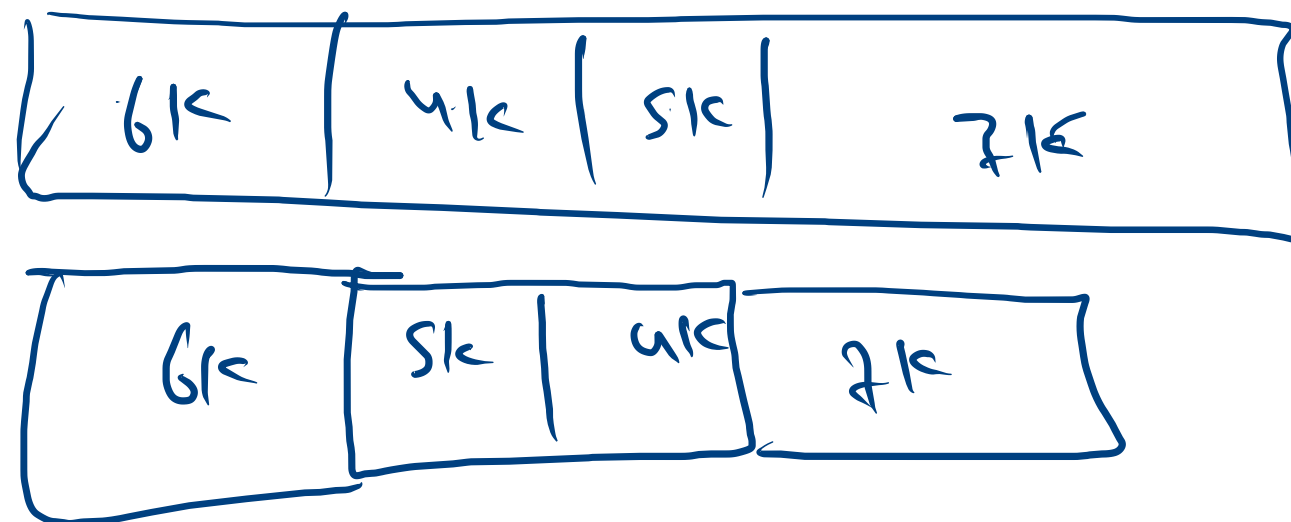
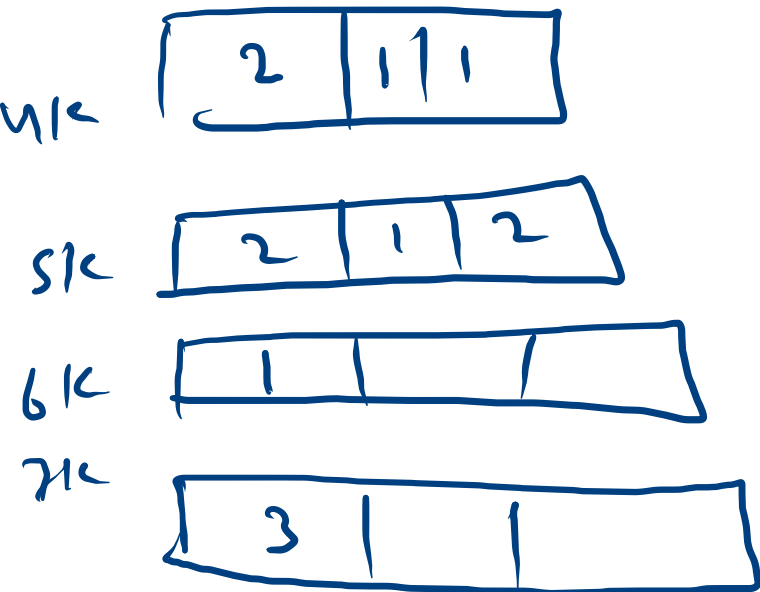
0	2	3	0	5	8
3	4	5	6	7	8

$\text{ind} = \text{ps} - 1$
 $\text{ans}[\text{ind}] = \text{val}$
 $\text{ps}[7] = \dots$

n length

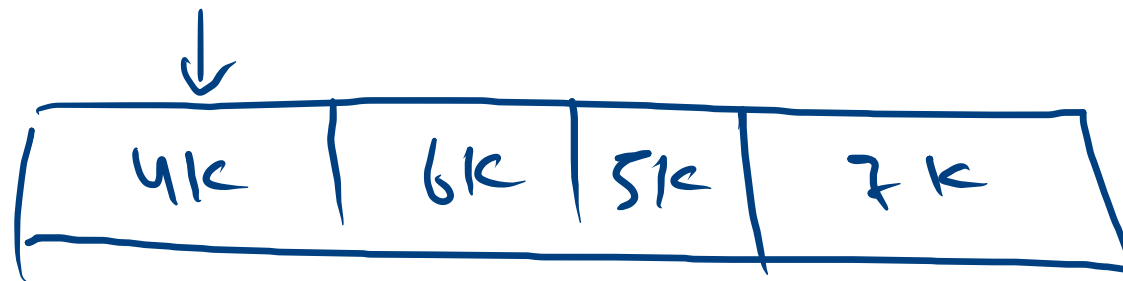
3	3''	4	5	5'	7	7'	7''	8	8'
0	1	2	3	4	5	6	7	8	9

stabile sortierung



stabile

~



$$O(n + 1c) \quad \leftarrow$$

$$O(n \log n) \quad \leftarrow$$

$$10^9 + 10 \quad /$$

$$10^9 \neq \underbrace{2 \cdot 10^{18}}$$

$$10^9 \times 30$$

$$\boxed{- 10^{18} \quad \dots \quad 10^{18}}$$

$$[\quad 1 \quad 89 \quad 10 \quad 754 \quad]$$

count sort(^{exp} 1)

exp
10

exp
100

→ count sort

h = 3

K → minimize

2 6 7
3 5 8
2 9 4

→

2	9	4
2	6	7
3	5	8

→

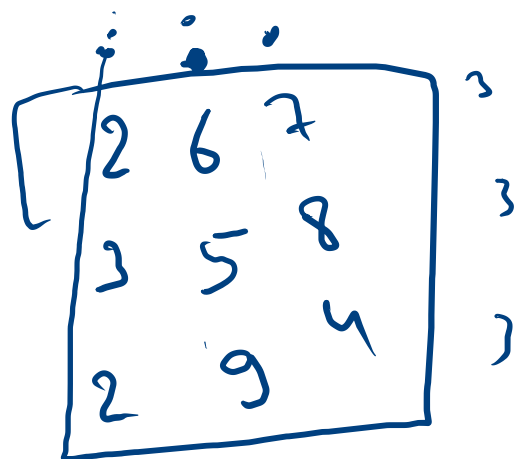
3	5	8
2	6	7
2	9	4

→

2	6	7
2	9	4
3	5	8

learn similar list

* non significant



$\text{max} / \text{exp} > 0$
 \uparrow
 $= 0$

radix sort

1
 10
 100
 $\rightarrow 1000$

exp

count sort

10

$267/10$

$26 \square 7 \cdot 10$

100

$267/100$

$2 \cdot 100 \cdot 2$

1

$267/1$

$26 \square 7 \cdot 10$

7

12041996
 20101996
 05061997
 12041989 •
 11081987

D	M	year
• 12	04	1996
20	10	1996
• 05	06	1997
• 12	04	1989
• 11	08	1987

→

05	06	1997
11	08	1987
12	04	1996
12	04	1989
20	10	1996

↓

• 12	04
12	04
05	06
11	08
• 20	10

←

1996
 • 1989

1997
 • 1987

1996

size	32	13	2501
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• 11	08	1987
12	04	1989
→ 12	04	1996
• 20	10	1996
05	06	1997

11081987 •
 12041989 •
 12041996 •
 20101996 •
 05061997 •