

0 1 2 3 4 5 6 7 8

2, 3, 4, 5, 5, 8, 9, 10, 11

Process 1 : 5, 9, 10

Process 2 : 2, 5, 11

Process 3 : 3, 4, 8

global min = 2    global max = 11    size = 9

median element at index:  $9/2 = 4$      $\overset{11}{\text{max}}/2$

Step 1: count all elements between 0 — 5   
  $\downarrow$  including

P.1 counts 1	P.2 counts 2	P.3 counts 2
[5]	[2, 5]	[3, 4]

check if total count  $<$  or  $>$  size/2

$1 + 2 + 2 = 5 > 4$ , so we know median is  
in the lower partition

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Step 1: count all elements between 0 - 2

P.1 counts 0

P.2 counts 1

P.3 counts 0

[2]

$0 + 1 + 0 = 1 < 4$ , so we know it's in upper part.

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count from 3 - 5

P.1 1  
[5]

P.2 1  
[5]

P.3 2  
[3, 4]

$1 + 1 + 2 = 4 = K^4$ , now find max value < 5

P1      4    8                    0    0    1    4    5    8

P2      0    1

P3      0    5

$k = 3$

range: 0 - 4

count = 4

Since  $\text{count} > k$ :

$$\begin{aligned}\text{upper} &= 4 - (4 - 0) / 2 \\ &= 2\end{aligned}$$

$$2 - 4$$

$$|c| = 3$$

$$c = 4$$

$$c \neq |c|$$

$$2 - 3$$

range 2:

count = 3

Process 1 : 5, 9, 10

Process 2 : 2, 5, 11

$n = 9$

$k = 4$

Process 3 : 3, 4, 8

Select Process 2 : [2, 5, 11]

Get element 5

Broadcast 5 to other processes

command - return size of large

P. 1 : 5, 9, 10  $\rightarrow$  larger = [5, 9, 10] smaller = []

P. 2 : 2, 5, 11  $\rightarrow$  lar = [5, 11] sm = [2]

P. 3 : 3, 4, 8  $\rightarrow$  lar = [8] sm = [3, 4]



reduce  $k=4$

$3+1+2=6 > k$ , then disregard the lower nums  
send signal to command to disregard "smaller"

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Select Process 1 with larger signal: [5, 9, 10]

Get element 9

Broadcast 9

## comm and

$$P.1 = [5, 9, 10] \quad lar = [9, 10] \quad sm = [5]$$

$$P.2 = [5, 11] \quad lar = [11] \quad sm = [5]$$

$$P.3 = [8] \quad \underline{lar = []} \quad sm = [8]$$

## reduce

$$P.1 = 2 \quad P.2 = 1 \quad P.3 = 0 \quad 2 + 1 + 0 = 3 < k^4$$

ignore large sets. update  $k = k - 3$   $k = 1$

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Select Process 2 : [5]

Choose 5

Broadcast 5

command

$p_1 = [5]$        $lar = [5]$        $sm = [ ]$

$p_2 = [5]$        $lar = [5]$        $sm = [ ]$

$p_3 = [8]$        $lar = [8]$        $sm = [ ]$

reduce

$$0+0+0 < K'$$

$$k = 1-0 \quad k = 1$$

dis

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Select Process

0-2