

Lists → linked lists → sequence container
↳ DLL

deque → sequence → double ended queue

1

9

10

2

5

1

18

-1

-1

4

3

-1

8

7

-1

0

1 2 9 10

$n \rightarrow \text{odd}$

$a_1, a_2, a_3, \dots, m, \dots, a_{n-1}, a_n, a_{n+1}$

median

x y

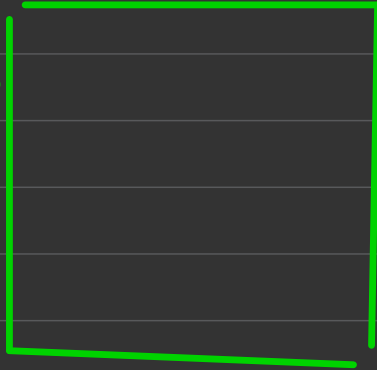
$x = y$

$a_m \rightarrow \text{median} \rightarrow$ after every insertion
 a_{m-1}, a_m, a_{m+1} are the only candidate

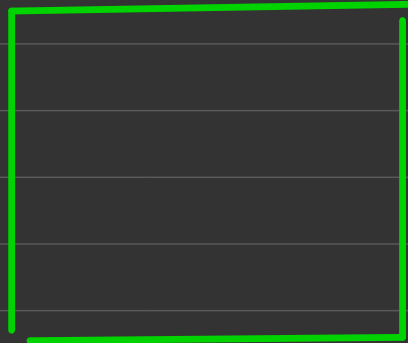
$a_{m-1} \rightarrow$ Biggest no. of all the
elements lesser than
median

$a_{m+1} \rightarrow$ Smallest no. of all the
elements greater than median

max
heap



min
heap



less than
median

x

greater
than median

y

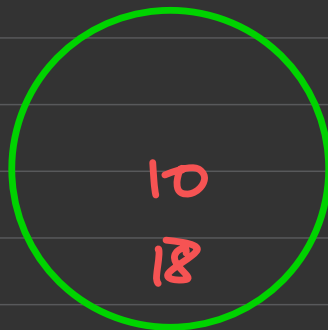
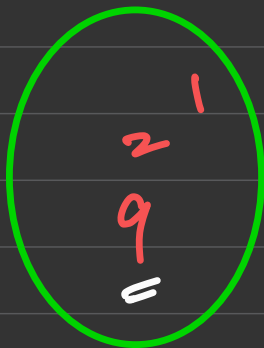
$x == y$

or

$x == y + 1$

1
9
10
2
5
1
18
-1
-1
4
3
-1
8
7
-1
0

→ 5
→



↳



$p_2(x, y)$

$$m_0 \rightarrow (p_1, p_2) \rightarrow |x_2 - x_1| + \underline{\underline{|y_2 - y_1|}}$$

$\swarrow \quad \downarrow$
 $(x_1, y_1) \quad (x_2, y_2)$

→ query

$$md(p_1, p_2) = |x_1 - x_2| + |y_1 - y_2|$$

$$= \max(x_1 - x_2, x_2 - x_1) + \max(y_1 - y_2, y_2 - y_1)$$

$$= \max((x_1 + y_1) - (x_2 + y_2), (x_1 - y_1) - (x_2 - y_2), \\ (-x_1 + y_1) - (-x_2 + y_2), (-x_1 - y_1) - (-x_2 - y_2))$$

$$\left. \begin{aligned} a(x, y) &= x + y \\ b(x, y) &= x - y \\ c(x, y) &= -x + y \\ d(x, y) &= -x - y \end{aligned} \right\} = \max(a(p_1) - a(p_2), b(p_1) - b(p_2), \\ c(p_1) - c(p_2), d(p_1) - d(p_2))$$

$$\max(a(p_1) - a(p_2), b(p_1) - b(p_2), c(p_1) - c(p_2), d(p_1) - d(p_2))$$

↳ for query 3

$$\max(a(p_i) - a(p), b(p_i) - b(p), c(p_i) - c(p), d(p_i) - d(p)) \quad \forall i \in \{set\ of\ p_i\}$$

$$\max \left\{ \begin{array}{l} \max(a(p_1) - a(p), b(p_1) - b(p), c(p_1) - c(p), d(p_1) - d(p)) \\ \max(a(p_2) - a(p), b(p_2) - b(p), c(p_2) - c(p), d(p_2) - d(p)) \\ \vdots \\ \max(a(p_i) - a(p), b(p_i) - b(p) \dots) \end{array} \right.$$

פיה'אל

$x+y$

 $x - y$
$$-x + 7$$
$$-x-y$$

max
leaf

1


$$\max (c_1 - (x'_1 + y'_1))$$
$$\underline{Q_2 = (x_1 - y_1)'} \quad \text{---}$$

1
C3

2. $\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$