

Line Sweep Algorithm

Concepts & One



- ∞ → codestorywithMIK
- X → CSwithMIK
- WhatsApp → codestorywithMIK

Video - 1
...
INTRODUCTION...

शार्पथ ग्रेहन : मैं DSA की कसम देता हूँ कि
मैं मैं पता चूँगा Full detail/intuition

(Oath taking)

जीवन में ज़रूरी,
के साथ पढ़ाऊँगा।

Motivation : Thodi himmat Kar lo, Apni aur apne family
Ki Duniya Badal Sakte ho tum.

What is Line Sweep Algorithm ?

a	b	c	d	e	f	g	h	i
a	b	c	d	e	f	g	h	i
a	b	c	d	e	f	g	h	i
a	b	c	d	e	f	g	h	i
a	b	c	d	e	f	g	h	i
a	b	c	d	e	f	g	h	i
a	b	c	d	e	f	g	h	i

What line Sweep Actually
means ???

~~ALGORITHM~~

WAY OF THINKING
(visualizing)

"Line (view) moves in sorted fashion"

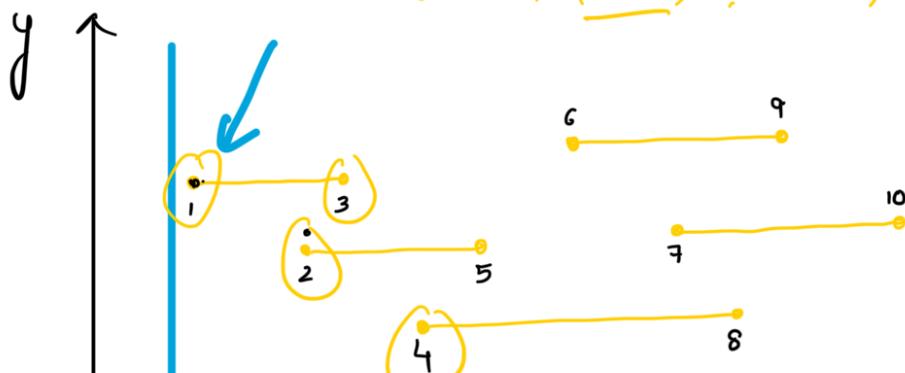
"Focus on what's on the line"

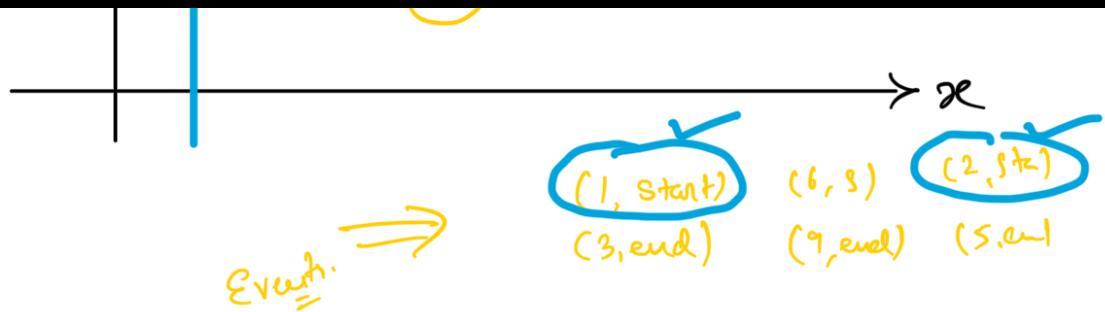
EVENTS !!!

- In Line Sweep, an Event is a point where something changes and you act on it.
- Line Sweep only cares about events and nothing else.

Example: Intervals (start, end)

$(1, 3)$, $(6, 9)$, $(2, 5)$



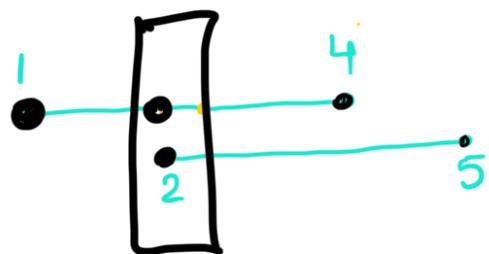


Sort the events.

⇒ Every start/end point is an event

⇒ We need to sweep in sorted order of events.

↳ Sort your events.



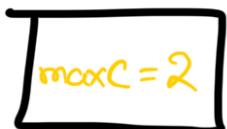
events

(1, +1), (4, -1)

(2, +1), (5, -1)



evn { (1, +1), (2, +1), (4, -1), (5, -1) }



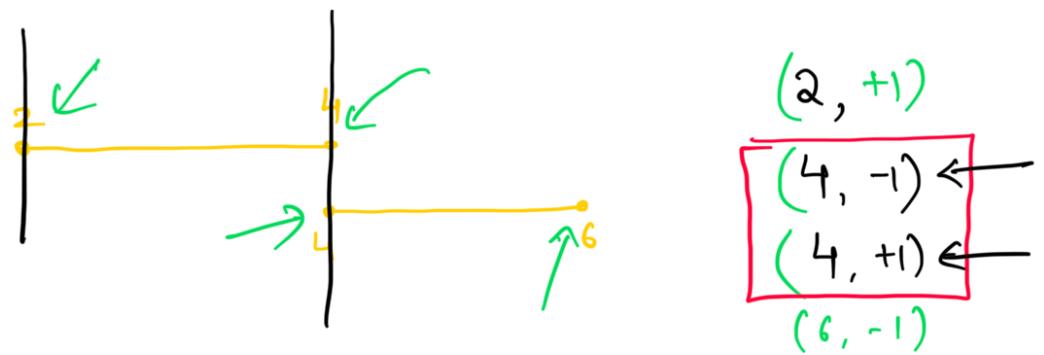
Delta !!!



(2, +1) ↘ delta

(2, 4)
↓
stuff end

$$\text{event} = \{(2, +1), (4, -1)\}$$



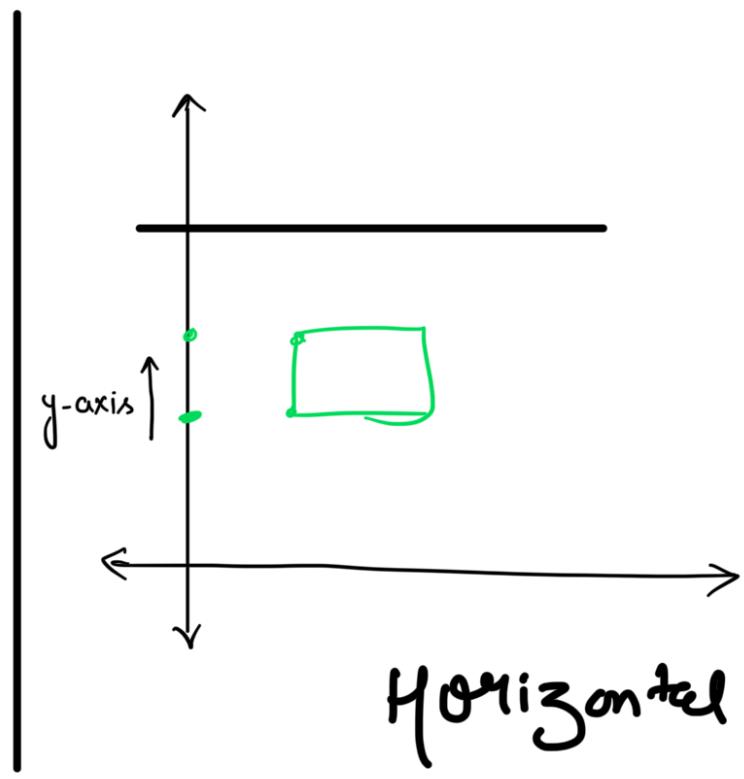
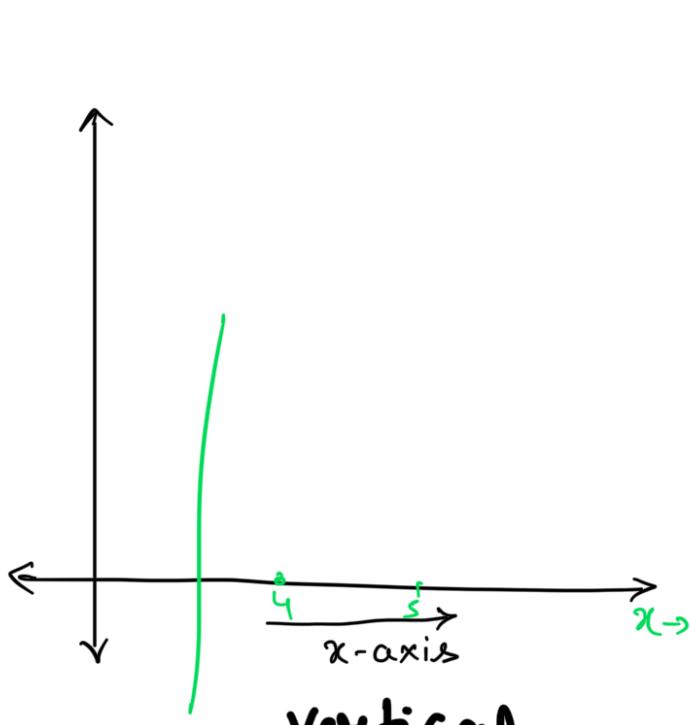
$$\text{int delta} = -1 / +1 ;$$

Types of Sweep

① Vertical Sweep



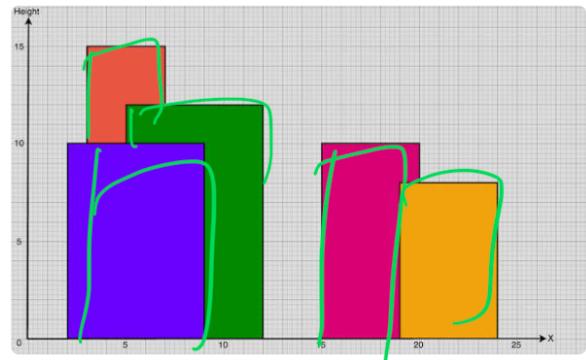
② Horizontal Sweep



when to use what ???

when to use line Sweep ???

- Overlapping intervals
- Scheduling problems
- Geometrical shape Problem
- Area / Skyline problems



Summary

① Line Sweep →

... - Vertical line Sweep

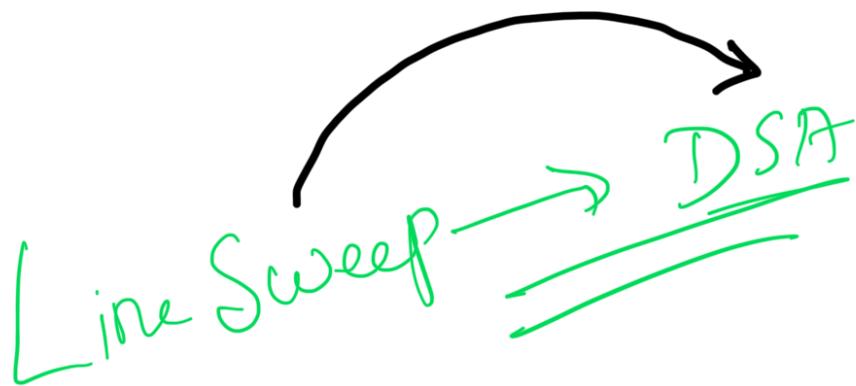
Line Sweep

→ x-axis → y-axis = horizontal line sweep

- ② Events → • Points where things change. That's all we care about.
• Sort accordingly. ←

- ③ Delta → $\begin{array}{c} +1 \\ -1 \end{array}$

- ④ when to use mostly



Non-tech. ↪ events
delta
...
DSA