

# Line Sweep Algorithm

## Concepts & Qns

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codestorywithmik



CSwithMIK



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## Video-1

...  
...INTRODUCTION...

शायद ग्रहण : मैं DSA की कसम खाता हूँ कि  
(Shapath Grahon) जो भी पढ़ाऊँगा Full detail/intuition

(oath taking)

के साथ पढ़ाऊंगा।

**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  
(visualising)

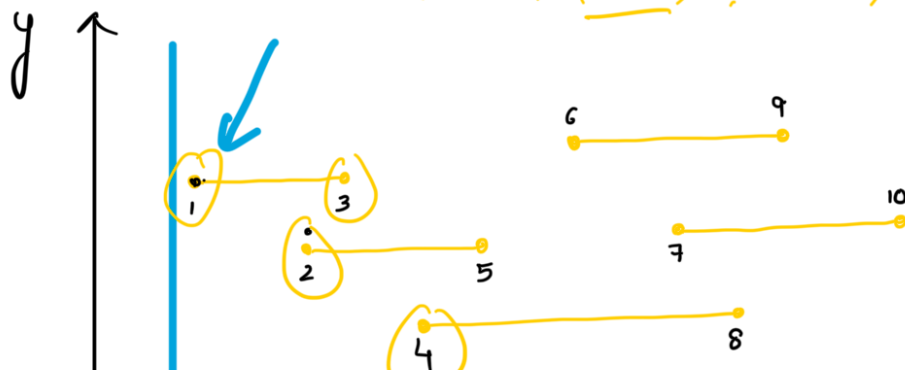
"Line (view) moves in sorted fashion"

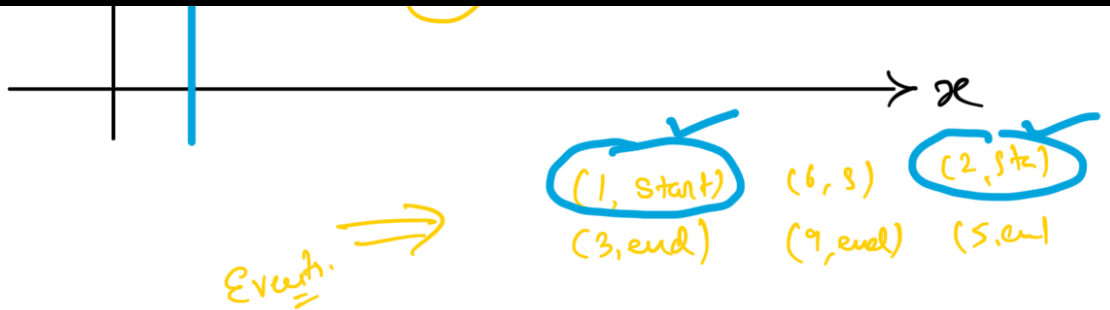
"Focus on what's on the line"

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



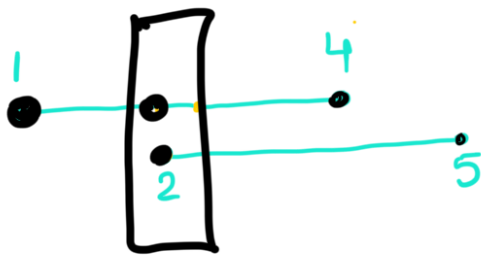


Sort the events.

$\Rightarrow$  Every start/end point is an event

$\Rightarrow$  We need to sweep in sorted order of events.

$\hookrightarrow$  Sort your events.



events:

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

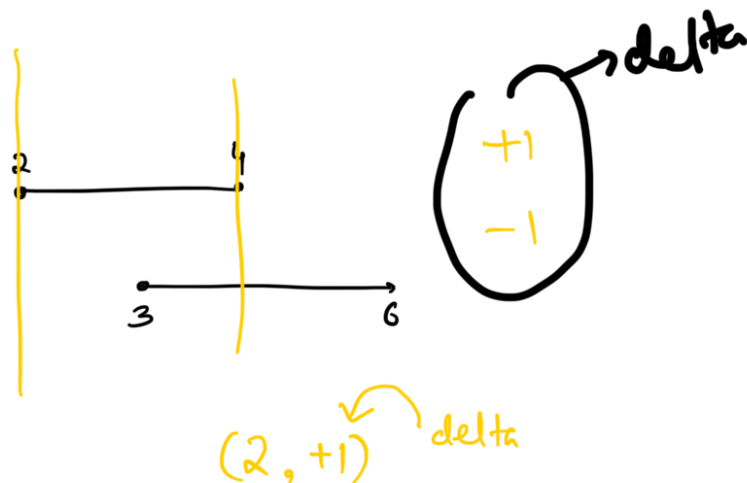
$(2, +1), (5, -1)$



even  $\{ (1, +1), (2, +1), (4, -1), (5, -1) \}$

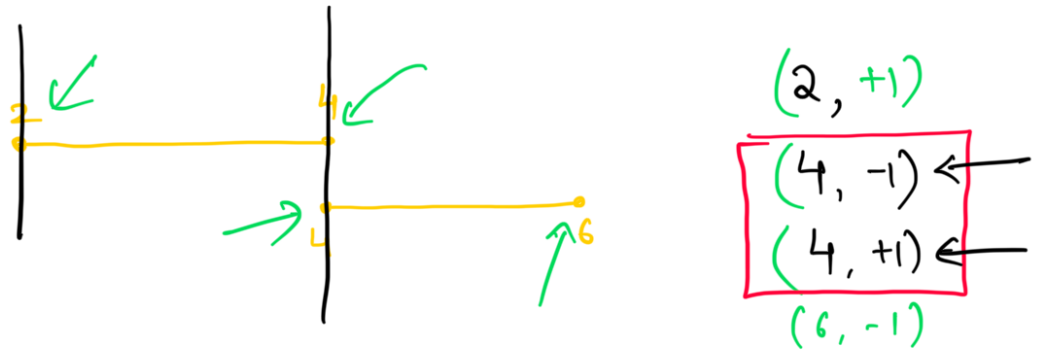
$\text{maxC} = 2$

Delta !!!



$(2, 4)$   
 $\downarrow \quad \downarrow$   
start end

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



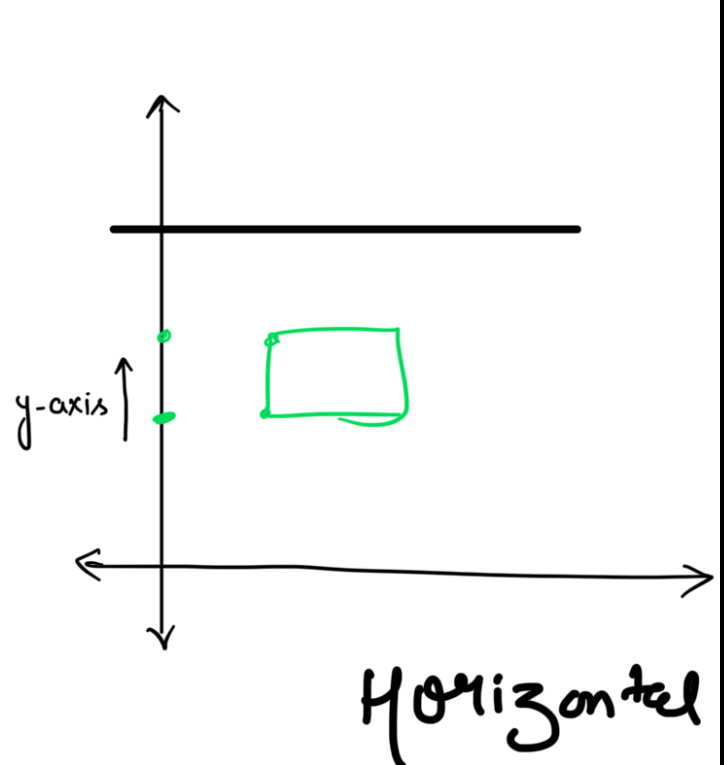
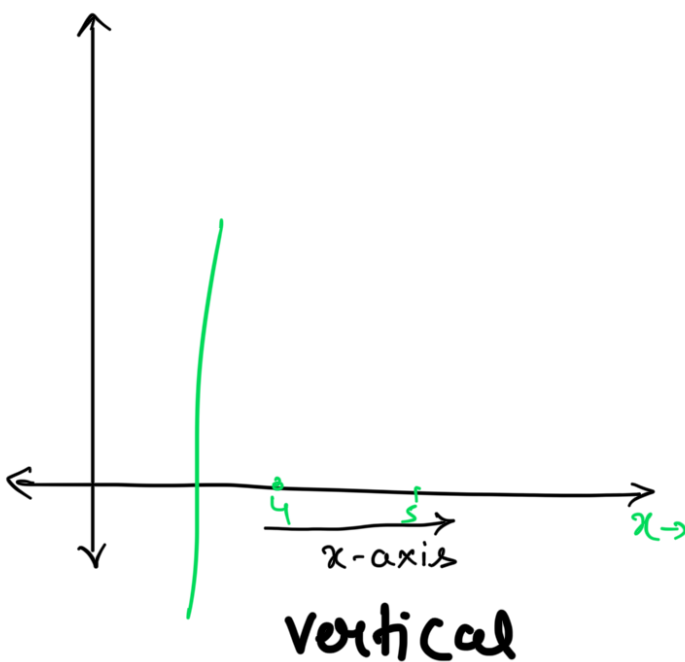
$$\text{int delta} = -1/+1 ;$$

# Types of Sweep

① Vertical Sweep



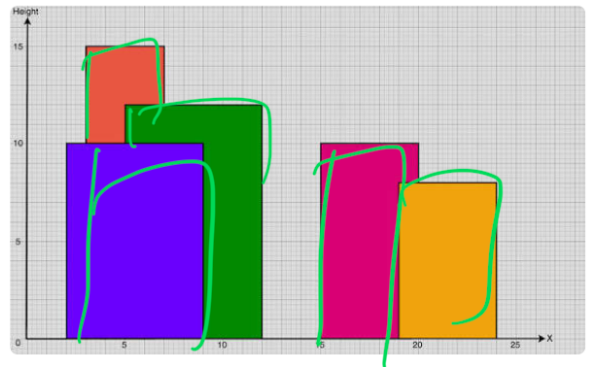
② Horizontal Sweep



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

① Line Sweep → x-axis = horizontal line Sweep  
→ y-axis

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

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

④ when to use mostly ↓

Line Sweep → DSA

Non-tech. ← → events  
delta  
...