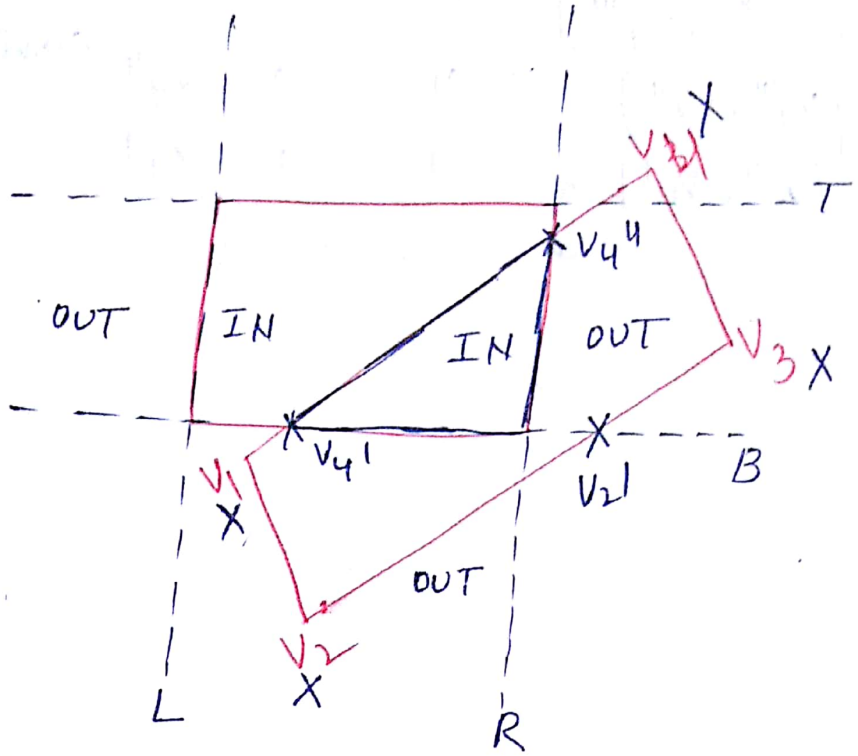
Sutherland - Hodgman Polygon

Eg:-



$[V_1, V_2]$: IN - IN - save V_2

$[V_2, V_3]$: " " - " V_3 ← Left (V_2 Not save)

$[V_3, V_4]$: " - " V_4

$[V_4, V_1]$: " - " V_1

Bottom :- $[V_1, V_2]$: out - out = no saving

$[V_2, V_3]$: out - inside = save V_2', V_3

$[V_3, V_4]$: in - in = save V_4 (V_1 Not save)

$[V_4, V_1]$: inout = save V_4'

Right :-

$[V_2', V_3]$: out - out = no saving (V_3 not sav)

$[V_3, V_4]$: " = " V_4

$[V_4, V_4']$: out - in = V_4'', V_4' save

$[V_4', V_2']$: in - out = V_4''' save

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TOP

$[V_4^{4}, V_4^{III}] = IN - IN \rightarrow V_4^{III}$

$[V_4^{III}, V_4^{4}] = " \rightarrow V_4^{4}$ save

$[V_4^{4}, V_4^{I}] = " \rightarrow V_4^{I}$

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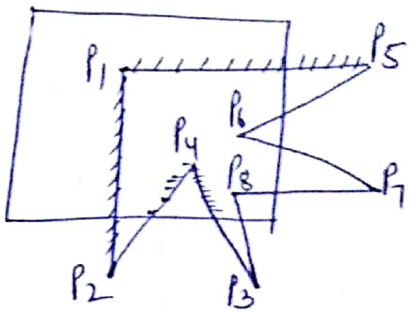
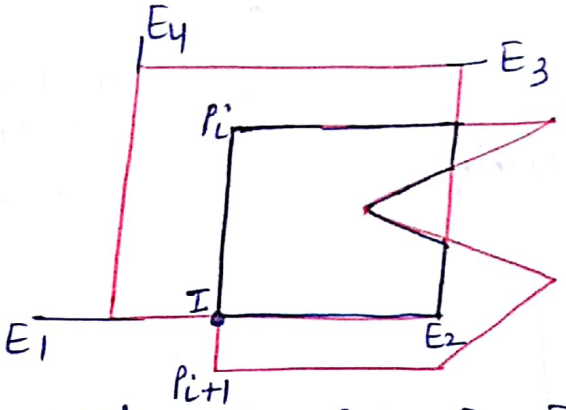
Clipping Polygons

→ sequence of edges

→ Polygon will be clipped into a set of line segment.

→ It won't be clipped into a closed region.



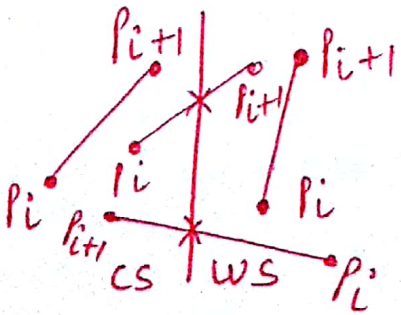


→ clipped at each edge (E_1, E_2, E_3, E_4)

→ I/P & O/P should be a sequence of vertices.

Intersection of P_i & P_{i+1} should be included into the O/p list.

P_i — included; P_{i+1} — not included



$P_1, P_2 \text{ ---- } P_m$

$P_{i+1} \longrightarrow Q_j$

$I \longrightarrow Q_j$

$I\ P_{i+1} \longrightarrow Q_j\ Q_{j+1}$

Process is Repeated for each edge.

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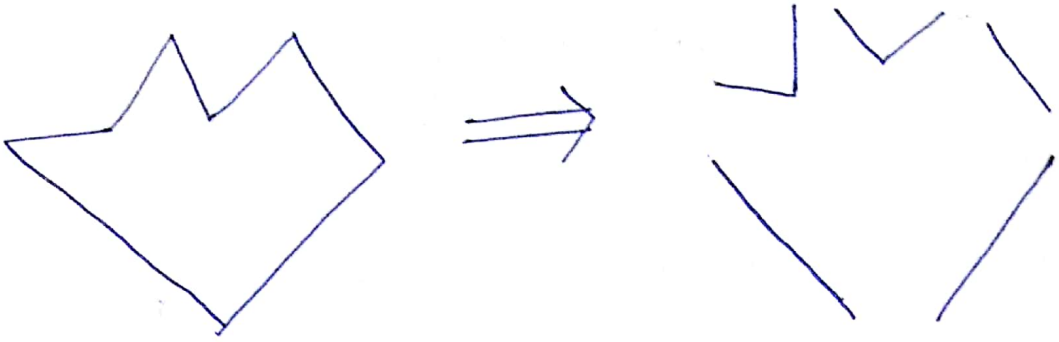
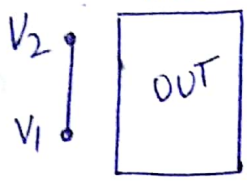


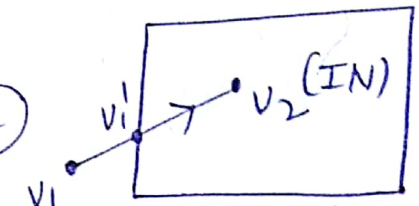
Discard

(1)



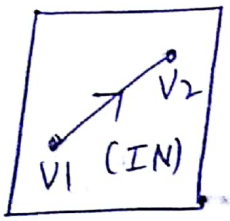
V_1 = out
V_2 = out
save = Nothing

(2)



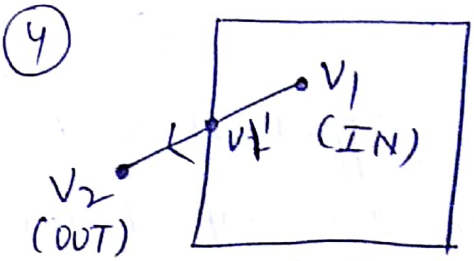
V_1 = out
V_2 = In
save V_1', V_2

(3)



V_1 = IN
V_2 = IN
save V_2 beco2 ending vertex.

(4)



V_1 = IN
V_2 = OUT
save $V_{i+1} = V_1'$

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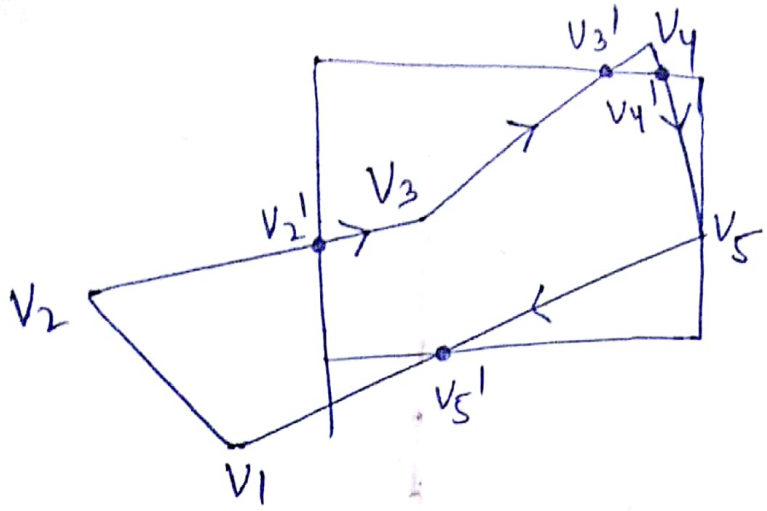
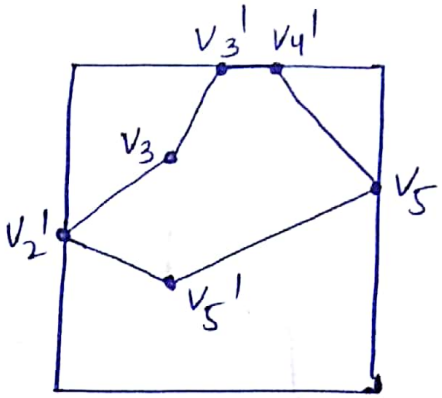
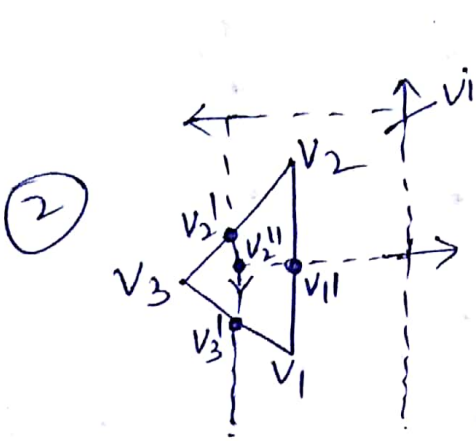


→ consider V_1V_2 = save nothing

save V_2', V_3
save V_3'
save V_4', V_5
save V_5'





LRBT

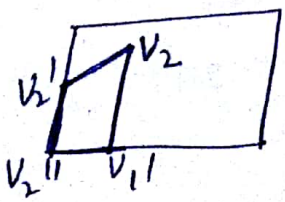
(L)
$V_1V_2 \rightarrow V_2$
$V_2V_3 \rightarrow V_2'$
$V_3V_1 \rightarrow V_3'V_1$

(R)
$V_1V_2 \rightarrow V_2$
$V_2V_2' \rightarrow V_2'$
$V_2'V_3' \rightarrow V_3'$
$V_3'V_1 \rightarrow V_1$

(B)
$V_1V_2 \rightarrow$ OUT – IN – $V_1'V_2$
$V_2V_2' \rightarrow$ NO (V_2')
$V_2'V_3' \rightarrow$ IN – OUT – V_2''
$V_3'V_1 \rightarrow$ NO O/P.

(TOP) Everything inside no change

→ Right & TOP clipper



↓
$V_1'V_2 = V_2$ $V_2''V_1' = V_1'$
$V_2V_2' = V_2'$
$V_2'V_2'' = V_2''$

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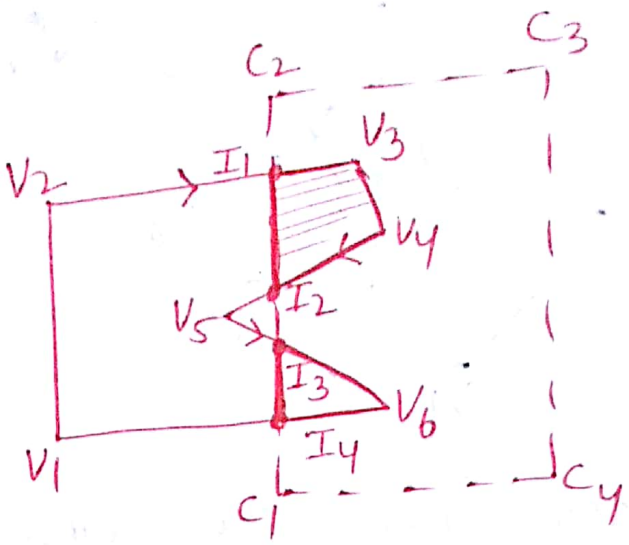
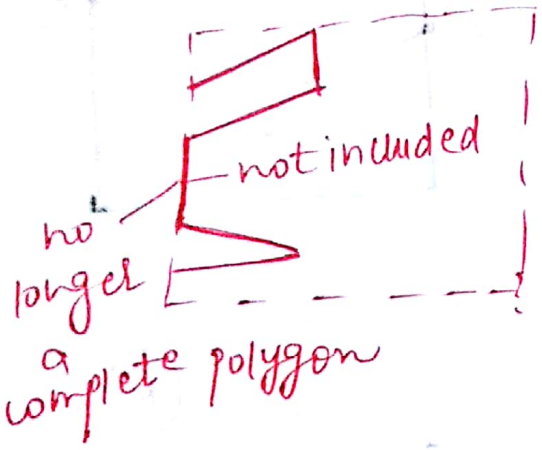
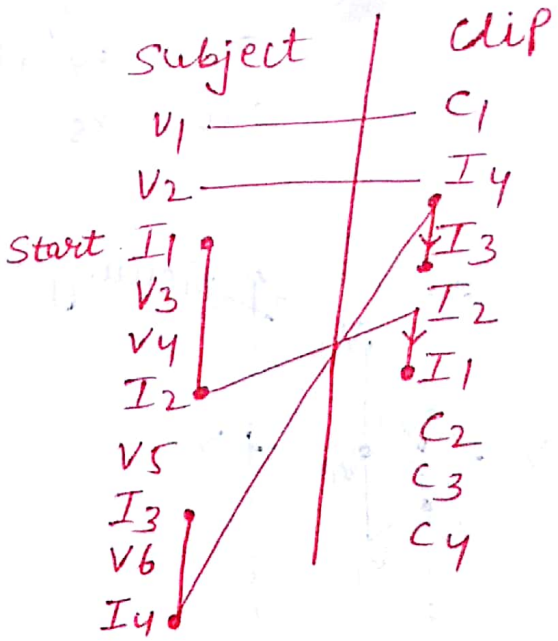


S-H



W-AA



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