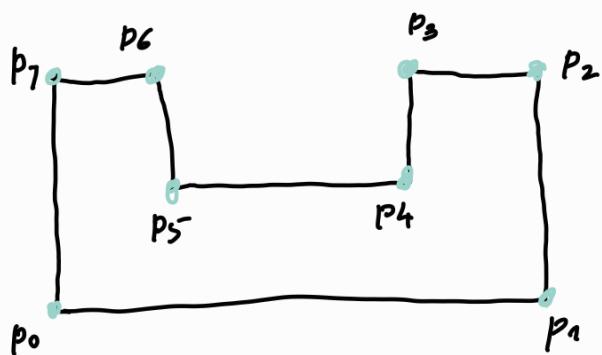


Logic of creating a 2D polygon with rounded corners

There are 9 conditions and 4 input functions required.

Consider the section below



radius list for 7 points
P0 P1 P2 P3 P4 P5 P6 P7
radius → 0 0 1 1 5 5 1 1

- So, at each point a radius could be specified or no radius specified.
- Point could be clockwise or counter clockwise.
clockwise is denoted by '1' and ccw as '-1'
- For each point consider the point just before it.
- let's say
 p_a = previous point
 p_b = The point in consideration.
 r_a = radius at previous point
 r_b = radius at the point in consideration.
- Conditions are

p_a	p_b	r_a	r_b
Condition 1	-	-	0 0

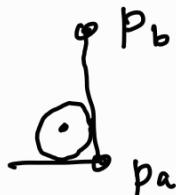
if at both the points p_a and p_b , there is no radius specified, it does not matter how the points are oriented.

$$p_a \quad p_b \quad r_a \quad r_b$$

$$\text{Condition 2} \quad -1 \quad - \quad >0 \quad 0$$

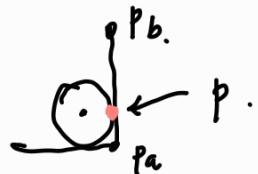
where ever the radius is not specified, orientation of that point is not necessary

The above condition can be denoted by.



The circle at the point p_a shows that a radius is specified at p_a and the joining horizontal to vertical lines shows that the orientation of p_a is ccw(-1)

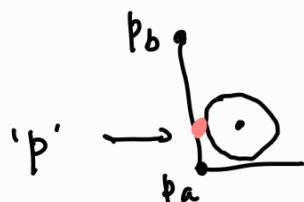
In this a point 'p' as shown below needs to be calculated.



function circle to point tangent
to be created to find point 'p'

$$p_a \quad p_b \quad r_a \quad r_b$$

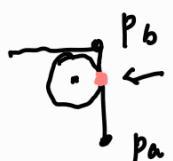
$$\text{Condition 3} \quad 1 \quad - \quad >0 \quad 0$$



function point to circle tangent
to be created to find point 'p'

$$p_a \quad p_b \quad r_a \quad r_b$$

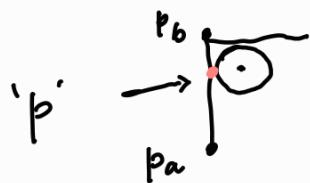
$$\text{Condition 4} \quad - \quad -1 \quad 0 \quad >0$$



function point to circle tangent

Condition 5

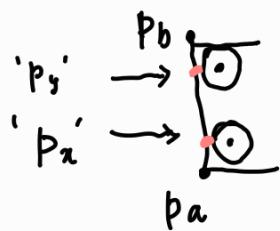
$$\begin{array}{cccc} p_a & p_b & r_a & r_b \\ - & 1 & 0 & >0 \end{array}$$



function circle to point tangent

Condition 6

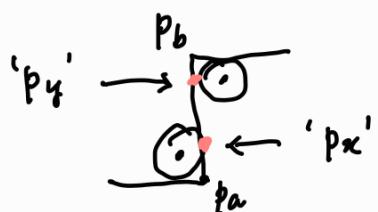
$$\begin{array}{cccc} p_a & p_b & r_a & r_b \\ 1 & 1 & >0 & >0 \end{array}$$



function 2 circle tangent point
to be created to calculate points.
'p_x' and 'p_y'

Condition 7

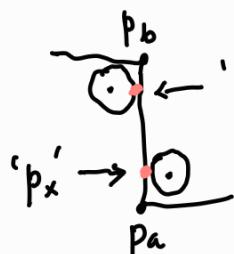
$$\begin{array}{cccc} p_a & p_b & r_a & r_b \\ -1 & 1 & >0 & >0 \end{array}$$



function 2 circles cross tangent-
to be created.

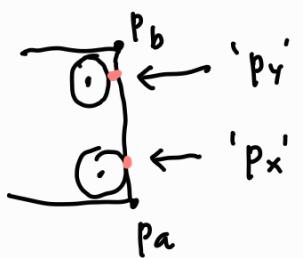
Condition 8

$$\begin{array}{cccc} p_a & p_b & r_a & r_b \\ 1 & -1 & >0 & >0 \end{array}$$



function 2 circle cross tangent

Condition Q	p_a	p_b	r_a	r_b
	-1	-1	>0	>0

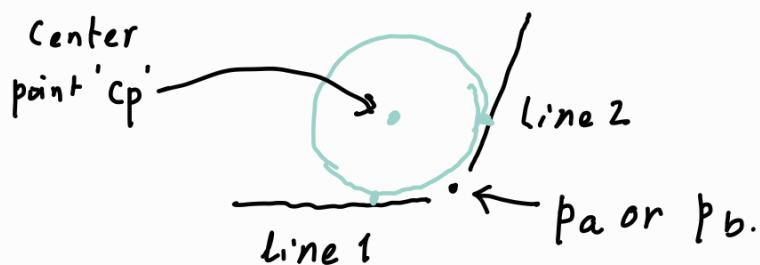


function 2 circle tangent point

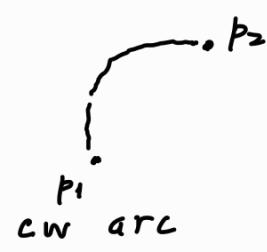
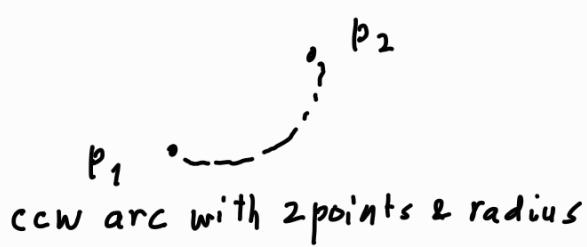
is required to calculate points
' p_x ' and ' p_y '

Apart from the above functions following calculations would be required for most of the above "conditions."

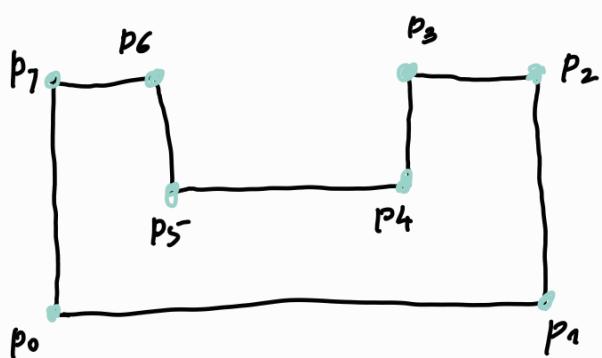
1. for the points where radius is specified, a center point for drawing circle is required such that the circle drawn is tangent to both the lines at the point.



2. function to create an arc where following arc specified.
 - 2 points
 - radius
 - clock wise or counter clockwise.



Now let us consider the example

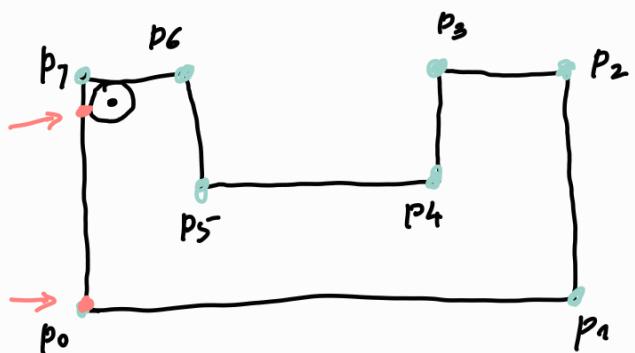
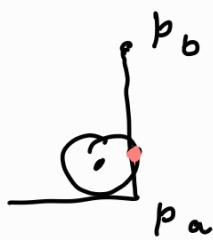


radius list for 7 points

p_0	p_1	p_2	p_3	p_4	p_5	p_6	p_7
radius $\rightarrow 0$	0	1	1	5	5	1	1

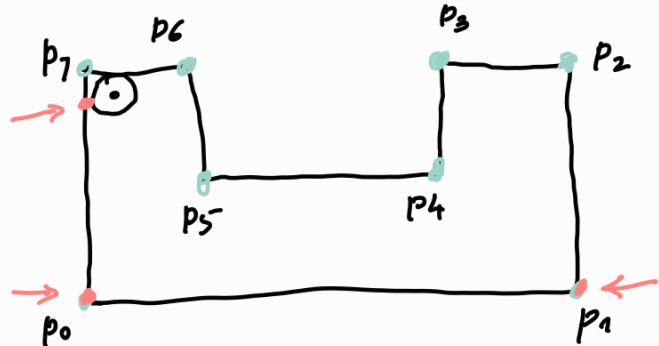
at point p_0

condition



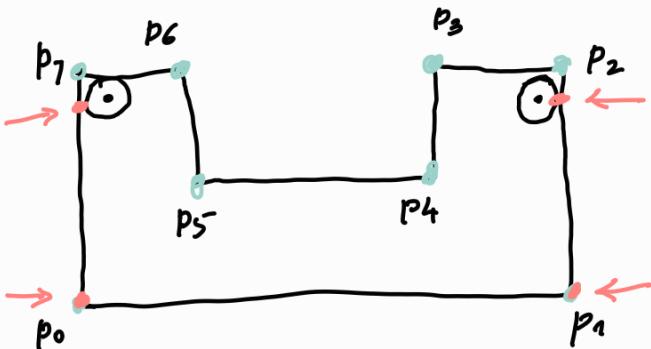
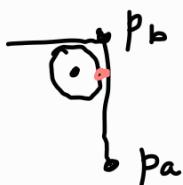
at point p_1

Condition



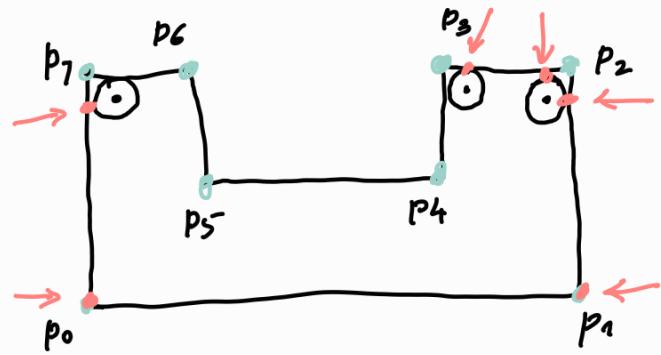
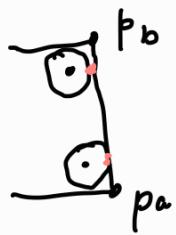
at point p_2

Condition.



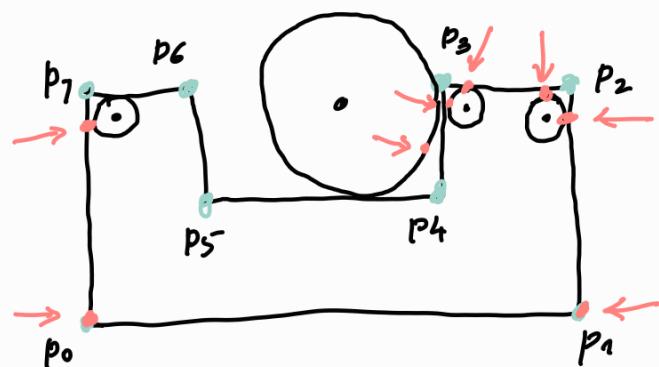
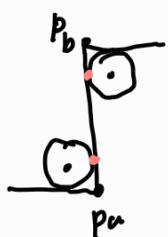
at point p_3

condition



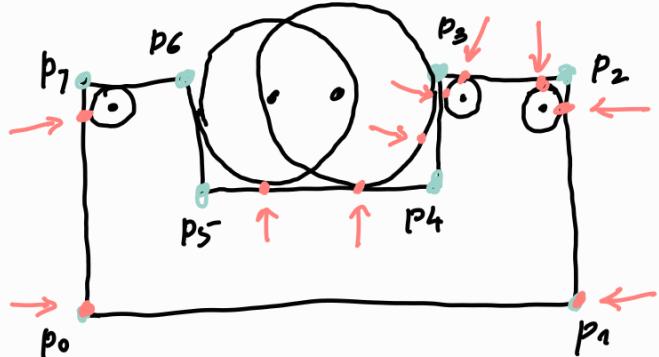
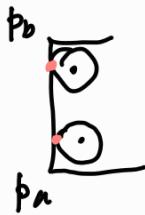
at point p_4

condition



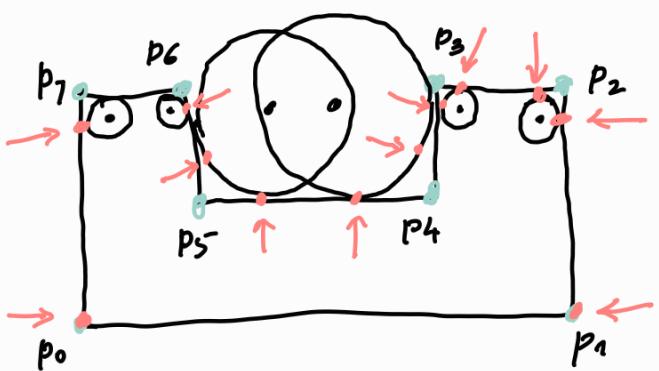
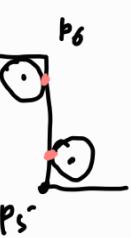
at point p_5

Condition



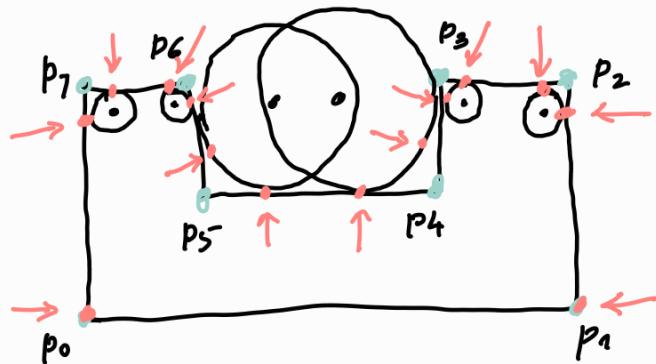
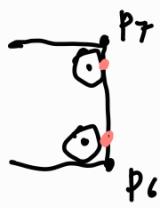
at point p_6

Condition



at point P_7

Condition



with all the above 'red' points now draw section.

