

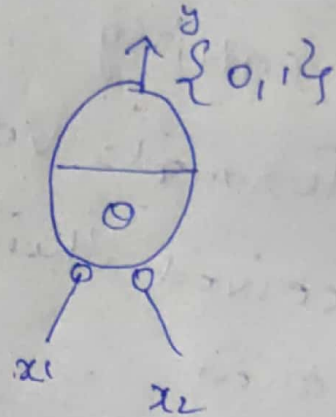
# Computational intelligence

1) NOR :

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| $x_1$ | $x_2$ | $x_1 \text{ NOR } x_2$ |
|-------|-------|------------------------|
| 0     | 0     | 1                      |
| 0     | 1     | 0                      |
| 1     | 0     | 0                      |
| 1     | 1     | 0                      |



Here,  $x_1$  &  $x_2$  are inhibitory input

So, if any of  $x_1$  &  $x_2$  is 1, then the output is 0

$$g(x) = \sum_{i=1}^2 x_i$$

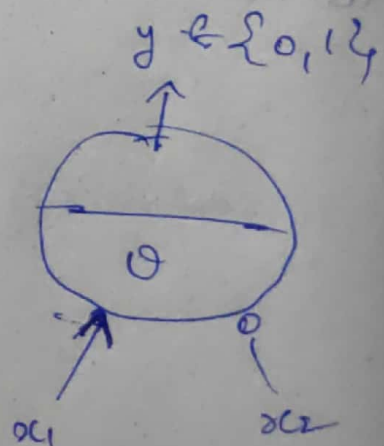
$$\therefore \boxed{\theta = 0}$$

$$y = \begin{cases} 1 & \text{if } g(x) \geq 0 \\ 0 & \text{if } g(x) < 0 \end{cases}$$

$\therefore$  for the threshold  $\theta \geq 0$ , the output is one

2)  $x_1$  and  $x_2$  :

| $x_1$ | $x_2$ | $x_1 \text{ AND } x_2$ |
|-------|-------|------------------------|
| 0     | 0     | 0                      |
| 0     | 1     | 0                      |
| 1     | 0     | 0                      |
| 1     | 1     | 1                      |



Here  $x_2$  is inhibitory input

So, for the case  $x_1=0$  and  $x_2=1$  &  
 $\bar{x}_1=1$  and  $x_2=1$  the output will be 1 because  
 $x_2$  is inhibitory.

for the case

$x_1=0, x_2=0$ , the output is 0 and

$x_1=1, x_2=0$ , the output is 1

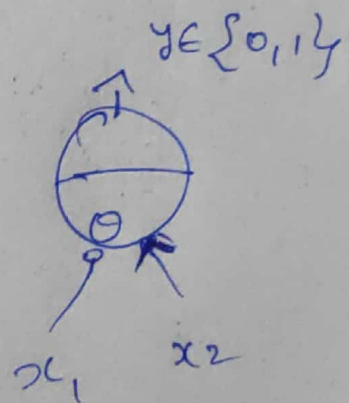
So, if the summation is  $\geq 1$ , the output  
 will be 1.

The threshold value is  $\boxed{0.5}$

$$\therefore y = \begin{cases} 1 & g(x) \geq 1 \\ 0 & g(x) < 1 \end{cases} \quad g(x) = \sum_{i=1}^2 x_i$$

3)  $\bar{x}_1$  and  $x_2$

| $x_1$ | $x_2$ | $\bar{x}_1$ And $x_2$ |
|-------|-------|-----------------------|
| 0     | 0     | 0                     |
| 0     | 1     | 1                     |
| 1     | 0     | 0                     |
| 1     | 1     | 0                     |



So, in the case

1)  $x_1=1, x_2=0$

2)  $x_1=1, x_2=1$

The output will be 0 as  $x_1 = 1$

For, the case

3)  $x_1 = 0, x_2 = 0 \Rightarrow$  The output has to be 0

4)  $x_1 = 0, x_2 = 1 \Rightarrow$  The out has to be 1

$\therefore$  So if the summation  $\geq 1$ , the

output will be 1

$\therefore$  The threshold value,  $\boxed{\theta = 1}$

$$\therefore y = \begin{cases} 1 & , g(x) \geq 1 \\ 0 & , g(x) < 1 \end{cases} \quad g(x) = \sum_{i=1}^2 x_i$$