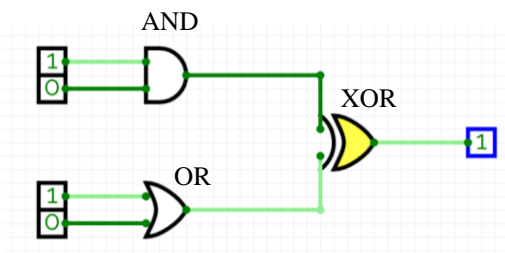


### Problem 1

Imagine that you are asked to build a tiny neural network to replicate the output of a gate system as shown below.



Truth table of each gate is given below.

Truth Table (AND Gate)			Truth Table (OR Gate)			Truth Table (XOR Gate)		
Input 1	Input 2	Output	Input 1	Input 2	Output	Input 1	Input 2	Output
0	0	0	0	0	0	0	0	0
0	1	0	0	1	1	0	1	1
1	0	0	1	0	1	1	0	1
1	1	1	1	1	1	1	1	0

Build the neural network to replicate the output of the system. For speedy operation, the network needs to be as small as possible without compromising accuracy. What would be the mathematical expression of the function to produce the outcome? You have to create the training set using python codes. [20]

### Problem 2

Build a CNN based autoencoder which will take an image of size 512 x 512 and then it will resize it to 128 x 128. [10]

### Problem 3

Explain how dropout layer, batch-normalization layer and max-pool layer together makes a CNN classification network robust. [10]