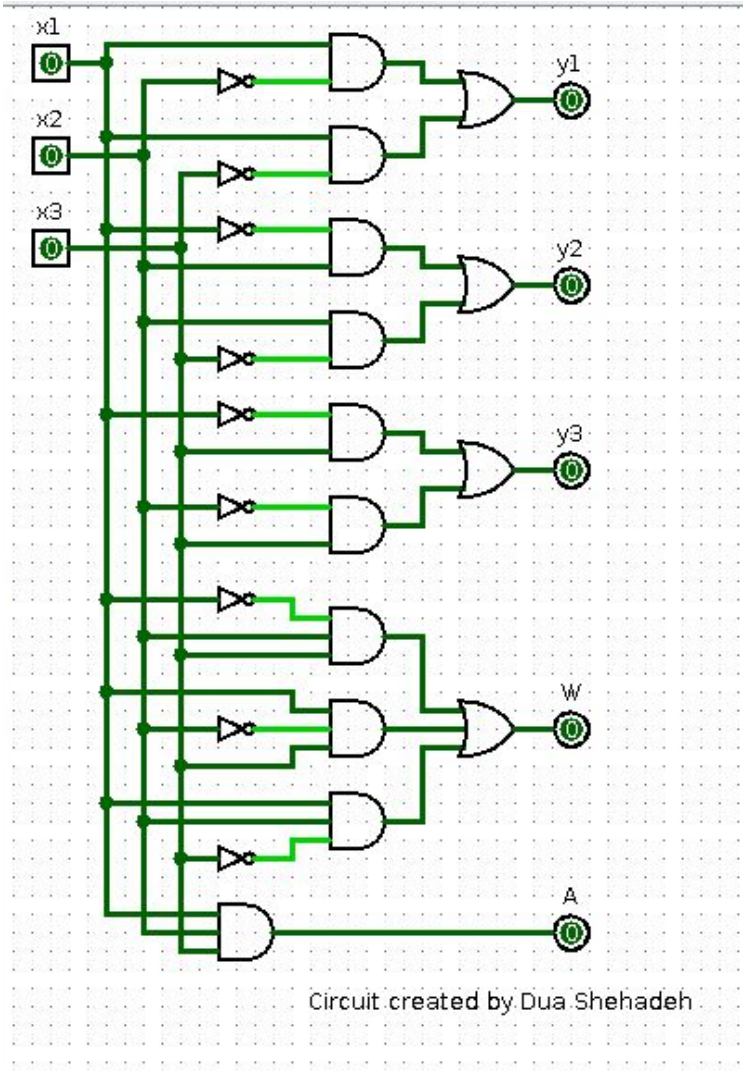
Design Restrictions:

Definition of Y_1, Y_2, Y_3 , W, A in terms of X_1, X_2 and X_3:

- $Y_n = X_n$ and W = A = 0 when one or fewer input signals are high (normal condition, at most one lock is open);
- $Y_n = X_n$, W = 1 and A = 0 when exactly two input signals are high (warning condition, 2 locks are open);
- $Y_n = 0$, W = 0 and A = 1 when the river lock operator had moved switches intending for all three locks to open (causing all locks to close and sounding an alarm).

x1	x2	x3	y1	y2	y3	W	A
0	0	0	0	0	0	0	0
0	0	1	0	0	1	0	0
0	1	0	0	1	0	0	0
0	1	1	0	1	1	1	0
1	0	0	1	0	0	0	0
1	0	1	1	0	1	1	0
1	1	0	1	1	0	1	0
1	1	1	0	0	0	0	1



Boolean Functions derived for outputs based on the scenario's specifications:
Y1 = x1x2'+x1x2x3'
Y2= x1'x2+x1x2x3'
Y3=x1'x3+x1x2x3'
W=x1'x2x3+x1x2'x3+x1x2x3'
A= x1x2x3
Boolean Function format used: SOP (Sum of product) where **'** **represents low (0)**