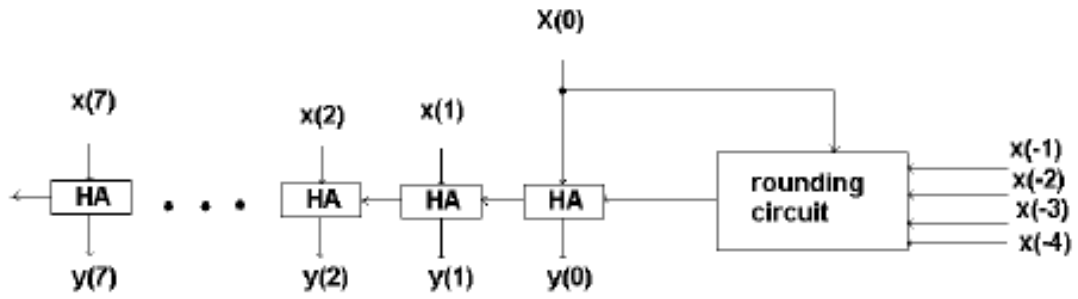


Problem 3



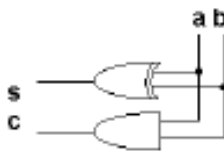
$$\text{non0} = x(-2) \text{ or } x(-3) \text{ or } x(-4)$$

cin is generated for

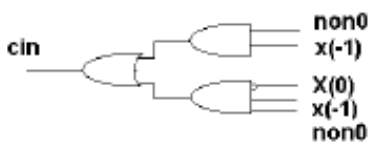
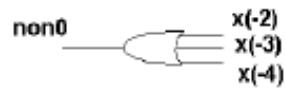
x(0)	x(-1)	non0
0	1	1
1	1	0

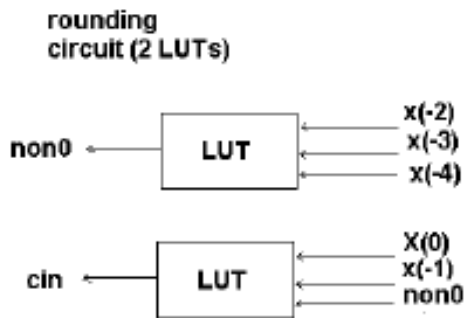
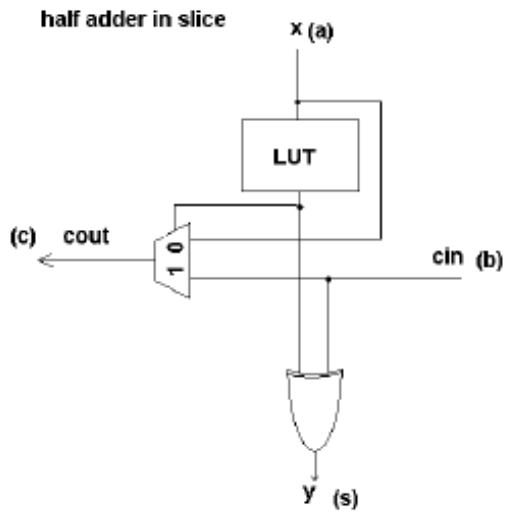
$$\text{cin} = x(-1)\text{non0} + x(0)x(1)(\text{not non0})$$

half adder - gates:



rounding circuit - gates:





Area = 8 LUTs (for an incrementer) + 2 LUTs (for rounding circuit) = **10 LUTs**

Latency = $2 \cdot d_{\text{LUT}} + 7 \cdot d_{\text{MUX}} + 1 \cdot d_{\text{XOR}} = 2 \cdot 1\text{ns} + 7 \cdot 0.1\text{ns} + 1 \cdot 0.25\text{ns} = \mathbf{2.95\text{ns}}$