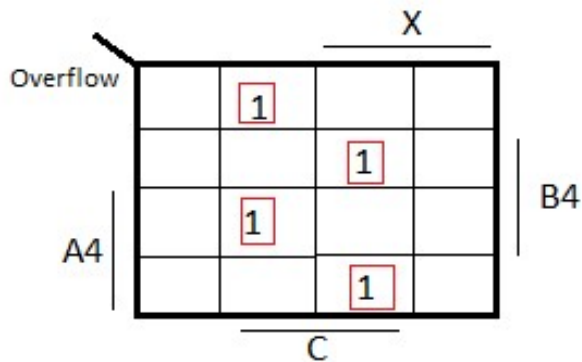
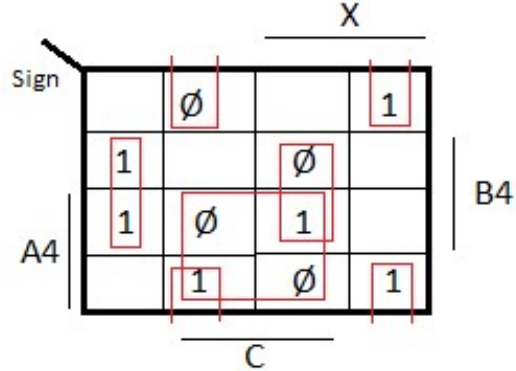
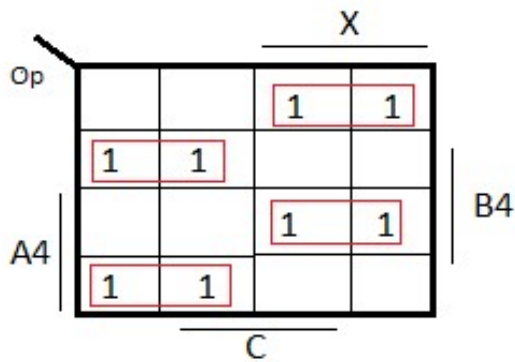


TakeHome Exam 4 Solutions:

a)

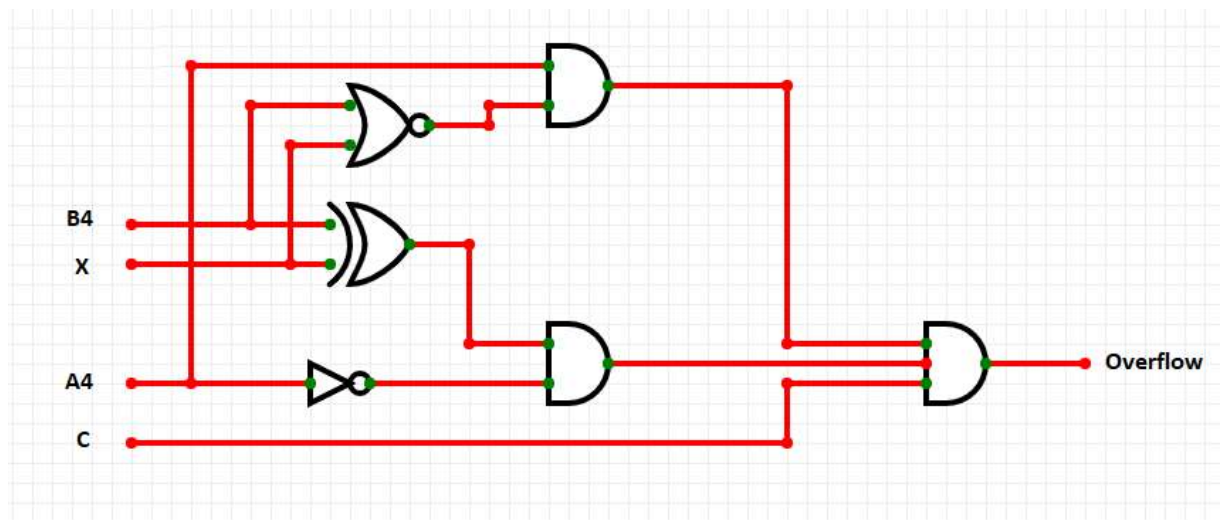
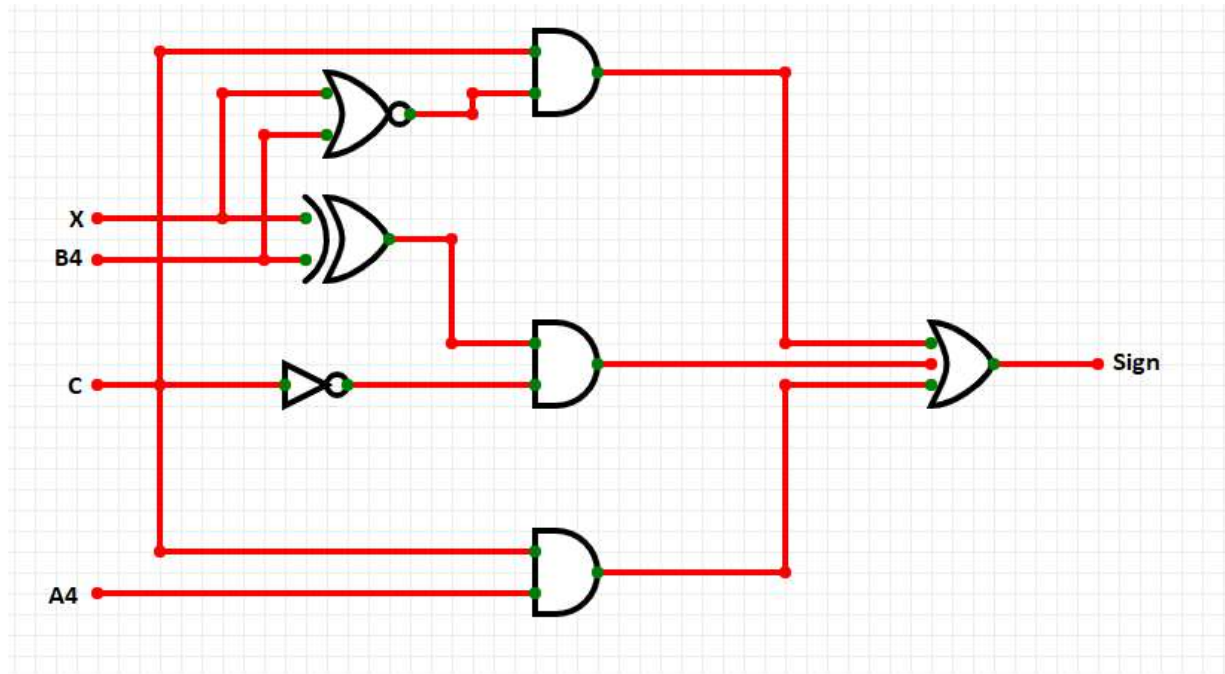
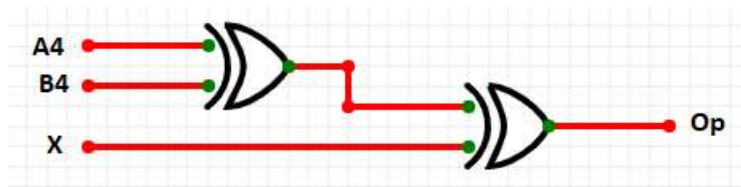
A4	B4	X	C	Op	Sign	Overflow
0	0	0	0	0	0	0
0	0	0	1	0	∅	1
0	0	1	0	1	1	0
0	0	1	1	1	0	0
0	1	0	0	1	1	0
0	1	0	1	1	0	0
0	1	1	0	0	0	0
0	1	1	1	0	∅	1
1	0	0	0	1	0	0
1	0	0	1	1	1	0
1	0	1	0	0	1	0
1	0	1	1	0	∅	1
1	1	0	0	0	1	0
1	1	0	1	0	∅	1
1	1	1	0	1	0	0
1	1	1	1	1	1	0



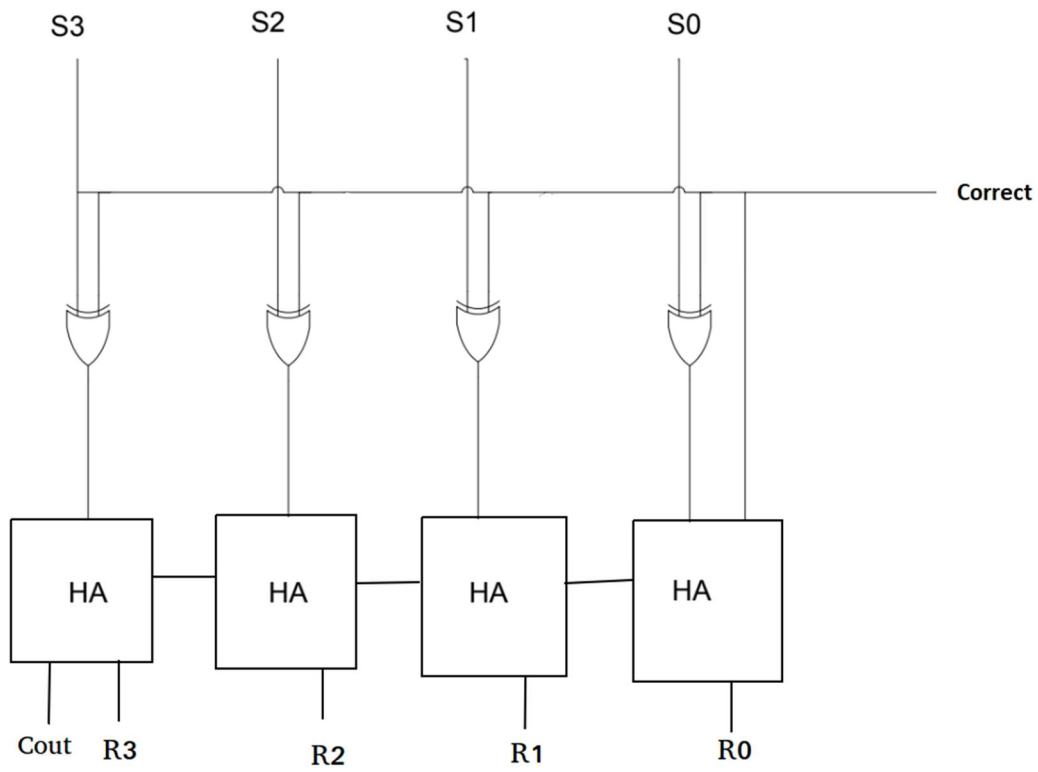
$$\text{Sign} = A4C + B4X'C' + B4'XC' + B4XC + B4'X'C = A4C + C' (B4X' + B4'X) + C(B4X + B4'X') = \mathbf{A4C + C'(B4 \oplus X) + C(B4 \odot X)}$$

$$\text{Op} = A4B4'X' + A4B4X + A4'B4X' + A4'B4'X = \mathbf{A4 \oplus B4 \oplus X}$$

$$\begin{aligned} \text{Overflow} &= A4'B4'X'C + A4'B4XC + A4B4X'C + A4B4'XC = C (A4'B4'X' + A4'B4X + A4B4X' + A4B4'X) \\ &= C(A4(B4X' + B4'X) + A4'(B4X' + B4'X)) \\ &= \mathbf{C(A4(B4 \odot X) + A4'(B4 \oplus X))} \end{aligned}$$



b)



c)

