Ruiyang Qin

Sept.9th 2017

CMPEN 271

Design a car alarm Circuit

Design a minimal circuit to implement the door alarm Boolean function

Boolean Function:

Alarm=doorOpen\*alarmEnabled

+doorOpen\*alarmEnabled\*motionSensorActivie

+alarmEnabled\*motionSensorActive

Simplification of words:

doopOpen = DO

alarmEnabled = AE

motionSensorActivie = MSA

Truth table

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| DO | AE | MSA | DO\*AE | DO\*AE\*MSA | AE\*MSA | output |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 | 0 | 1 |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Minimize:

F = DO \* AE + DO \* AE \* MSA + AE \* MSA

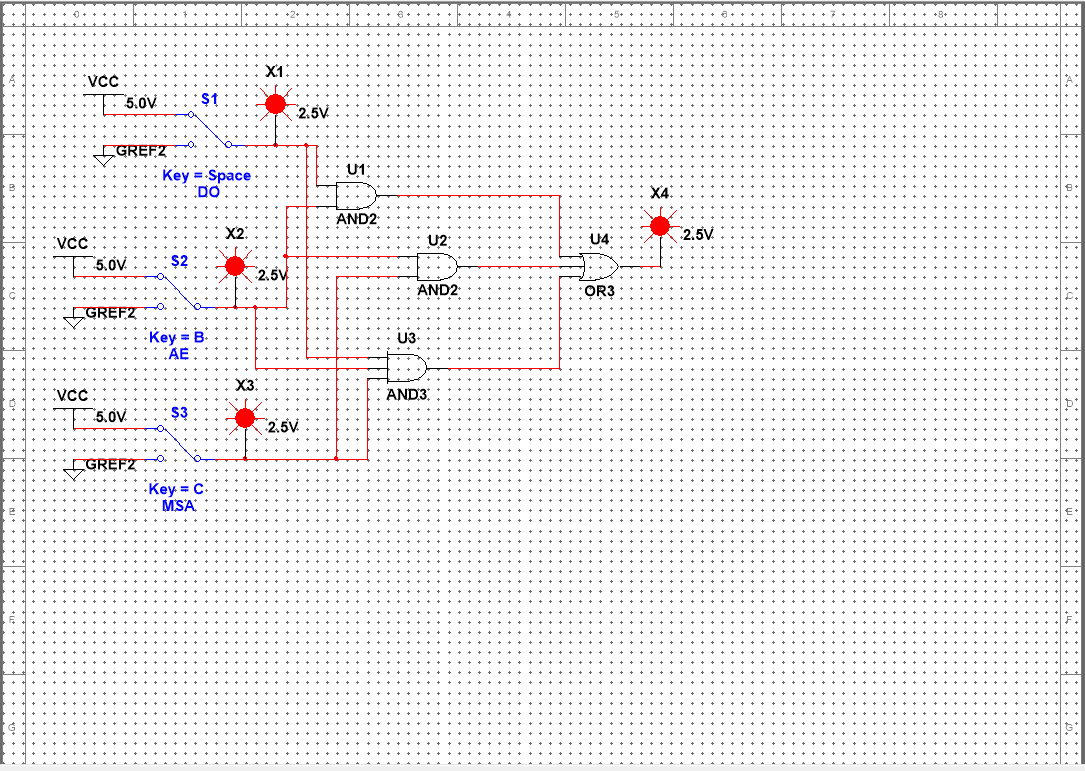
= DO \* AE + MSA \* (DO \* AE + AE)

= DO \* AE + MSA \* AE (DO + 1)

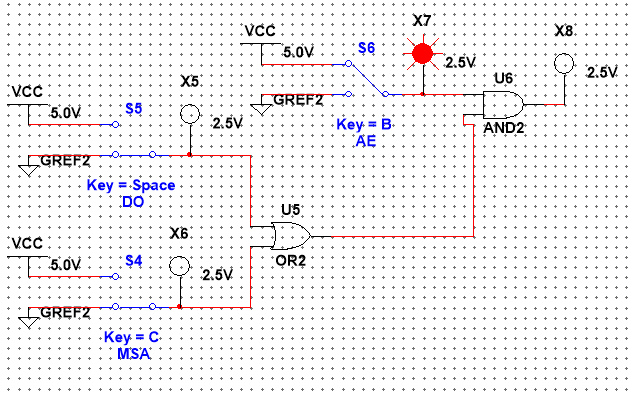
= DO \* AE + MSA \* AE \* 1 = DO \* AE + MSA \* AE

= AE \* (DO + MSA)

# of IC: 2(one for and one for or)



Minimize: (# of IC: 2)



Other version of minimize:

