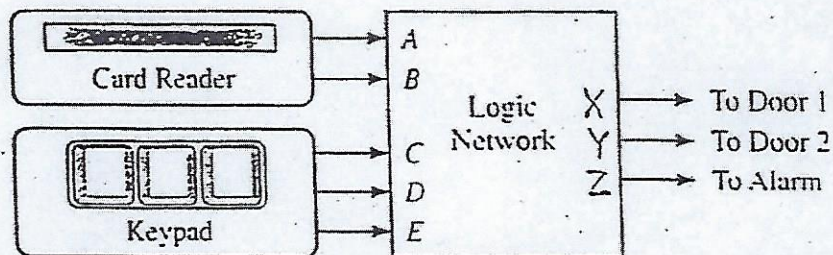


A simple security system for two doors consists of a card reader and a keypad.



A person may open a particular door if he or she has a card containing the corresponding code, and enters an authorized keypad code for that card. The outputs from the card reader are as follows:

	<u>A</u>	<u>B</u>
No card inserted	0	0
Valid code for door 1	0	1
Valid code for door 2	1	1
Invalid card code	1	0

To unlock a door, a person must hold down the proper keys on the keypad and then insert the card in the reader. The authorized keypad codes for door 1 are 101 and 110, and the authorized keypad codes for door 2 are 101 and 011. If the card has an invalid code or if the wrong keypad code is entered, the alarm will ring when the card is inserted. If the correct keypad code is entered, the corresponding door will be unlocked when the card is inserted.

Design the logic network for this simple security system. Your network's inputs will consist of a card code AB , and a keypad code CDE . The network will have three outputs XYZ (if X or $Y = 1$, door 1 or 2 will be opened; if $Z = 1$, the alarm will sound). ~~Design your network using only 2- and 3-input NOR-gates and inverters. Any solution with 20 or fewer gates and inverters is acceptable (not counting the 5 inverters for the inputs). Use toggle switches for inputs $A, B, C, D,$ and E when you test your network.~~