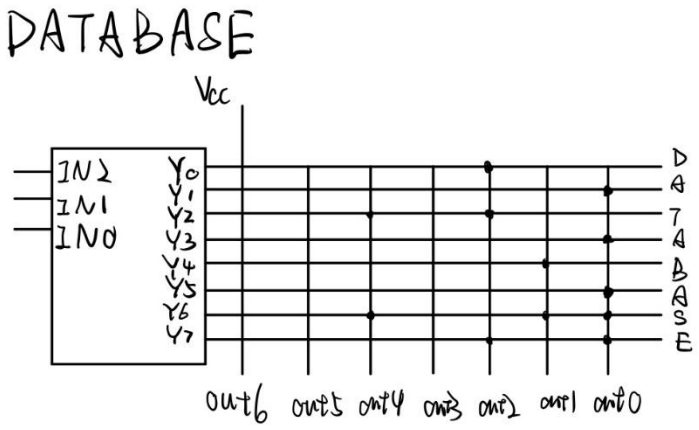
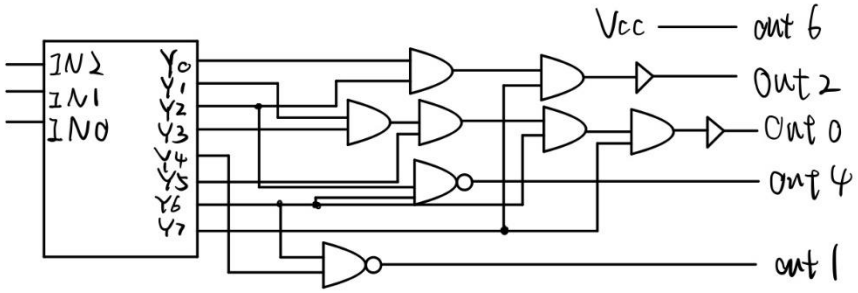
1) Because there are 8 letters, theoretically, if they all have “1” in one bites, we can use 7 OR gates to connect them. However, we also can connect that output with VCC directly because all of them are “1”. Thus, actually the most OR gates we can use for one bit is 6.

2) When there are 2 outputs from decoder, use NAND gate to connect them; when there are more than 2 out puts, use AND gate to connect them, and before connect to OUT, add a NOT gate.

3)



Address	output
0 0 0	1 0 0 0 1 0 0
0 0 1	1 0 0 0 0 0 1
0 1 0	1 0 1 0 1 0 0
0 1 1	1 0 0 0 0 0 1
1 0 0	1 0 0 0 0 1 0
1 0 1	1 0 0 0 0 0 1
1 1 0	1 0 1 0 0 1 1
1 1 1	1 0 0 0 1 0 1



According to the given example circuit and the question 2, I finished my circuit. I use AND gates to connect outputs that over 3 and with a NOT gate to invert the value, or NAND gat to connect 2 outputs. Because OUT6 is always “1”, I connect it with VCC. And OUT3 and 5 are always “0”, so I do not connect them then they will always be “0”.

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