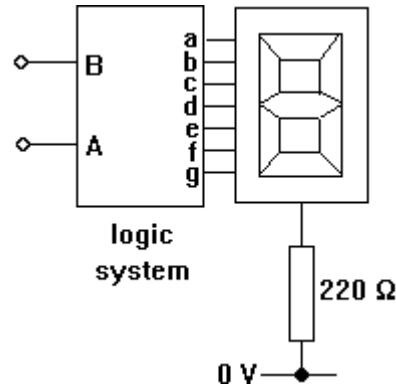


Binary-to-seven-segment converter

The logic system shown in the diagram below displays a number on the seven-segment LED corresponding to the binary value of the word BA.



The number displayed on the seven-segment LED must be as shown in the table below.

B	A	number
0	0	zero
0	1	one
1	0	two
1	1	three

1. Write out a truth table for the logic system, showing how the outputs (a,b,....., f, g) are related to the inputs (B, A).
2. Write down seven separate Boolean algebra expressions, one for each output in terms of the two inputs.
3. Design a NAND gate circuit for the logic system. Try to minimise the number of NAND gates being used. Any output which controls an LED will not produce a clean logic signal at the input of another gate.
4. Assemble the system and test it. Use pull-down resistors and switches to feed signals into the inputs.