

1007ICT Assignment/Report

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1.0 Part A

Jarrod Currie-Hammond s5016255 Main

Part A has the role of joining multiple sub circuits, with the aim of testing the Current floor (C1, C2, C3) and the Destination floor (D1, D2, D3) inputs. Current floor is used to signify the floor that the elevator is currently positioned at, and Destination floor is used to provide a position in which the user wants to travel to. The inputs are passed onto the Decoder sub circuit, which results in a single output from 0 – 7 for each of the inputs. These results inform the Floor Check sub circuit of the current floor position, and which floor the user intends to travel to. The Successful LED is lit accordingly to the validity of the users' intentions, determining whether the Current floor and Destination floor values are allowed and passed successfully.

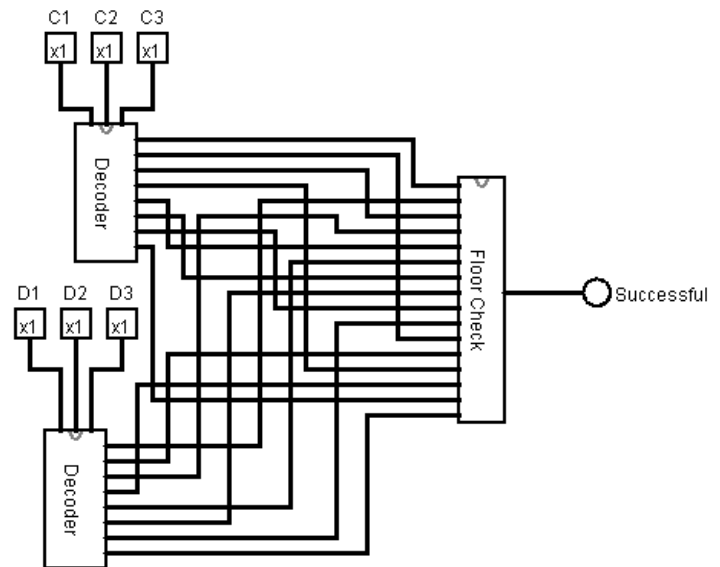


Figure 1.1

2.0 Decoder

Jarrod Currie-Hammond s5016255 3-8 Decoder

This sub circuit is a 3 to 8 decoder used in Part A (*Figure 1*). This Decoder circuit allows for 3 inputs and uses pre-defined truth tables (*Table 2.1, Table 2.2*) to decipher the Current floor and Destination floor inputs and result in a set output. These outputs turn a 3-bit input into a series of 1-bit outputs, covering all possible values. The Decoder will only have a single active output at any time, which in turn, shows the user what the corresponding input is.

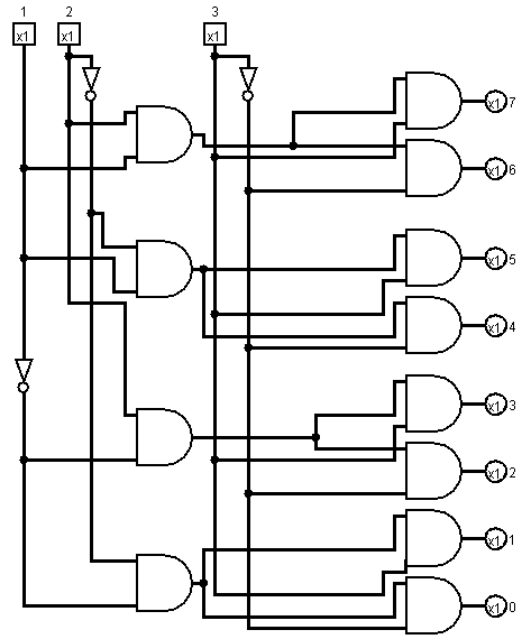


Figure 1.2

3.0 Floor Check

Jarrod Currie-Hammond s5016255 Floor Check

The Floor Check relies heavily on the outputs of the Decoder (*Figure 1.2*) and the Switch (*Figure 1.4*) sub circuits. The data from the decoders in Part A (*Figure 1.1*) are passed to this sub circuit and are then broken in to two sections for allowed floors and private floors. The decoder sub circuit can only ever output one line carrying a value of 1 at any given time, so these lines are bundled together. Allowed floors exclusively pass through the Switch sub circuit and are first checked against this defined rule set.

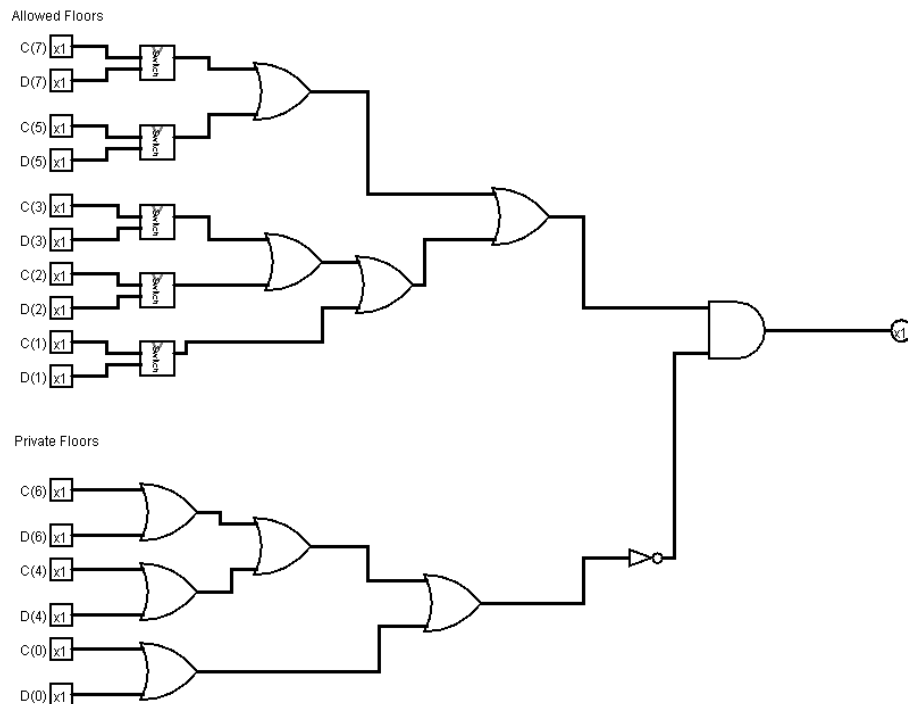


Figure 1.3

4.0 Switch

Jarrod Currie-Hammond s5016255 Switch

The Switch is built as a basic XOR gate comprising of AND, OR and NOT gates. It passes the two inputs received by the allowed floors in the Floor Check (*Figure 1.3*) sub circuit to be determined as a single output. The Floor Check then relies on this output for the allowed floors section exclusively.

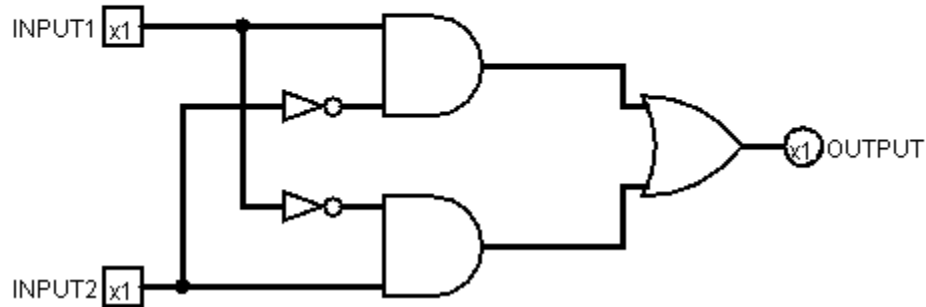


Figure 1.4

5.0 Truth Tables

C value	C1	C2	C3
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

Table 2.1

D value	D1	D2	D3
0	0	0	0
1	0	0	1
2	0	1	0
3	0	1	1
4	1	0	0
5	1	0	1
6	1	1	0
7	1	1	1

Table 2.2

C1	C2	C3	D1	D2	D3	Successful
0	0	0	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	0	0	1	0	0	0
0	0	0	1	0	1	0
0	0	0	1	1	0	0
0	0	0	1	1	1	0
0	0	1	0	0	0	0
0	0	1	0	0	1	0
0	0	1	0	1	0	1
0	0	1	0	1	1	1
0	0	1	1	0	0	0
0	0	1	1	0	1	1
0	0	1	1	1	0	0
0	0	1	1	1	1	1
0	1	0	0	0	0	0
0	1	0	0	0	1	1
0	1	0	0	0	0	0
0	1	0	1	0	1	1
0	1	0	1	1	0	0
0	1	0	1	1	1	1
0	1	0	0	0	0	0
0	1	1	0	0	1	1
0	1	1	0	1	0	1
0	1	1	0	1	1	0

0	1	1	1	0	0	0
0	1	1	1	0	1	1
0	1	1	1	1	0	0
0	1	1	1	1	1	1
1	0	0	0	0	0	0
1	0	0	0	0	1	0
1	0	0	0	1	0	0
1	0	0	0	1	1	0
1	0	0	1	0	0	0
1	0	0	1	0	1	0
1	0	0	1	1	0	0
1	0	0	1	1	1	0
1	0	1	0	0	0	0
1	0	1	0	0	1	1
1	0	1	0	1	0	1
1	0	1	0	1	1	1
1	0	1	1	0	0	0
1	0	1	1	0	1	0
1	0	1	1	1	0	0
1	0	1	1	1	1	1
1	1	0	0	0	0	0
1	1	0	0	0	1	0
1	1	0	0	1	0	0
1	1	0	0	1	1	0
1	1	0	0	1	0	0
1	1	0	1	0	0	0
1	1	0	1	0	1	0
1	1	0	1	1	0	0
1	1	0	1	1	1	0
1	1	1	0	0	0	0
1	1	1	0	0	1	1

1	1	1	0	1	0	0
1	1	1	0	1	1	1
1	1	1	1	0	0	0
1	1	1	1	0	1	1
1	1	1	1	1	0	0
1	1	1	1	1	1	0

Table 2.3