Lab 2 BCD to 7-segment Decoder

Answer Sheet

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1. Determine the logic functions of the 7 segments of LED outputs in terms of minterms of the inputs A, B, C, and D **directly** from the truth table in Table 1 for decimal digits from 1 to 4 only. [30 marks]

a = A’B’CD’+A’B’CD

b = A’B’C’D+ A’B’CD’+A’B’CD+A’BC’D’

c = A’B’C’D+A’B’CD+A’BC’D’

d = A’B’CD’+A’B’CD

e = A’B’CD’

f = A’BC’D’

g= A’B’CD’+A’B’CD+A’BC’D

1. Convert the **simplified** logic functions in part 1) to another set of logic functions which are using **maximum** 4 NOR gates only in the final overall circuit. [30 marks]

a= C

b=1

c= (B nor D),

d= C

e= B nor D

f= B

g= (B nor C)’

1. Build the circuit using Logisim with name and SID label. The circuit should include 4 inputs (i.e. A, B, C, D), the combinational logic (i.e. 4 NOR gates only), and the outputs (i.e. a, b, c, d, e, f, g) connected to a 7-segment display. [40 marks]