

ENGR xD52: HW b010

Due October 1st 5PM EST

This homework is to be done primarily alone. If you get stuck, you may consult anyone you like after putting in real effort. Annotate collaboration per problem.

Expected time is less than one hour.

Look Up Tables

For either {1.1 and 1.2} or {1.3}, do the following:

1. Create a Look Up Table that simulates the corresponding function. Note Depth and Width for the table.
2. Neatly draw the entire table in gates and constants.
3. Write the corresponding Boolean equation.
4. Use Boolean laws to simplify the Boolean equation back down to the original function. Show all work.

1.1 Two Input OR Gate ($A+B$)

1.2 The Carry Bit of a base 2 Full Adder ($AB+AC+BC$)

1.3 A Three Bit [Gray Code Decoder](#)

Estimation

This is intended as a “back of the envelope” estimation. This problem is intentionally missing information. Do not use any outside sources or people to fill in these gaps. Identify what it is missing, make best guess assumptions and document them.

2.1 How long would it take to exhaustively test the 32-bit “Add” instruction on your laptop? That is to say that it tries all possible combinations of {32-bit number}+{32-bit number}.

2.2 How much would the electricity cost for this exhaustive test?