

HW1

EECS150, Fall 2010

Due Friday, 2:10 pm, September 3, outside 125 Cory

1. How many rows are there in a truth table with 1 input variable? How many possible functions are there of 1 variable?
2. Same question, but for 2 input variables: how many rows, how many possible functions?

Fill in the following table, and label each column

A	B	F ₀	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	F ₇	F ₈	F ₉	F ₁₀	F ₁₁	F ₁₂	F ₁₃	F ₁₄	F ₁₅
0	0	0	0	0													1
0	1	0	0	0													1
1	0	0	0	1													1
1	1	0	1	0													1
		zero	AND	A/B													one

3. Write the formula for the number of rows in a truth table of N variables, and the number of different functions of N variables.
4. You have made an ALU (arithmetic/logic unit) that performs 16 different functions on two 32 bit inputs. You have a test machine that can test your ALU by supplying it with different inputs, specifying one of the 16 functions, and checking the output. The tester can do this in 1ns. Your boss asks you to exhaustively test your ALU (i.e. test all possible combinations of inputs and function). How long will it take?
5. Is it possible to write two different Boolean expressions which have the same truth table? Is it possible to write two different truth tables which have the same Boolean expression?