

CS 2420 Lab 4

Topics: Introduction to DSCH

Pre Lab: Learn how to use snipping tool in order to neatly capture images off your screen for reports. Create the truth table for T3.

DSCH is a software package for interactive circuit design. With DSCH we can replicate (simulate) the same kinds of circuits we physically built in Labs 1-4 without ever having to handle a real chip or wire. You'll learn how to use DSCH by following your instructor's example.

T1. Logic Gates

Turn on your PC and click on the DSCH icon. DSCH will bring up two windows – the schematic drawing board and the symbol library. The drawing board should be blank. The symbol library window presents you with choices for using predefined devices, such as AND gates. **YOUR INSTRUCTOR WILL DEMONSTRATE HOW TO BUILD A CIRCUIT** corresponding to the Boolean expression below. Listen and learn,

$$F = ab + a'c$$

Make sure you understand how to do the following: a) choose a device from the library and place it on the circuit “board”; b) Use buttons and lights to “test” your circuit; c) connect signals from output to input points; d) run a simulation; e) label (title) your circuit; f) print out your circuit.

T2. Simulation

Use DSCH to simulate a NOR to NOR circuit (using NOR and NOT gates) for the function. $F = (x+y+z')(x'+y'+z)$. Use buttons for the inputs, a light for the output F, and use gates from the symbol library. Once you have “debugged” your circuit, use the snipping tool take a screen shot of your circuit to include in your report. Don't forget to make a truth table to test your circuit against.

T3. Implement a logic function

A useful logical function is a “majority” function. There are three inputs x,y,z . The output is 1 *if and only if* a majority of the inputs are 1. Fill out a truth table below for this circuit. Determine a simplified sum of products for the expression, draw a circuit diagram and then simulate this device using the appropriate logic gates (you may use one 3-input OR gate). Use buttons for inputs and a light for the output to verify the device. After testing your circuit use snipping tool again to capture your circuit for your report.