CSE435 Introduction to EDA & Testing - Spring 2022

Homework Assignment #4

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1. (25%)
   (a) (10%) For state transition fault model, explain why there are M(N-1) faults for a M-transition N-state machine. Similarly explain why there are N^M-1 multiple state transition faults.

   Solution:

   (b) (10%) For stuck-at fault model, explain why there are 2K single stuck-at faults. Similarly explain why there are 3^K-1 multiple stuck-at faults.

   Solution:

   (c) (5%) Please show the similarity and differences of (single, multiple) fault numbers between the state transition fault model and the stuck-at fault model.

   Solution:

2. (20%) Prove that for combinational circuits **faults dominance is a transitive relation**, i.e. if f dominates g and g dominates h, then f dominates h.

   Solution:

3. (55%) In the circuit shown in Figure 1,

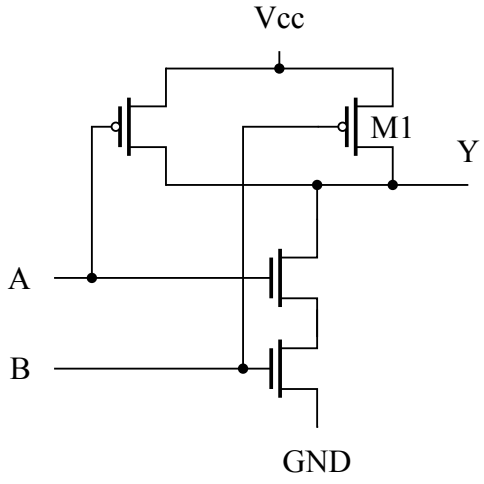

Figure 1

(a) (5%) How many single stuck-at faults needed to be considered initially?

Solution:

(b) (25%) Applying the **check point theorem (incl. fault dominance)**, how many check point faults needed to be considered?

Solution:

(c) (25%) Using **fault dominance** and **fault equivalence** relations to further reduce the number of stuck-at faults? How many remaining faults needed to be considered?

Solution: