

國立中山大學
資訊工程學系所

Introduction to EDA&Testing – Fall, 2022

Homework Assignment #4

Due Date: April 20, 2022

Please note: MUST SHOW YOUR SOLUTION PROCESS.

Without detailed solution process, only answers are NOT acceptable.

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.
 - 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.
 - c. (5%) Please show the similarity and differences of (single, multiple) fault numbers between a. state transition fault model and b. stuck-at fault model.
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.
3. (55%) In the circuit shown in Figure 1,
 - a. (5%) How many single stuck-at faults needed to be considered initially?
 - b. (25%) Applying the **check point theorem (incl. fault dominance)**, how many check point faults needed to be considered?
 - 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?

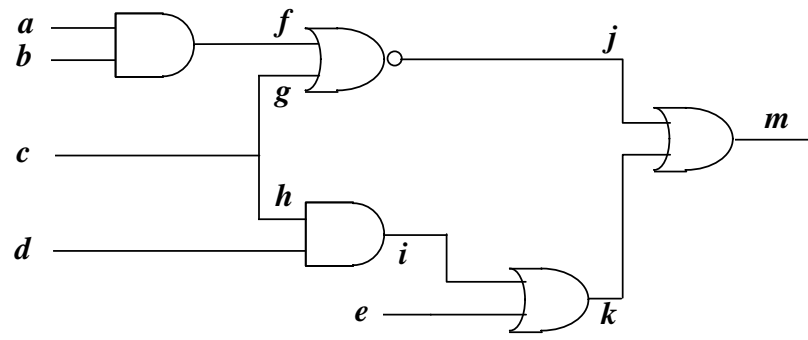


Figure 1