Assignment 10

Rasika Mohod
rmohod@gmu.edu
G01044774

Introduction to Software Testing (Edition 2): Book by Jeff Offutt and Paul Amman
Exercises Section 8.2, Number 1 (predicate iv).

Note: *I have done all the computations as defined in textbook. I tried to match it on our web tool, but the tool does not seem to be working correctly. It was giving ambiguous results or may be I was not able to understand it.*

f = !a!c!d + !cd + bcd

a. Draw the Karnaugh maps for f and !f.

K-Map for f:

cd \ ab	00	01	11	10
00	T	T		
01	T	T	T	T
11		T	T	
10				

K-Map for !f:

cd \ ab	00	01	11	10
00			T	T
01				
11	T			T
10	T	T	T	T

b. Find the nonredundant prime implicant representation for f and ¯ f.

K-Map for f:

cd \ ab	00	01	11	10
00	T	T		
01	T	T	T	T
11		T	T	
10				

Nonredundant prime implicant representation for f: !a!c + !cd + bd

K-Map for !f:

cd \ ab	00	01	11	10
00			T	T
01				
11	T			T
10	T	T	T	T

Nonredundant prime implicant representation for !f: !bc + c!d + a!d

c. Give a test set that satisfies Implicant Coverage (IC) for f.

Implicants: {!a!c, !cd, bd, !bc, c!d, a!d }

Test Set: {F_F_, __FT, _T_T, _FT_, __TF, T__F}

Final minimized Test Set: {FTFT, TFTF}

d. Give a test set that satisfies Multiple Unique True Points (MUTP) for f.

f: !a!c + !cd + bd

MUTP ={ FTFF, FFFT, → !a!c
TFFT, FTFT, → !cd
TTFT, FTTT, → bd
}

MUTP Test Set: { FTFF, FFFT, TFFT, FTFT, TTFT, FTTT }

e. Give a test set that satisfies Corresponding Unique True Point and Near False Point Pair Coverage (CUTPNFP) for f.

f: !a!c + !cd + bd

For implicant !a!c:

UTP, NFP Pair:

- !a → FFFF, TFFF
- !c → FTFF, FTTF

For implicant !cd:

UTP, NFP Pair:

- !c → TFFT, TFTT
- d → FTFT, FTFF

For implicant bd:

UTP, NFP Pair:

- b → TTFT, TFFT
- d → FTFT, FTFF

Possible CUTPNFP Test set: { FFFF, FTFF, TFFT, TTFT, FTFT →UTPs
TFFF, FTTF, TFTT, FTFF, TFFT → NFPs}

f. Give a test set that satisfies Multiple Near False Points (MNFP) for f.

f: !a!c + !cd + bd

For implicant !a!c:

NFPs:

- !a → TTFF, TFFT
- !c → FTTF, FFTT

For implicant !cd:

NFPs:

- !c → TFTT, FTTT
- d → TFFF, FTFF

For implicant bd:

NFPs:

- b → TFFT, FFTT
- d → TTFF, FTTF

MNFP Test Set = { TTFF, TFFT, FTTF, FFTT, TFTT, FTTT, TFFF, FTFF }

g. Give a test set that is guaranteed to detect all faults in figure 8.2.

MUTP Test Set: { FTFF, FFFT, TFFT, FTFT, TTFT, FTTT }

CUTPNFP Test set: { FFFF, FTFF, TFFT, TTFT, FTFT →UTPs

TFFF, FTTF, TFTT, FTFF, TFFT → NFPs}

MNFP Test Set = { TTFF, TFFT, FTTF, FFTT, TFTT, FTTT, TFFF, FTFF }

Test set to detect all faults (MUMCUT):

{ FTFF, FFFT, TFFT, FTFT, TTFT, FTTT, FFFF, TFFF, FTTF, TFTT, TTFF, FFTT}