**Homework 6**

Chapter 8.2: Syntactic Logic Coverage Criteria (DNF)

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Complete the problems below and submit this word document with your answers.

1. Draw Karnaugh maps for and (**15 points: 7.5 points each**)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ab**  **c** | 00 | 01 | 11 | 10 |
| 0 |  |  | T |  |
| 1 |  | T | T | T |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ab**  **c** | 00 | 01 | 11 | 10 |
| 0 | T | T |  | T |
| 1 | T |  |  |  |

1. Find the DNF non-redundant prime implicant representation for and (**15 points: 7.5 points each**)
2. Give a test set that satisfies Implicant Coverage (IC) for f (**15 points**)

|  |  |  |  |
| --- | --- | --- | --- |
|  | a | b | c |
| 1) ab | T | T |  |
| 2) ac | T |  | T |
| 3) bc |  | T | T |
| 4) | F | F |  |
| 5) | F |  | F |
| 6) |  | F | F |

Possible IC set for f: {TTT, FFF}

1. By using Karnaugh maps, identify when determines f (**15 points**)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ab**  **c** | 00 | 01 | 11 | 10 |
| 0 |  |  | T |  |
| 1 |  | T | T | T |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ab**  **c** | 00 | 01 | 11 | 10 |
| 0 |  | T | T |  |
| 1 | T |  |  | T |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ab**  **c** | 00 | 01 | 11 | 10 |
| 0 |  |  | T | T |
| 1 | T | T |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ab**  **c** | 00 | 01 | 11 | 10 |
| 0 |  | T |  | T |
| 1 |  | T |  | T |

1. Give a test set that satisfies Multiple Unique True Point (MUTP) for f (**10 points**)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ab**  **c** | 00 | 01 | 11 | 10 |
| 0 |  |  | T |  |
| 1 |  | T | T | T |

Unique True Points

ab:{110} ac:{101} bc:{011}

Possible MUTP: {110, 101, 011}

1. Give a test set that satisfies Corresponding Unique True Point and Near False Point

Pair Coverage (CUTPNFP) for f (**10 points**)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ab**  **c** | 00 | 01 | 11 | 10 |
| 0 |  |  | T |  |
| 1 |  | T | T | T |

* For implicant ab
  + For a, UTP 110 paired with 010 which is a NFP
  + For b, UTP 110 paired with 100 which is a NFP
* For implicant ac
  + For a, UTP 011 paired with 001 which is a NFP
  + For c, UTP 011 paired with 100 which is a NFP
* For implicant bc
  + For b, UTP 011 paired with 001 which is a NFP
  + For c, UTP 011 paired with 010 which is a NFP

Possible CUTPNFP: {110, 101, 011, 001, 010, 100}

1. Give a test set that satisfies Multiple Near False Points (MNFP) for f (**10 points**)

* For implicant ab
  + For a, we can choose
    - 010
  + For b, we can choose
    - 100
* For implicant ac
  + For a, we can choose
    - 001
  + For c, we can choose
    - 100
* For implicant bc
  + For b, we can choose
    - 001
  + For c, we can choose
    - 010

Possible MNFP: {010,001,100}

1. Give a test set that is guaranteed to detect all DNF faults (i.e., MUMCUT) (**10 points**)

Possible MUMCUT: {110, 101, 011, 001, 010, 100}

\*Sample answers are provided at the end of Lecture-10 slides (see last exercise in Lecture-10 pdf).

**What to submit?**

Submit the following file to Blackboard:

* A word document describing your answers to the question above.

You can use the below K-Map template.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **ab**  **c** | 00 | 01 | 11 | 10 |
| 0 |  |  |  |  |
| 1 |  |  |  |  |