Natnael kebede

1001149004

**CSE 4321**

**Spring 2018**

**HW 3 (30 points)**

Consider a system that consists of 4 parameters, P1, P2, P3, and P4. Each parameter has two values 0 and 1. Apply algorithm IPO to create a pairwise test set for this system. Use “-” to represent *don’t care* values, i.e., values that do not affect coverage. Clearly indicate your tie-breaking rules that may be needed in the test generation process. You must show intermediate steps to obtain full credits.

Step 1

**P1** **P2**

|  |  |
| --- | --- |
| 0 | 0 |
| 0 | 1 |
| 1 | 0 |
| 1 | 1 |

The combinations for P1P3, P1P4, P2P3, P2P4 and P3P4 will also be identical to the combinations of P1P2 displayed in the above table.

Step 2: Horizontal Growth

We need to cover all the combinations between P1&P2, P1&P3 and P2 & P4

|  |  |  |
| --- | --- | --- |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

**P1** **P2 P1** **P2 P3**

|  |  |
| --- | --- |
| 0 | 0 |
| 0 | 1 |
| 1 | 0 |
| 1 | 1 |

The value of 1 in P3 (third row) and the value of 0 in P3 (4th row) are chosen because it brings in new test combinations.

Step 3: Horizontal Growth

We also need to cover all the combinations between P1&P4, P2&P4 and P3 & P4

That is 00, 01, 10, 11

**P1 P2 P3 P4**

|  |  |  |  |
| --- | --- | --- | --- |
| 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |

The value of 0 in P4 (third row) and the value of 0 in P4 (4th row) are chosen because it brings in new test combinations.

Step 4: Vertical Growth

**P1 P2 P3 P4**

|  |  |  |  |
| --- | --- | --- | --- |
| 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |

|  |  |  |  |
| --- | --- | --- | --- |
| - | 0 | - | 1 |
| - | 1 | - | 0 |

The value of 0 in P4 (third row) is a tie breaking value. Even though both cover the same amount of cases, we choose 0 for optimization.