**2. Finding Prime Implicants**

| **Group** | **Decimal** | **Binary** |
| --- | --- | --- |
| **0** | **1** | **000001 ✓** |
| **0** | **2** | **000010 ✓** |
| **1** | **3** | **000011 ✓** |
| **1** | **9** | **001001 ✓** |
| **1** | **6** | **000110 ✓** |
| **2** | **7** | **000111 ✓** |
| **2** | **13** | **001101 ✓** |
| **3** | **15** | **001111 ✓** |

**3. Finding Prime Implicants**

| **Group** | **Decimal** | **Binary** |
| --- | --- | --- |
| **0** | **1, 9** | **00-001 ✹** |
| **0** | **1, 3** | **0000-1 ✹** |
| **0** | **2, 6** | **000-10 ✓** |
| **0** | **2, 3** | **00001- ✓** |
| **1** | **3, 7** | **000-11 ✓** |
| **1** | **13, 9** | **001-01 ✹** |
| **1** | **6, 7** | **00011- ✓** |
| **2** | **15, 7** | **00-111 ✹** |
| **2** | **13, 15** | **0011-1 ✹** |

**4. Finding Prime Implicants**

| **Group** | **Decimal** | **Binary** |
| --- | --- | --- |
| **0** | **2, 3, 6, 7** | **000-1- ✹** |

**The Prime Implicants Are**

A'B'D'E'F, A'B'C'D'F, A'B'CE'F, A'B'DEF, A'B'CDF, A'B'C'E

**6. Prime Implicants Chart**

| **Minterms** | **1** | **13** | **15** | **3** | **7** | **9** | **Cost** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **A'B'D'E'F** | **X** |  |  |  |  | **X** | **10** |
| **A'B'C'D'F** | **X** |  |  | **X** |  |  | **10** |
| **A'B'CE'F** |  | **X** |  |  |  | **X** | **9** |
| **A'B'DEF** |  |  | **X** |  | **X** |  | **8** |
| **A'B'CDF** |  | **X** | **X** |  |  |  | **8** |
| **A'B'C'E** |  |  |  | **X** | **X** |  | **8** |

**No Essential Implicants Found**

**8. Applying Petrick Method**

Let p1 = A'B'D'E'F

Let p2 = A'B'C'D'F

Let p3 = A'B'CE'F

Let p4 = A'B'DEF

Let p5 = A'B'CDF

Let p6 = A'B'C'E

(p1 + p2)(p2 + p6)(p4 + p6)(p1 + p3)(p3 + p5)(p4 + p5) =

(p1p2 + p1p6 + p2 + p2p6)(p1p4 + p3p4 + p1p6 + p3p6)(p3p4 + p3p5 + p4p5 + p5) = (p1p2p4 + p1p2p3p4 + p1p2p6 + p1p2p3p6 + p1p4p6 + p1p3p4p6 + p1p6 + p1p3p6 + p2p3p4 + p2p3p6 + p1p2p4p6 + p2p3p4p6)(p3p4 + p3p5 + p4p5 + p5) =

(p1p2p3p4 + p1p2p3p4p5 + p1p2p4p5 + p1p2p3p4p6 + p1p2p3p5p6 + p1p2p4p5p6 + p1p2p5p6 + p1p2p3p4p5p6 + p1p3p4p6 + p1p3p4p5p6 + p1p4p5p6 + p1p3p5p6 + p1p5p6 + p2p3p4 + p2p3p4p5 + p2p3p4p6 + p2p3p5p6 + p2p3p4p5p6)

**Possible Function Minimizations**

F = A'B'D'E'F + A'B'CDF + A'B'C'E

F = A'B'C'D'F + A'B'CE'F + A'B'DEF