**Báo cáo thực hành cuối kì**

Phạm Hải Đăng - 20194736

|  |  |
| --- | --- |
|  |  |

**Ex1**:

X = 5642 = 0101 0110 0100 0010

Y = 7381 = 0111 0011 1000 0001

Truth table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A | B | C | D | F1 | F2 |
| 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 1 | 0 | 1 | 0 |
| 1 | 1 | 1 | 1 | 0 | 1 |

K map:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| F1 |  | CD |  |  |  |
|  |  | 00 | 01 | 11 | 10 |
| AB | 00 | 0 | 1 | 1 | 0 |
|  | 01 | 0 | 1 | 0 | 1 |
|  | 11 | 0 | 0 | 0 | 1 |
|  | 10 | 0 | 1 | 0 | 0 |

F1 = A’B’D + A’C’D + B’C’D + BCD’

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| F2 |  | CD |  |  |  |
|  |  | 00 | 01 | 11 | 10 |
| AB | 00 | 0 | 1 | 1 | 1 |
|  | 01 | 0 | 0 | 1 | 1 |
|  | 11 | 0 | 0 | 1 | 0 |
|  | 10 | 1 | 0 | 0 | 0 |

F2 = A’C + A’B’D + BCD + AB’C’D’

Diagram, schematic

Description automatically generated

Diagram

Description automatically generated with low confidence

**Ex 2:**

Truth table

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| A | B | C | D | OA | OB | OC | OD | Oa | Ob | Oc | Od |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |

K map

OA = 0

OB = 0

OC = 0

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| OD |  | CD |  |  |  |
|  |  | 00 | 01 | 11 | 10 |
| AB | 00 | 0 | 0 | 0 | 0 |
|  | 01 | 0 | 0 | 0 | 0 |
|  | 11 | 1 | 1 | 1 | 1 |
|  | 10 | 0 | 0 | 1 | 1 |

OD = AC + AB

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Oa |  | CD |  |  |  |
|  |  | 00 | 01 | 11 | 10 |
| AB | 00 | 0 | 0 | 0 | 0 |
|  | 01 | 0 | 0 | 0 | 0 |
|  | 11 | 0 | 0 | 0 | 0 |
|  | 10 | 1 | 1 | 0 | 0 |

Oa = AB’C’

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Ob |  | CD |  |  |  |
|  |  | 00 | 01 | 11 | 10 |
| AB | 00 | 0 | 0 | 0 | 0 |
|  | 01 | 1 | 1 | 1 | 1 |
|  | 11 | 0 | 0 | 1 | 1 |
|  | 10 | 0 | 0 | 0 | 0 |

Ob = A’B + BC

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Oc |  | CD |  |  |  |
|  |  | 00 | 01 | 11 | 10 |
| AB | 00 | 0 | 0 | 1 | 1 |
|  | 01 | 0 | 0 | 1 | 1 |
|  | 11 | 1 | 1 | 0 | 0 |
|  | 10 | 0 | 0 | 0 | 0 |

Oc = A’C + ABC’

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Od |  | CD |  |  |  |
|  |  | 00 | 01 | 11 | 10 |
| AB | 00 | 0 | 1 | 1 | 0 |
|  | 01 | 0 | 1 | 1 | 0 |
|  | 11 | 0 | 1 | 1 | 0 |
|  | 10 | 0 | 1 | 1 | 0 |

Od = D

Chart

Description automatically generated

Chart

Description automatically generated

**Ex3**:

Truth table from 3-bit counter to BCD

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| A | B | C | OA | OB | OC | OD |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 1 | 0 | 0 | 1 | 0 |
| 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 0 | 1 | 1 |
| 1 | 1 | 0 | 1 | 0 | 0 | 0 |
| 1 | 1 | 1 | 0 | 0 | 0 | 1 |

K map

|  |  |  |  |
| --- | --- | --- | --- |
| OA |  | C |  |
|  |  | 0 | 1 |
| AB | 00 | 0 | 0 |
|  | 01 | 0 | 0 |
|  | 11 | 1 | 0 |
|  | 10 | 0 | 0 |

OA = ABC’

|  |  |  |  |
| --- | --- | --- | --- |
| OA |  | C |  |
|  |  | 0 | 1 |
| AB | 00 | 1 | 1 |
|  | 01 | 1 | 0 |
|  | 11 | 0 | 0 |
|  | 10 | 1 | 0 |

OB = A’B’ + A’C’ + B’C’

|  |  |  |  |
| --- | --- | --- | --- |
| OA |  | C |  |
|  |  | 0 | 1 |
| AB | 00 | 0 | 1 |
|  | 01 | 0 | 1 |
|  | 11 | 0 | 0 |
|  | 10 | 1 | 1 |

OC = A’C + AB’

|  |  |  |  |
| --- | --- | --- | --- |
| OA |  | C |  |
|  |  | 0 | 1 |
| AB | 00 | 1 | 0 |
|  | 01 | 0 | 0 |
|  | 11 | 0 | 1 |
|  | 10 | 1 | 1 |

OD = B’C’ + AC

Diagram

Description automatically generated

Chart

Description automatically generated