**REPORT**



**제목 : 학번 카운터**

**󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏**

**수강과목 : 디지털 공학**

**󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏**

**담당교수 : 김선종**

**󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏**

**학 과 : IT응용공학과**

**󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏**

**학 번 : 201545830**

**󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏**

**이 름 : 이주은**

**󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏**

**제출일자 : 2016. 12. 08**

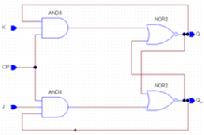
**󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏󰠏**

1. 목적

- JK플립플롭의 원리를 이해하고, 자신의 학번을 카운터하는 회로를 설계한다.

2. JK플립플롭이란

- RST플립플롭 회로에서의 입력 금지 상태 즉 S단자와 R단자의 입력이 “1”일 때 출력이 부정(不定)하게 되는 결점을 없앤 그림과 같은 플립플롭 회로이다. 그러나 클록 펄스(T)를 가하는 방법에 따라서는 출력이 안정하지 않은 상태가 있으므로 실제로는 에지 트리거(edge trigger)법이나 마스터 슬레이브 JK플립플롭이 사용된다.



|  |  |  |  |
| --- | --- | --- | --- |
| **Q(t)** | **Q(t+1)** | **J** | **K** |
| 0 | 0 | 0 | X |
| 0 | 1 | 1 | X |
| 1 | 0 | X | 1 |
| 1 | 1 | X | 0 |

3. 실습 준비물

- AND GATE 3개, OR GATE 1개, 7-SEGMENT 1개, IC 7447 1개, JK Flip-Flop 3개

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **십진수** | **현재상태** | | | | | **차기상태** | | | | | **DRW0000043c0ddc** | **DRW0000043c0dde** | **DRW0000043c0de0** | **DRW0000043c0de2** | **DRW0000043c0de4** | **DRW0000043c0de6** | **DRW0000043c0de8** | **DRW0000043c0dea** | **DRW0000043c0dec** | **DRW0000043c0dee** |
| **E** | **D** | **C** | **B** | **A** | **E** | **D** | **C** | **B** | **A** |
| **2** | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | X | 0 | X | 0 | X | X | 1 | 0 | X |
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | X | 0 | X | 0 | X | 0 | X | 1 | X |
| **1** | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | X | 0 | X | 1 | X | 0 | X | X | 0 |
| **5** | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | X | 0 | X | X | 0 | 0 | X | X | 1 |
| **4** | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 1 | X | 0 | X | X | 0 | 0 | X | 1 | X |
| **5** | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | X | 1 | 1 | X | X | 1 | 0 | X | X | 1 |
| **8** | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | X | X | 1 | 0 | X | 1 | X | 1 | X |
| **3** | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | X | 0 | X | 0 | X | X | 1 | X | 1 |
| **0** | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | X | 1 | 0 | X | 0 | X | 1 | X | 0 | X |

4. 진리표

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df0 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 1 | 0 | 0 | 0 |  |  |  |
| **01** | X | X |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 0 |  |  |  |  |  |  |  |

5. 카르노 맵

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df2 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 1 | X | X | 0 | 0 |  |  |  |
| **01** | 1 | X |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df4 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | 0 | 1 | X | 0 |  |  |  |
| **01** | X | 1 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df6 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | X | X | 1 |  |  |  |
| **01** | 0 | 0 |  |  |  | 0 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df8 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | X | X | X | X |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfa | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 0 | 0 | 0 |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfc | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 1 | 0 | 0 |  |  |  |
| **01** | 1 | 0 |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 0 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df2 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 1 | X | X | 0 | 0 |  |  |  |
| **01** | 1 | X |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df4 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | 0 | 1 | X | 0 |  |  |  |
| **01** | X | 1 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df6 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | X | X | 1 |  |  |  |
| **01** | 0 | 0 |  |  |  | 0 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df8 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | X | X | X | X |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfa | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 0 | 0 | 0 |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfc | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 1 | 0 | 0 |  |  |  |
| **01** | 1 | 0 |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 0 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df2 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 1 | X | X | 0 | 0 |  |  |  |
| **01** | 1 | X |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df4 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | 0 | 1 | X | 0 |  |  |  |
| **01** | X | 1 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df6 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | X | X | 1 |  |  |  |
| **01** | 0 | 0 |  |  |  | 0 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df8 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | X | X | X | X |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfa | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 0 | 0 | 0 |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfc | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 1 | 0 | 0 |  |  |  |
| **01** | 1 | 0 |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 0 |  |  |  |  |  |  |  |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df2 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 1 | X | X | 0 | 0 |  |  |  |
| **01** | 1 | X |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df4 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | 0 | 1 | X | 0 |  |  |  |
| **01** | X | 1 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df6 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | X | X | 1 |  |  |  |
| **01** | 0 | 0 |  |  |  | 0 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df8 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | X | X | X | X |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfa | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 0 | 0 | 0 |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfc | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 1 | 0 | 0 |  |  |  |
| **01** | 1 | 0 |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 0 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df2 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 1 | X | X | 0 | 0 |  |  |  |
| **01** | 1 | X |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df4 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | 0 | 1 | X | 0 |  |  |  |
| **01** | X | 1 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df6 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | X | X | 1 |  |  |  |
| **01** | 0 | 0 |  |  |  | 0 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df8 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | X | X | X | X |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfa | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 0 | 0 | 0 |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfc | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 1 | 0 | 0 |  |  |  |
| **01** | 1 | 0 |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 0 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df2 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 1 | X | X | 0 | 0 |  |  |  |
| **01** | 1 | X |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df4 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | 0 | 1 | X | 0 |  |  |  |
| **01** | X | 1 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

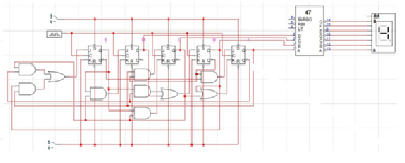
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df6 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | X | X | 1 |  |  |  |
| **01** | 0 | 0 |  |  |  | 0 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 1 |  |  |  |  |  |  |  |

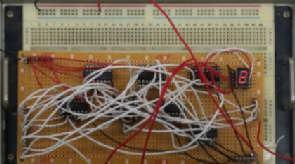
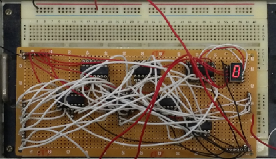
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0df8 | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | X | X | X | X | X |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

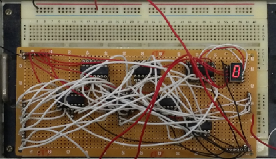
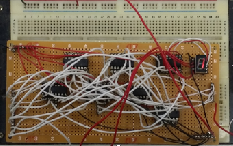
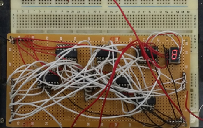
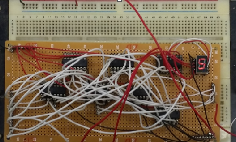
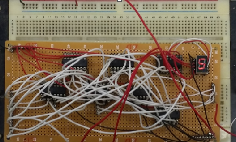
|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfa | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 0 | 0 | 0 |  |  |  |
| **01** | 0 | 0 |  |  |  | 1 |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | X |  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| DRW0000043c0dfc | | | | | | | | |
|  | **E=0** | | | | **E=1** | | | |
| **BA**  **DC** | **00** | **01** | **11** | **10** | **00** | **01** | **11** | **10** |
| **00** | 0 | 0 | 1 | 0 | 0 |  |  |  |
| **01** | 1 | 0 |  |  |  | X |  |  |
| **11** |  |  |  |  |  |  |  |  |
| **10** | 0 |  |  |  |  |  |  |  |

7. 시뮬레이션 프로그램(LogicWorks)를 이용한 회로도



8. 결과



9. 결론 및 고찰

여기표를 이용해 학번(201545830)에 맞도록 상태표를 그렸다. 이를 이용해 카르노맵을 그려 각각 J,K을 식으로 표현하였고, 납땜을 하기 전 로직웍스를 이용해 시뮬레이션을 하였다. 설계도대로 남땜을 하였고 전선을 연결하였다. 마지막으로 Vcc, GND, CLK을 브레드보드의 5V, GND, 1Hz에 연결하였고 2-0-1-5-4-5-8-3-0 이 나오는 것을 확인하였다. 한 번에 성공하지 못하여 납땜을 다시하고 회로도를 수정하는 등의 시행착오가 있었지만 원하는 결과가 나오는 것을 보고 보람을 느꼈다.