디지털회로설계 HW #8

10진 업/다운 카운터 설계

20161453 전자공학과

C = 0

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | x | 0 | x | 0 | x | 1 | x |
| 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | x | 0 | x | 1 | x | x | 1 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | x | 0 | x | x | 0 | 1 | x |
| 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | x | 1 | x | x | 1 | x | 1 |
| 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | x | x | 0 | 0 | x | 1 | x |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | x | x | 0 | 1 | x | x | 1 |
| 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | x | x | 0 | x | 0 | 1 | x |
| 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | x | x | 0 | x | 1 | x | 1 |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | x | 0 | 0 | x | 0 | x | 1 | x |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | x | 0 | 0 | x | 1 | x | x | 1 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | x | 1 | 0 | x | x | 1 | 1 | x |
| 1 | 0 | 1 | 1 | d | d | d | d | d | d | d | d | d | d | d | d |
| 1 | 1 | 0 | 0 | d | d | d | d | d | d | d | d | d | d | d | d |
| 1 | 1 | 0 | 1 | d | d | d | d | d | d | d | d | d | d | d | d |
| 1 | 1 | 1 | 0 | d | d | d | d | d | d | d | d | d | d | d | d |
| 1 | 1 | 1 | 1 | d | d | d | d | d | d | d | d | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | 0 | 0 | 1 | 0 |
| 01 | x | x | x | x |
| 11 | 0 | 0 | d | 0 |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | x | x | x | x |
| 01 | x | x | x | x |
| 11 | 0 | 0 | 1 | d |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | 0 | 1 | x | x |
| 01 | 0 | 1 | x | x |
| 11 | 0 | 1 | d | x |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | x | x | x | x |
| 01 | 0 | 0 | 0 | 0 |
| 11 | x | x | x | d |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | 0 | 1 | x | x |
| 01 | 0 | 1 | x | x |
| 11 | 0 | 1 | d | x |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | x | x | 1 | 0 |
| 01 | x | x | 1 | 0 |
| 11 | x | x | d | 1 |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | 1 | x | x | 1 |
| 01 | 1 | x | x | 1 |
| 11 | 1 | x | d | 1 |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | x | 1 | 1 | x |
| 01 | x | 1 | 1 | x |
| 11 | x | 1 | d | x |
| 10 | d | d | d | d |

C = 1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | x | 0 | x | 0 | x | 1 | x |
| 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | x | 0 | x | 0 | x | x | 1 |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | x | 0 | x | x | 1 | 1 | x |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | x | 0 | x | x | 0 | x | 1 |
| 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | x | x | 1 | 1 | x | 1 | x |
| 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | x | x | 0 | 0 | x | x | 1 |
| 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | x | x | 0 | x | 1 | 1 | x |
| 0 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | x | x | 0 | x | 0 | x | 1 |
| 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | x | 1 | 1 | x | 1 | x | 1 | x |
| 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | x | 1 | 0 | x | 0 | x | x | 1 |
| 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | x | 1 | 0 | x | 1 | x | 1 | x |
| 1 | 0 | 1 | 1 | d | d | d | d | d | d | d | d | d | d | d | d |
| 1 | 1 | 0 | 0 | d | d | d | d | d | d | d | d | d | d | d | d |
| 1 | 1 | 0 | 1 | d | d | d | d | d | d | d | d | d | d | d | d |
| 1 | 1 | 1 | 0 | d | d | d | d | d | d | d | d | d | d | d | d |
| 1 | 1 | 1 | 1 | d | d | d | d | d | d | d | d | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | 1 | 0 | 0 | 0 |
| 01 | 0 | 0 | 0 | 0 |
| 11 | x | x | d | x |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | x | x | x | x |
| 01 | x | x | x | x |
| 11 | 1 | 1 | d | 1 |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | 0 | 0 | 0 | 0 |
| 01 | x | x | x | x |
| 11 | 1 | 0 | d | 0 |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | x | x | x | x |
| 01 | 1 | 0 | 0 | 0 |
| 11 | x | x | d | x |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | 0 | 0 | x | x |
| 01 | 1 | 0 | x | x |
| 11 | 1 | 0 | d | 1 |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | x | x | 0 | 1 |
| 01 | x | x | 0 | 1 |
| 11 | x | x | d | x |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | 1 | x | x | 1 |
| 01 | 1 | x | x | 1 |
| 11 | 1 | x | d | 1 |
| 10 | d | d | d | d |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 00 | 01 | 10 | 11 |
| 00 | x | 1 | 1 | x |
| 01 | x | 1 | 1 | x |
| 11 | x | 1 | d | x |
| 10 | d | d | d | d |