|  |  |
| --- | --- |
| Họ và tên |  |
| MSSV |  |

**Lab 5**

**Thiết kế khối điều khiển**

Bảng trạng thái kế tiếp

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| State | Trạng thái hiện tại | | | Trạng thái kế tiếp | | | |
| Start, Data = 0 | | | |
| Q2 | Q1 | Q0 | 00 | 01 | 10 | 11 |
| S0 | 0 | 0 | 0 | 000 | 000 | 001 | 001 |
| S1 | 0 | 0 | 1 | 010 | 010 | 010 | 010 |
| S2 | 0 | 1 | 0 | 011 | 011 | 011 | 011 |
| S3 | 0 | 1 | 1 | 100 | 100 | 100 | 100 |
| S4 | 1 | 0 | 0 | 101 | 101 | 101 | 101 |
| S5 | 1 | 0 | 1 | 100 | 110 | 100 | 110 |
| S6 | 1 | 1 | 0 |  |  |  |  |
| S7 | 1 | 1 | 1 | 000 | 000 | 000 | 000 |

D2

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Q2Q1Q0  StartData | 000 | 001 | 011 | 010 | 110 | 111 | 101 | 100 |
| 00 |  |  | 1 |  |  |  | 1 | 1 |
| 01 |  |  | 1 |  |  |  | 1 | 1 |
| 11 |  |  | 1 |  |  |  | 1 | 1 |
| 10 |  |  | 1 |  |  |  | 1 | 1 |

D2 = Q2’Q1Q0 + Q2Q1’

D1

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Q2Q1Q0  StartData | 000 | 001 | 011 | 010 | 110 | 111 | 101 | 100 |
| 00 |  | 1 |  | 1 |  |  |  |  |
| 01 |  | 1 |  | 1 |  |  | 1 |  |
| 11 |  | 1 |  | 1 |  |  | 1 |  |
| 10 |  | 1 |  | 1 |  |  |  |  |

D1 = Q2’Q1’Q0 + Q2’Q1Q0’ + DataQ2Q1’Q0 = Q2’(Q1 ⊕Q0) + DataQ2Q1’Q0

D0

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Q2Q1Q0  StartData | 000 | 001 | 011 | 010 | 110 | 111 | 101 | 100 |
| 00 |  |  |  | 1 |  |  |  | 1 |
| 01 |  |  |  | 1 |  |  |  | 1 |
| 11 | 1 |  |  | 1 |  |  |  | 1 |
| 10 | 1 |  |  | 1 |  |  |  | 1 |

D0 = StartQ2’Q1’Q0’ + Q2’Q1Q0’ + Q2Q1’Q0’ = Q1’Q0’(Start+Q2) + Q2’Q1Q0’

Biểu thức ngõ ra

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Q2 | Q1 | Q0 | IE | WEA | WA[1..0] | WEB | WB[1..0] | REA | RA[1..0] | REB | RB[1..0] | OP[2..0] | PASS | OE |
| 0 | 0 | 0 | 0 | 0 | X | 0 | X | 0 | X | 0 | X | X | X | 0 |
| 0 | 0 | 1 | 1 | 1 | 00 | 0 | X | 0 | X | 0 | X | X | X | 0 |
| 0 | 1 | 0 | 0 | 1 | 10 | 0 | X | 1 | 00 | 1 | 00 | 110 | X | 0 |
| 0 | 1 | 1 | 0 | 1 | 01 | 0 | X | 1 | 10 | 0 | X | 111 | X | 0 |
| 1 | 0 | 0 | 0 | 1 | 11 | 1 | 00 | 1 | 00 | 1 | 01 | 001 | 0 | 0 |
| 1 | 0 | 1 | 0 | 1 | 10 | 0 | X | 1 | 10 | 1 | 11 | 101 | X | 0 |
| 1 | 1 | 0 | 0 | 0 | X | 0 | X | 1 | 10 | 0 | X | X | 1 | 1 |

IE = Q2’Q1’Q0

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 |  | 1 | 1 | 1 |
| 1 | 1 | 1 |  |  |

WEA = Q2Q1’ + Q1’Q0 +Q2’Q1 = (Q2⊕Q1) + Q1’Q0

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 | X |  |  | 1 |
| 1 | 1 | 1 |  | X |

WA1= Q2Q1’ + Q0’

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 | X |  | 1 |  |
| 1 | 1 |  |  | X |

WA0 = Q1’Q0’ + Q2’Q1Q0

WEB = Q2Q1’Q0’

WB1 = 0

WB0 = 0

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 |  |  | 1 | 1 |
| 1 | 1 | 1 |  | 1 |

REA = Q2Q1’ + Q2’Q1 + Q1Q0’ = (Q2 ⊕ Q1) + Q1Q0’

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 |  | X | 1 |  |
| 1 |  | 1 |  | 1 |

RA1 = Q1’Q0 + Q2’Q0 + Q2Q1Q0’ = Q0(Q1’ + Q2’) + Q2Q1Q0’

RA0 = 0

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 |  |  |  | 1 |
| 1 | 1 | 1 |  | 1 |

REB = Q2Q1’ + Q1Q0

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 | X | X |  |  |
| 1 |  | 1 |  | 1 |

RB1 = Q1’Q0 + Q2Q1Q0’

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 |  |  |  |  |
| 1 | 1 | 1 |  |  |

RB0 = Q2Q1’

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 |  | X | 1 | 1 |
| 1 |  | 1 |  |  |

OP2 = Q1’Q0 + Q2’Q1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 |  |  | 1 | 1 |
| 1 |  |  |  |  |

OP1 = Q2’Q1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q1Q0  Q2 | 00 | 01 | 11 | 10 |
| 0 |  | X | 1 |  |
| 1 | 1 | 1 |  |  |

OP0 = Q2Q1’ + Q2’ Q0

PASS = Q2Q1Q0’

OE = Q2Q1Q0’