

Name

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Roll no

20P-0153

Section

BSCS - 2B

Assignment

#06

Submitted to

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First 4 odd number 1, 3, 5, 7

Solution :

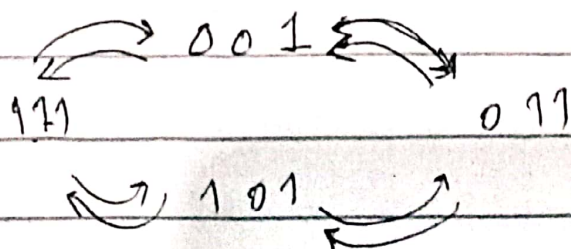
1, 3, 5, 7

1 = 001

3 = 011

5 = 101

7 = 111



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So we use a 'M' input
for $M=0$ for down and $M=1$
for up.

(ii)
Next state table

| M | present state | | | Next state | | |
|---|---------------|-------|-------|------------|-------|-------|
| | Q_2 | Q_1 | Q_0 | Q_2 | Q_1 | Q_0 |
| 0 | 0 | 0 | 0 | | | |
| 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | | | |
| 0 | 0 | 1 | 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 0 | | | |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 0 | | | |
| 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| 1 | 0 | 0 | 0 | | | |
| 1 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | | | |
| 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 1 | 0 | 0 | | | |
| 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 1 | 1 | 1 | 0 | | | |
| 1 | 1 | 1 | 1 | 0 | 0 | 1 |

20p.0153 Damm Safety

Transition table

$y = 0$ (down)

| $J_2 K_2$ | $J_1 K_1$ | $J_0 K_0$ |
|-----------|-----------|-----------|
| 1 0 | 1 0 | x 0 |
| 0 0 | x 1 | x 0 |
| x 1 | 1 0 | x 0 |
| x 0 | x 1 | x 0 |

$y = 0$

| $J_2 K_2$ | $J_1 K_1$ | $J_0 K_0$ |
|-----------|-----------|-----------|
| 0 x | 1 x | x 0 |
| 1 x | x 1 | x 0 |
| x 0 | 1 x | x 0 |
| x 1 | x 1 | x 0 |

K-map for F_2 :

| $MQ_2 \backslash MQ_0$ | 00 | 01 | 11 | 10 |
|------------------------|----|----|----|----|
| 00 | | 1 | | |
| 01 | | x | x | |
| 11 | | x | x | |
| 10 | | | 1 | |

20p.0153 Downward Safety

Transition table

$y = 0$ (down)

| $J_2 K_2$ | $J_1 K_1$ | $J_0 K_0$ |
|-----------|-----------|-----------|
| 1 x | 1 x | x 0 |
| 0 x | x 1 | x 0 |
| x 1 | 1 x | x 0 |
| x 0 | x 1 | x 0 |

$y = 0$

| $J_2 K_2$ | $J_1 K_1$ | $J_0 K_0$ |
|-----------|-----------|-----------|
| 0 x | 1 x | x 0 |
| 1 x | x 1 | x 0 |
| x 0 | 1 x | x 0 |
| x 1 | x 1 | x 0 |

K-map for F_2 :

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

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$$J_2 = M'Q_1Q_0 + MQ_1Q_0$$

for K_2

| $MQ \backslash Q_1Q_0$ | 00 | 01 | 11 | 10 |
|------------------------|----|----|----|----|
| 00 | | X | X | |
| 01 | | 1 | | |
| 11 | | | 1 | |
| 10 | | X | X | |

$$K_2 = M'Q_1Q_0 + MQ_1Q_0$$

K-Map for J_1 :

| $MQ \backslash Q_1Q_0$ | 00 | 01 | 11 | 10 |
|------------------------|----|----|----|----|
| 00 | | X | 1 | X |
| 01 | | | 1 | X |
| 11 | | | 1 | X |
| 10 | | | 1 | X |

$$J_1 = Q_0$$

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| MQ ₂ | Q ₁ Q ₀ | | | |
|-----------------|-------------------------------|----|----|----|
| | 00 | 01 | 11 | 10 |
| 00 | | X | 1 | |
| 01 | | X | 1 | |
| 11 | | X | 1 | |
| 10 | | X | 1 | |

$$K_1 = Q_0$$

For J₀:

| MQ ₂ | Q ₁ Q ₀ | | | |
|-----------------|-------------------------------|----|----|----|
| | 00 | 01 | 11 | 10 |
| 00 | | X | X | |
| 01 | | X | X | |
| 11 | | X | X | |
| 10 | | X | X | |

$$J = 0$$

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For K_2 :

| $M \backslash Q_1 Q_0$ | $Q_1 Q_0$ | | | |
|------------------------|-----------|----|----|----|
| | 00 | 01 | 11 | 10 |
| 00 | | 0 | 0 | |
| 01 | | 0 | 0 | |
| 11 | | 0 | 0 | |
| 10 | | 0 | 0 | |

$$K_2 = 0$$

Logical Expression

$$J_2 = M'Q_1'Q_0 + MQ_1Q_0$$
$$Q_0 (M \oplus Q_1)$$

$$J_1 = Q_0$$

$$J_0 = 0$$

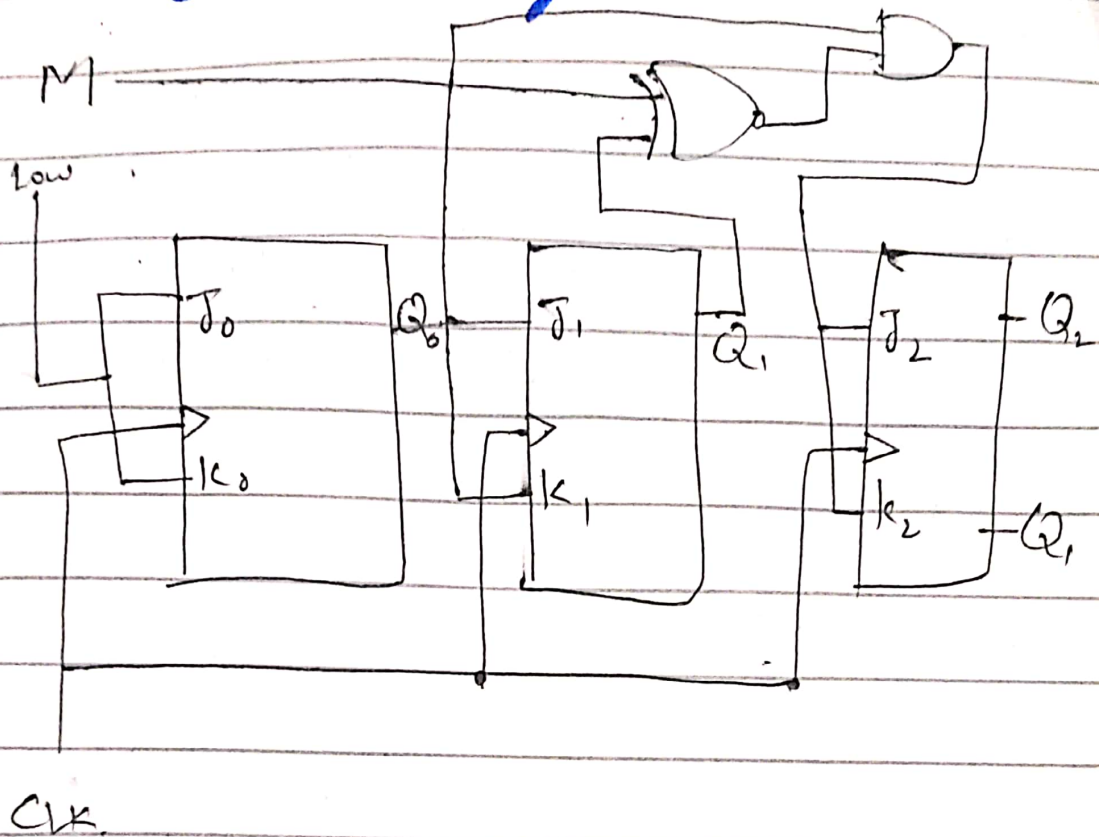
$$K_2 = Q_0 (M \oplus Q_1)$$

$$K_1 = Q_0$$

$$K_0 = 0$$

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Circuit diagram



End.