① $+43.5 \longrightarrow$ IEEE 754

10| 10000100 | 01011100000...

② 0xC2440000

1|100 0010 0|100 0100 0000 0000 0000 0000

132 - 127 = 5

$-1,10001 = 110001 = -49$

③ 10000011 → $01111101 = 1+4+8+16+32+64 =$

$= 125$

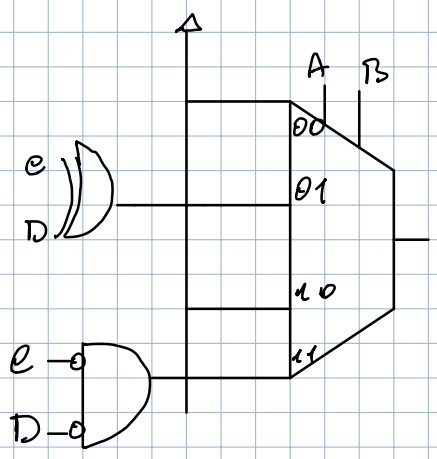
④ 125 − 128 = −003

10000011 + 10000000 = 10000011 = −3, corretto

⑤ Duale di $(A+B)C \rightarrow F_{duale} = (AC)+(BC)$

| A | B | C | F | C |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 0 |
| 1 | 1 | 1 | 1 | 1 |

⑥




| C D | XOR | AND |
|---|---|---|
| 0 0 | 0 | 1 |
| 0 1 | 1 | 0 |
| 1 0 | 1 | 0 |
| 1 1 | 0 | 0 |

$$(C+D)(\bar{C}+\bar{D})(C+\bar{D})(\bar{C}+D)(\bar{C}+\bar{D})$$

⑦

$$F = (AB) + \bar{C}$$

| A B C | F | G |
|---|---|---|
| 0 0 0 | 1 | 0 |
| 0 0 1 | 0 | 1 |
| 0 1 0 | 1 | 0 |
| 0 1 1 | 0 | 1 |
| 1 0 0 | 1 | 0 |
| 1 0 1 | 0 | 1 |
| 1 1 0 | 1 | 0 |
| 1 1 1 | 1 | 0 |

$$G = \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}\bar{C}$$

⑧

$(F \text{ XOR } G) = m_1 + m_2 + m_3$

| A B C D | F | G |
|---|---|---|
| 0 0 0 0 | 1 | 1 |
| 0 0 0 1 | 1 | 0 |
| 0 0 1 0 | 1 | 0 |
| 0 0 1 1 | 1 | 0 |
| 0 1 0 0 | 0 | 0 |
| 0 1 0 1 | 0 | 0 |
| 0 1 1 0 | 0 | 0 |
| 0 1 1 1 | 1 | 1 |
| 1 0 0 0 | 1 | 1 |
| 1 0 0 1 | 0 | 0 |
| 1 0 1 0 | 0 | 0 |
| 1 0 1 1 | 0 | 0 |
| 1 1 0 0 | 0 | 0 |
| 1 1 0 1 | 1 | 1 |
| 1 1 1 0 | 1 | 1 |
| 1 1 1 1 | 0 | 0 |

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

$G = \bar{B}\bar{C}\bar{D} + AB\bar{C}D + \bar{A}BCD + ABC\bar{D}$

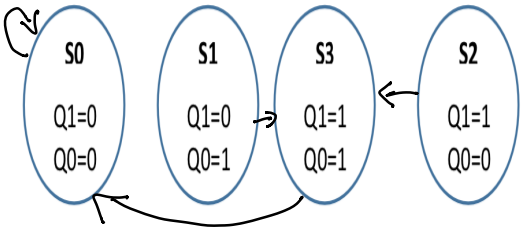
⑨

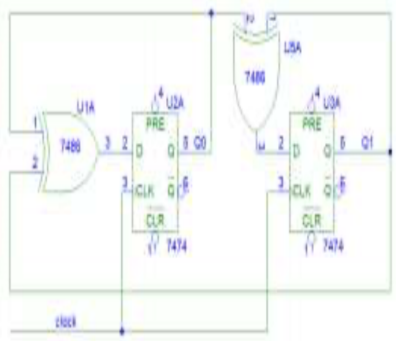
3 FF $\rightarrow$ $2^3 = 8$ stati totali $\rightarrow$ 3 stati inutilizzati

$2^{\#\text{input}}$ = 2 stati diversi raggiungibili

(10)

10- l'automa a stati finiti riportato di fianco e' inizializzato nello stato S1. Indicare lo stato assunto al ventesimo ciclo di clock

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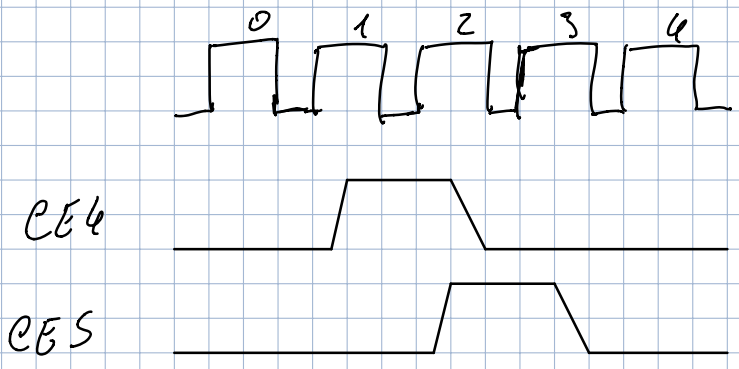
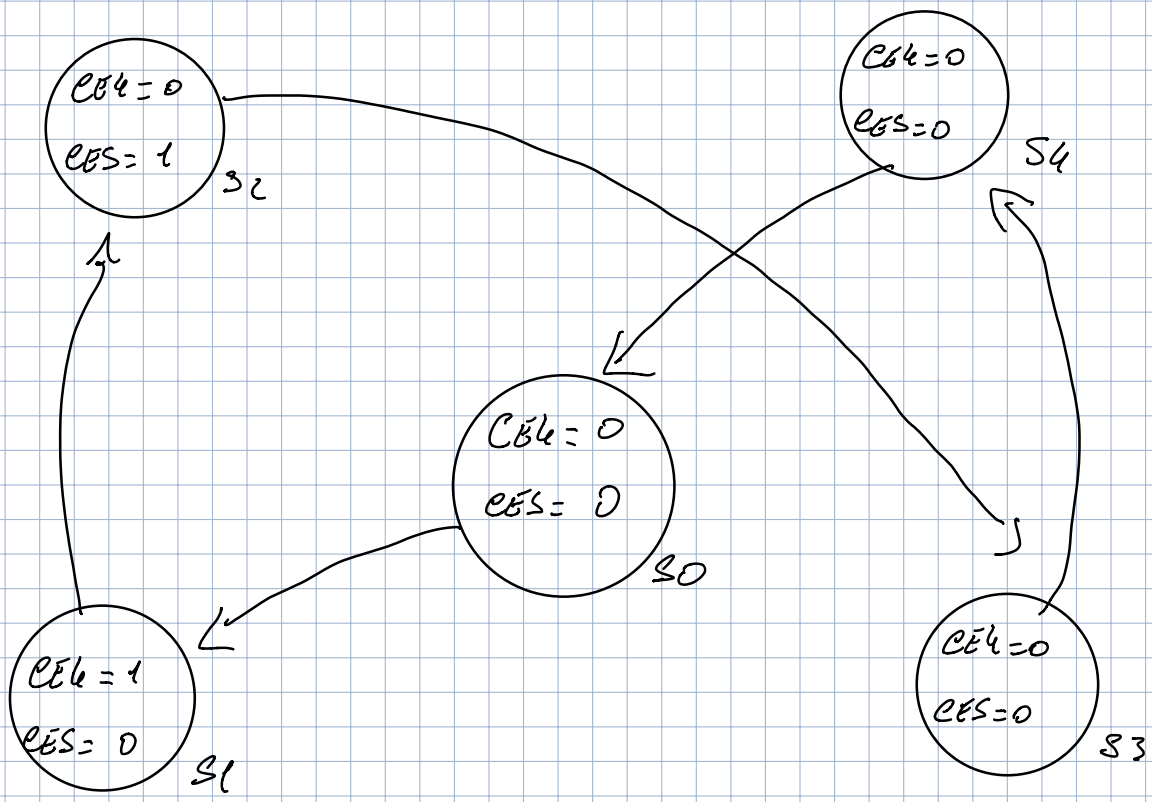
Parte 2

(1)

$q_1 \rightarrow R4 \circ r_2$

$q_2 \rightarrow R5 \circ r_3$






Funzioni prossimo stato

| $Q_2$ | $Q_1$ | $Q_0$ | $Q_2'$ | $Q_1'$ | $Q_0'$ |
|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 0 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | X | X | X |
| 1 | 1 | 0 | X | X | X |
| 1 | 1 | 1 | X | X | X |

$$Q_2' = \bar{Q}_2 Q_1 Q_0$$

$$Q_1' = \bar{Q}_2 \bar{Q}_1 Q_0 + \bar{Q}_2 Q_1 \bar{Q}_0 = \bar{Q}_2$$

$$Q_0' = \bar{Q}_2 \bar{Q}_1 \bar{Q}_0 + \bar{Q}_2 Q_1 \bar{Q}_0 = \bar{Q}_2 \bar{Q}_1$$

Funzioni di uscita

| $Q_2$ | $Q_1$ | $Q_0$ | 4 | 5 |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 |
| 0 | 1 | 0 | 0 | 1 |
| 0 | 1 | 1 | 0 | 0 |
| 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | | |
| 1 | 1 | 0 | | |
| 1 | 1 | 1 | | |

$CE4 = \bar{Q}_2 \bar{Q}_1 Q_0$

$CE5 = \bar{Q}_2 Q_1 \bar{Q}_0$

②

$n_2 = 5 - 6 = -1$

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

③

a) $2^8 = 256$

b)

1 - Presente in TLB -> pag 11111111 = pag 255

2 - Bit di validità a 1 nella TNP -> pag 11111001 = pag 249

3 - Page fault, la pagina viene prelevata dal disco, causando una penalità di spostamento