CS2100 Tutorial 9

AY 24/25 Sem 2 — github/omgeta

Q1. (a.) $TA = (A' + B)' = A \cdot B'$, $DB = A' + B$

A	B	p	TA	DB	A+	B+
0	0	1	0	1	0	1
0	1	0	0	1	0	1
1	0	0	1	0	0	0
1	1	1	0	1	1	1

(b.) After 3 cycles, we are at state 1 with output 100

(c.) Sinks: states 1 and 3

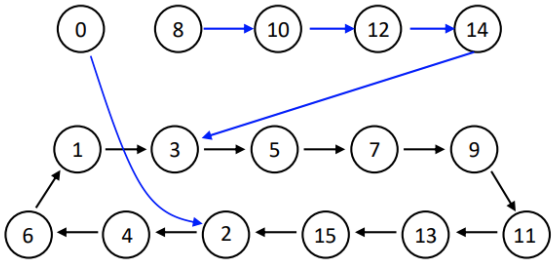
(d.) State 3

Q2. $JA = B \cdot x' + B' \cdot x = B \oplus x$
$KA = 1$
$A' \cdot x' + A \cdot x$
$KB = 1$

Present state A	Present state B	Input x	Next state A^+	Next state B^+	Flip-flop A JA	Flip-flop A KA	Flip-flop B JB	Flip-flop B KB
0	0	0	0	1	0	d	1	d
0	0	1	1	0	1	d	0	d
0	1	0	1	0	1	d	0	d
0	1	1	0	0	d	1	0	d
1	0	0	0	0	d	1	0	d
1	0	1	0	1	d	1	1	d
1	1	0	d	d	d	d	d	d
1	1	1	d	d	d	d	d	d

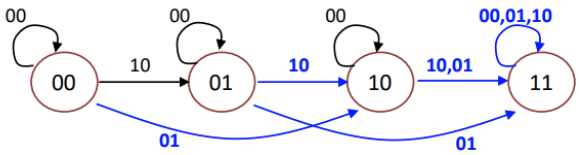
Q3. (a.) $DA = A \cdot B' + A \cdot C' + A' \cdot B \cdot C \cdot D$
$TB = C$
$TC = A' + B' + C'$
$JD = B \cdot C$
$KD = A \cdot B \cdot C$

(b.) Solution:



(c.) Yes; as unused states transition to used states after finite number of cycles

Q4. (a.) Solution:



(b.) $DA = A + y + B \cdot x$
$DB = B \cdot x' + B' \cdot x + A \cdot y + A \cdot x$