

The obtained table consists of a single row. So, the machine is definite. Its order is the number of steps required to obtain the single state machine, and here it is 4.

16. Test whether the following machine is information lossless or not. If lossless, find its order.

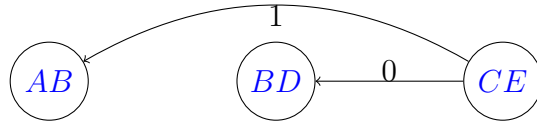
Present State	Next State,Z	
	X=0	X=1
A	B,1	A,1
B	D,0	B,0
C	D,0	B,1
D	E,1	C,1
E	A,1	B,0

Solution: The first step to test whether a machine is lossless or not is to construct a testing table. The testing table is divided into two halves.

Present State	Next State	
	z = 0	z = 1
A	–	(AB)
B	(BD)	–
C	D	B
D	–	(CE)
E	B	A
(AB)	–	–
(BD)	–	–
(CE)	(BD)	(AB)

The testing table does not contain any repeated entry. The machine is an information lossless machine.

The testing graph for the machine is



The testing graph for information losslessness is loop-free. The order of losslessness is $\mu = 1 + 2 = 3$. The length of the longest path of the graph is 1.

17. Test whether the following machine is information lossless or not. If lossless, find its order.

Present State	Next State,O/P	
	X=0	X=1
A	B,1	C,1
B	D,0	E,0
C	A,1	F,1
D	C,0	B,0
E	F,1	A,0
F	E,0	D,0

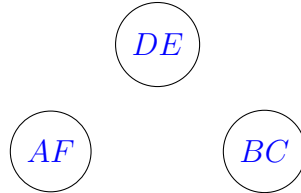
Solution: First, we have to construct a testing table for information losslessness for testing whether the machine is information lossless or not. The testing table is divided into two halves.

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Present State	Next State	
	$z = 0$	$z = 1$
A	–	BC
B	DE	–
C	–	AF
D	BC	–
E	–	AF
F	DE	–
AF	–	–
BC	–	–
DE	–	–

The testing table does not contain any repeated entry. The machine is an information lossless machine.

The testing graph for the machine is



The testing graph for information losslessness is loop-free. The order of losslessness is $\mu = 0 + 2 = 2$. The length of the longest path of the graph is 0.

18. Test whether the following machine is information lossless or not. If lossless, find its order.

Present State	Next State,O/P	
	X=0	X=1
A	B,0	E,0
B	E,0	D,0
C	D,1	A,1
D	C,1	E,0
E	B,0	D,0

Solution: First, we have to construct a testing table for information losslessness for testing whether the machine is information lossless or not. The testing table is divided into two halves.

Present State	Next State	
	z = 0	z = 1
A	BE	—
B	DE	—
C	A	D
D	E	C
E	BD	—
BD	(DE)(EE)	--
BE	(BD)(DE)	—
DE	(BE)(DE)	—

The testing table contains repeated entry (EE). Therefore, the machine is a lossy machine.

19. Test whether the following machine is information lossless or not. If lossless, find its order.

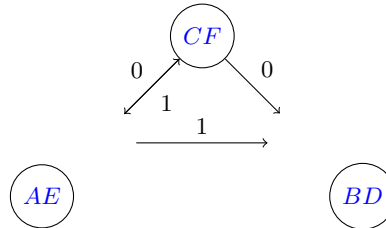
Present State	Next State,O/P	
	X = 0	X = 1
A	B, 1	C, 0
B	B, 1	D, 1
C	E, 1	B, 0
D	A, 0	E, 0
E	F, 0	D, 1
F	A, 1	D, 0

Solution: First, we have to construct a testing table for information losslessness for testing whether the machine is information lossless or not. The testing table is divided into two halves.

Present State	Next State	
	$z = 0$	$z = 1$
A	C	B
B	--	(BD)
C	B	E
D	(AE)	--
E	F	D
F	D	A
AE	CF	BD
BD	--	--
CF	BD	AE

The testing table does not contain any repeated entry. The machine is an information lossless machine.

The testing graph for the machine is



The testing graph contains a loop. So, the machine is not information lossless of finite order. The order of losslessness $\mu = 2 + 2 = 4$. The length of the longest path of the graph is 2.

20. The state table of a finite state machine M is as follows. Check whether the machine M is information lossless. If it is information lossless, then determine the order of losslessness.

[WBUT 2003]

Present State	Next State,O/P	
	X = 0	X = 1
A	A, 0	B, 0
B	C, 0	D, 0
C	D, 1	C, 1
D	B, 1	A, 0

Solution: First, we have to construct a testing table for information losslessness for testing whether the machine is information lossless or not. The testing table is