(2)

Problem 3

10

- see if lossless: if lossless: initial state = S_1
  initial state = S_4
  Output_seq = 011010

a)

	0	1
S1	S2/0	S3/0
S2	S1/0	S4/1
S3	S6/0	S6/1
S4	S2/1	S3/1
S5	S4/0	S5/0
S6	S5/1	S4/1

Build forwards table:

States	0	1
S1	S2,S3	∅
S2	S1	S4
S3	S6	S6
S4	∅	S2S3
S5	S4S5	∅
S6	∅	S4S5
S2S3	S1S6	S4S6
S4S5	S4S5	S2S3
S1S6	S2S3	S5S4
S4S6	∅	S2S3S4S5

~~no duplicates ⇒ no losses~~

~~S5~~

S2S3S4S5	S1S6S4S5	S1S4S6S2S3
S1S6S4S5	S2S3S4S5	S6S2S3
S1S4S6S2S3 S6S2S3	S2S3S1S6	S1S4S6S2S3S5S4* → duplicate ⇒ it has losses

6)

	0	1
S1	S2/0	S3/0
S2	S1/0	S4/1
S3	S6/0	S6/1
S4	S2/1	S3/1
S5	S4/0	S4/0
S6	S5/1	S4/1

Build forwards

States	0	1
S1	S2S3	~~∅~~
S2	S1	S4
S3	S6	S6
S4	~~∅~~	S2S3
S5	S4S4*	~~∅~~
S6	~~∅~~	S4S5
S2S3	S1S6	S4S6
S4S5	S4S4*	S2S3
S4S6		
S1S6		

2

⇒ it has losses

Backwards table:

0	1	State
S2		S1
		S2
		S3
		S4
		S5
		S6

2