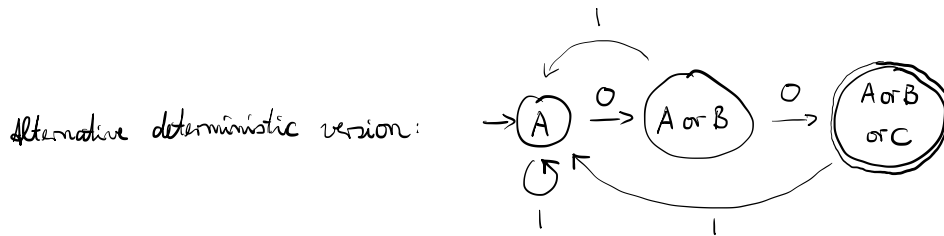
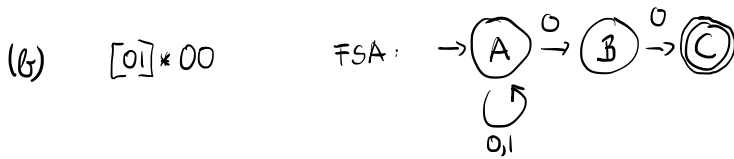
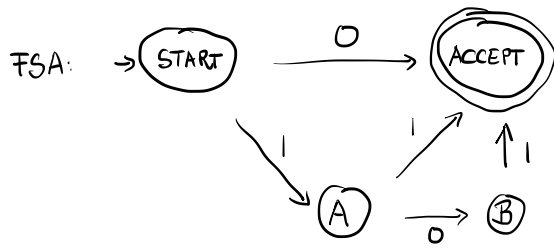
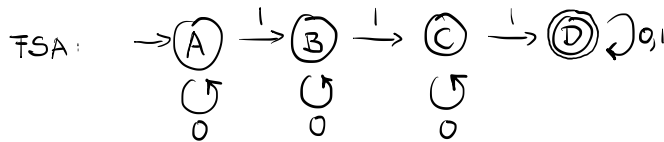


Exercise 6 Solutions

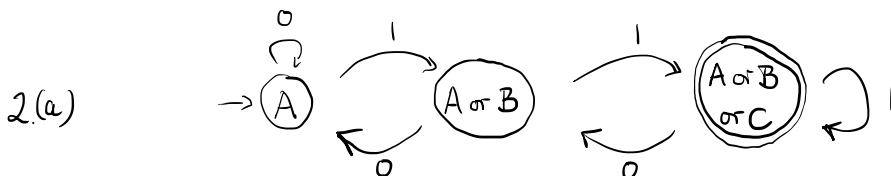
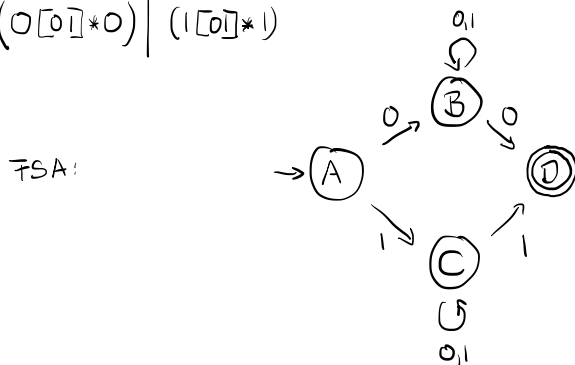
1. (a) $0|(11)|(101)$ alternatively: $0|1(1|01)$



(c) $0^*|0^*|0^*|[01]^*$



(d) $(0[01]^*0)|(1[01]^*1)$



(b) $0^*|0^*1(0+1)^*1+$, $0^*|0^*1(0+1)^*|0(0+1)^*1)^*|*$ is also a solution

3. (a) The transducer outputs a zero first, then outputs the previous input.

⇒ Can be seen as a shift of the input sequence

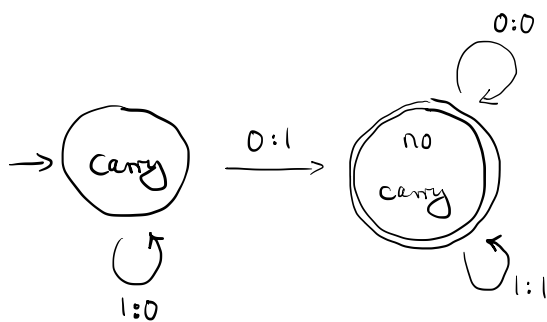
(b) If a binary number is input left-to-right, it performs a binary division by 2

(the remainder is in the final state of the transducer: $A=0$, $B=1$)

If a binary number is input right-to-left, it performs binary multiplication by 2.

In this case, it is necessary to pad the number with a leading 0 to get the most significant digit out of the transducer.

4. Feed the digits of the binary number right-to-left into the following transducer:



Note: If the final state is "carry", this signals an overflow.

It can be avoided by padding the number with a leading 0.