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Exercise 6.1

We encounter the problem that we want to force an A to be on top of the stack but at the same time not pop A. To work around this, we can add a second transition controlling the A.
It would look like this:

1. transition $q_0 \to q_1$: $\epsilon, A \to A$
2. transition $q_1 \to q_2$: c, ϵ, B

In the first transition we force an A to be on top of the stack by popping it, but then pushing it right back. Then in the second transition we process the c from the input word and add the B

Exercise 6.2

(a) To simulate a multi-tape TM we need to place all k tapes on one single tape. In order to keep track of our different tapes, we introduce a new symbol that acts as a delimiter to separate our tapes. This can be any symbol that is not in the alphabet and it must only be used as delimiter and nothing else. In this case we use # as delimiter.

Now that we have separated our tapes we still need to figure out a way to keep track of the different tape-heads. We again introduce a new symbol $\dot{z}$ to our alphabet Γ' where $z \in \Gamma$. This new symbol marks the cells where a tape head is.

Ich han eifach das hier gmacht... verstand ned genau was sie überhaupt vo eus wott :/
https://www.youtube.com/watch?v=g8b-cPEZGy4

(b) The Head is again on the first position either when any transition has been completed or when the head got moved there by a "L" transition from the second cell ??

Ke plan was hier d'frog isch????

(c) When we're supposed to move right but we're on the last cell of that "tape" (there is a # next), then we have to shift all the cells from our tape-head to the last cell one step to the right.

Idk das stoht ja scho ide Frag? Isch mer ned ganz klar was sie hier wend?

Exercise 6.3

Exercise 6.4