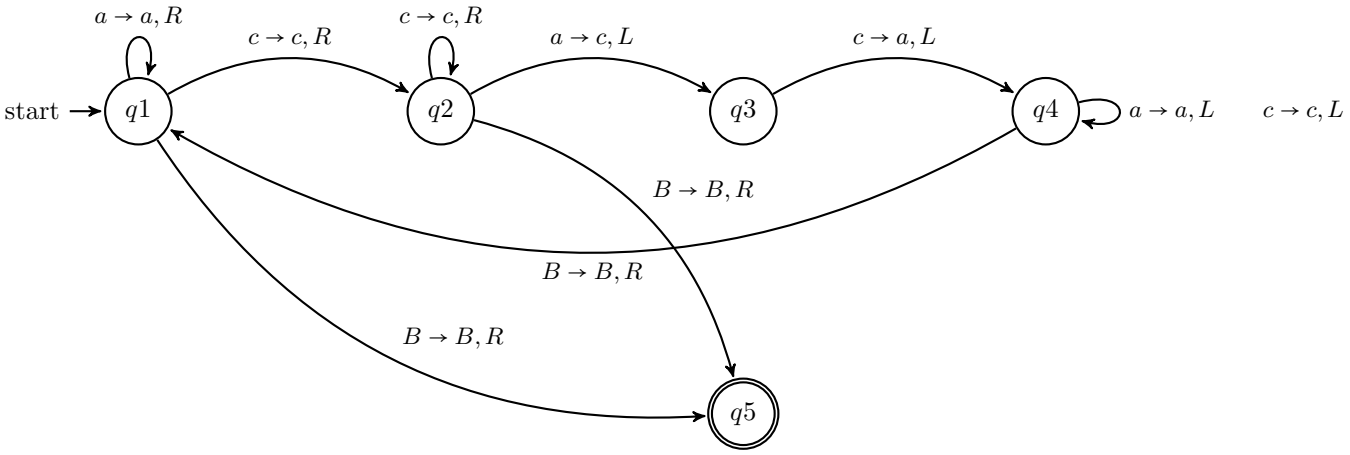
Homework 5: Turing Machines

Q: Create a Turing machine over input alphabet $\Sigma = \{a, c\}$ that sorts the input on the tape (first all a symbols then all c symbols) and then accepts.

A:



Q: Run your Turing machine on the following inputs: ϵ, ac, a, c, ca, $caca$.

A:

- $q_1B \vdash\!\!\rightarrow q_5$ = *Accepted*
- $q_1ac \vdash\!\!\rightarrow q_1c \vdash q_2B \vdash q_5$ = *Accepted*
- $q_1a \vdash\!\!\rightarrow q_1B \vdash q_5$ = *Accepted*
- $q_1c \vdash\!\!\rightarrow q_2B \vdash q_5$ = *Accepted*
- $q_1ca \vdash\!\!\rightarrow q_2a \vdash q_3cc \vdash q_4ac \vdash q_4B \vdash q_1ac \vdash q_1c \vdash q_2B \vdash q_5$ = *Accepted*
- $q_1caca \vdash\!\!\rightarrow q_2aca \vdash q_3ccca \vdash q_4acca \vdash q_4B \vdash q_1acca \vdash q_1cca \vdash q_2ca \vdash q_2a \vdash q_3cc \vdash q_4ac \vdash q_4cac \vdash q_4acac \vdash q_4B \vdash q_1acac \vdash q_1cac \vdash q_2ac \vdash q_3ccc \vdash q_4aacc \vdash q_4B \vdash q_1aacc \vdash q_1acc \vdash q_1cc \vdash q_2c \vdash q_2B \vdash q_5$ = *Accepted*