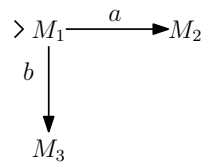


# Theory of Computation, Fall 2021

## Assignment 7 (Due November 14 Monday 10:00am)

- Q1. Fix an alphabet  $\Sigma$  contains  $\triangleright$  and  $\sqcup$ . Given a precise definition for the head-moving machine  $M_{\rightarrow}$ , which, regardless of the symbol it reads, always moves its head to the right and then halt immediately.
- Q2. Let  $\Sigma = \{a, b, c, \triangleright, \sqcup\}$ . Let  $M_i = (K_i, \Sigma, \delta_i, s_i, H_i)$  for  $i = 1, 2, 3$  be three Turing machines. Give the definition of the following Turing machine in terms of  $M_1, M_2, M_3$ .



- Q3. Design a right-shifting machine  $S_{\rightarrow}$  that transforms  $\triangleright \sqcup w \sqcup$  into  $\triangleright \sqcup \sqcup w \sqcup$ , where  $w$  is a string that contains no blank symbol. You may use the machines and the diagrams we presented in class.