

# Mod/Div Turing Machine

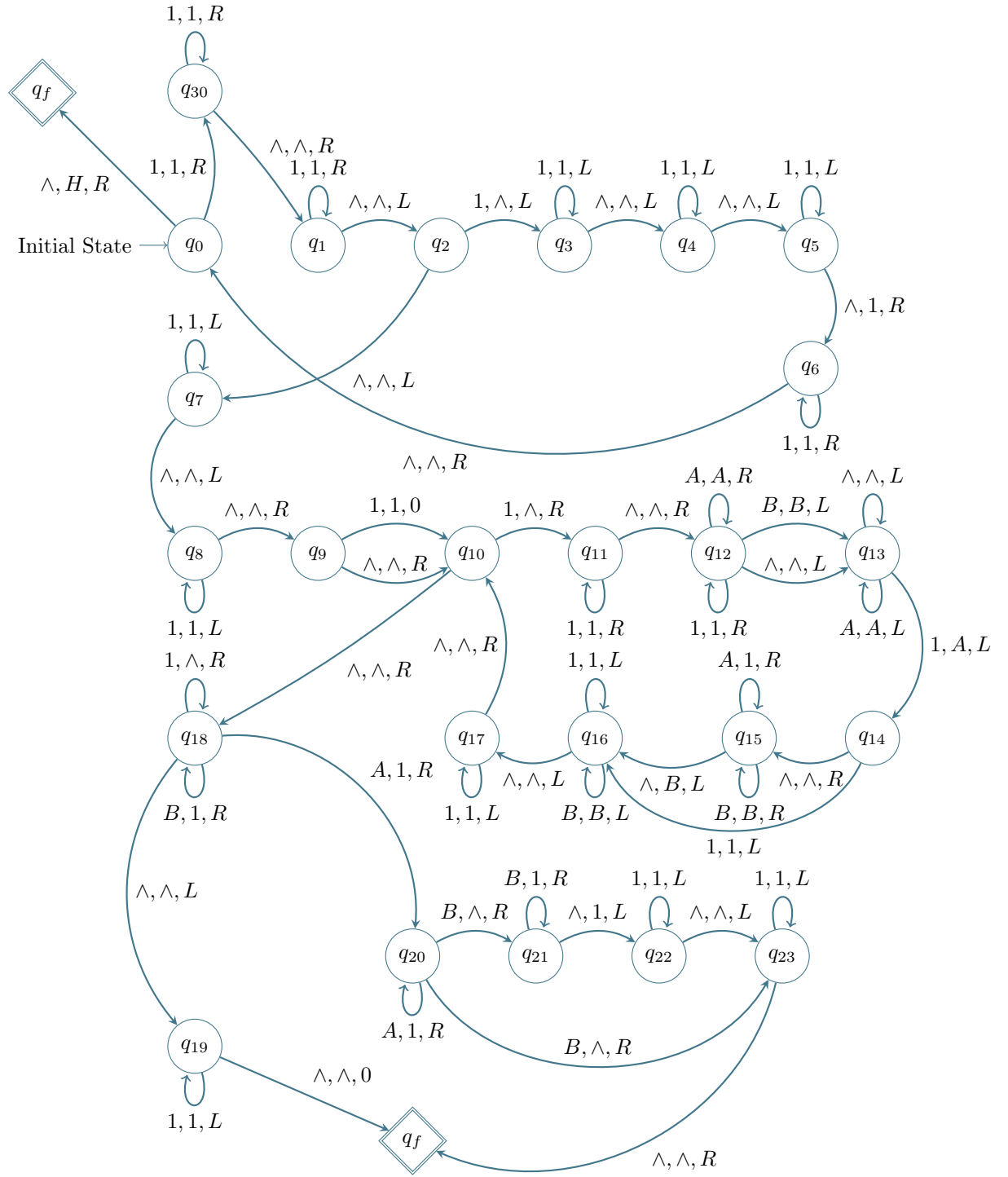
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INDIVIDUAL COURSEWORK  
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SUBMITTED BY

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# 1 Graph



## 2 Mathematical Notation

$$s_0 \equiv \wedge, s_1 \equiv 1, s_2 \equiv A, s_3 \equiv B, s_4 \equiv H$$

$$\begin{aligned}
M_g = \{ & ((q_0, s_0) \rightarrow (q_f, s_4, 0)), \\
& ((q_0, s_1) \rightarrow (q_{30}, s_1, R)), \\
& ((q_1, s_1) \rightarrow (q_1, s_1, R)), \\
& ((q_1, s_0) \rightarrow (q_2, s_0, L)), \\
& ((q_{30}, s_1) \rightarrow (q_{30}, s_1, R)), \\
& ((q_{30}, s_0) \rightarrow (q_1, s_0, R)), \\
& ((q_2, s_0) \rightarrow (q_7, s_0, L)), \\
& ((q_2, s_1) \rightarrow (q_3, s_0, L)), \\
& ((q_3, s_1) \rightarrow (q_3, s_1, L)), \\
& ((q_3, s_0) \rightarrow (q_4, s_0, L)), \\
& ((q_4, s_1) \rightarrow (q_4, s_1, L)), \\
& ((q_4, s_0) \rightarrow (q_5, s_0, L)), \\
& ((q_5, s_1) \rightarrow (q_5, s_1, L)), \\
& ((q_5, s_0) \rightarrow (q_6, s_1, R)), \\
& ((q_6, s_1) \rightarrow (q_6, s_1, R)), \\
& ((q_6, s_0) \rightarrow (q_{30}, s_0, R)), \\
& ((q_7, s_1) \rightarrow (q_7, s_1, L)), \\
& ((q_7, s_0) \rightarrow (q_8, s_0, L)), \\
& ((q_8, s_1) \rightarrow (q_8, s_1, L)), \\
& ((q_8, s_0) \rightarrow (q_9, s_0, R)), \\
& ((q_9, s_1) \rightarrow (q_{10}, s_1, 0)), \\
& ((q_9, s_0) \rightarrow (q_{10}, s_0, R)), \\
& ((q_{10}, s_1) \rightarrow (q_{11}, s_0, R)), \\
& ((q_{10}, s_0) \rightarrow (q_{18}, s_0, R)), \\
& ((q_{11}, s_1) \rightarrow (q_{11}, s_1, R)), \\
& ((q_{11}, s_0) \rightarrow (q_{12}, s_0, R)), \\
& ((q_{12}, s_1) \rightarrow (q_{12}, s_1, R)), \\
& ((q_{12}, s_2) \rightarrow (q_{12}, s_2, R)), \\
& ((q_{12}, s_3) \rightarrow (q_{13}, s_3, L)), \\
& ((q_{12}, s_0) \rightarrow (q_{13}, s_0, L)), \\
& ((q_{13}, s_0) \rightarrow (q_{13}, s_0, L)), \\
& ((q_{13}, s_2) \rightarrow (q_{13}, s_2, L)), \\
& ((q_{13}, s_1) \rightarrow (q_{14}, s_2, L)), \\
& ((q_{14}, s_0) \rightarrow (q_{15}, s_0, R)), \\
& ((q_{14}, s_1) \rightarrow (q_{16}, s_1, L)), \\
& ((q_{15}, s_2) \rightarrow (q_{15}, s_1, R)), \\
& ((q_{15}, s_3) \rightarrow (q_{15}, s_3, R)), \\
& ((q_{15}, s_0) \rightarrow (q_{16}, s_3, L)), \\
& ((q_{16}, s_1) \rightarrow (q_{16}, s_1, L)), \\
& ((q_{16}, s_3) \rightarrow (q_{16}, s_3, L)), \\
& ((q_{16}, s_0) \rightarrow (q_{17}, s_0, L)), \\
& ((q_{17}, s_1) \rightarrow (q_{17}, s_1, L)), \\
& ((q_{17}, s_0) \rightarrow (q_{10}, s_0, R)), \\
& ((q_{18}, s_1) \rightarrow (q_{18}, s_0, R)), \\
& ((q_{18}, s_3) \rightarrow (q_{18}, s_1, R)), \\
& ((q_{18}, s_2) \rightarrow (q_{20}, s_1, R)), \\
& ((q_{18}, s_0) \rightarrow (q_{19}, s_0, L)), \\
& ((q_{19}, s_1) \rightarrow (q_{19}, s_1, L)), \\
& ((q_{19}, s_0) \rightarrow (q_f, s_0, 0)), \\
& ((q_{20}, s_2) \rightarrow (q_{20}, s_1, R)), \\
& ((q_{20}, s_3) \rightarrow (q_{21}, s_0, R)), \\
& ((q_{20}, s_0) \rightarrow (q_{23}, s_0, L)), \\
& ((q_{21}, s_3) \rightarrow (q_{21}, s_1, R)), \\
& ((q_{21}, s_0) \rightarrow (q_{22}, s_1, L)), \\
& ((q_{22}, s_1) \rightarrow (q_{22}, s_1, L)), \\
& ((q_{22}, s_0) \rightarrow (q_{23}, s_0, L)), \\
& ((q_{23}, s_1) \rightarrow (q_{23}, s_1, L)), \\
& ((q_{23}, s_0) \rightarrow (q_f, s_0, R)), \\
& \}
\end{aligned}$$

### 3 Input (3, 5)

A

(i)

(ii)