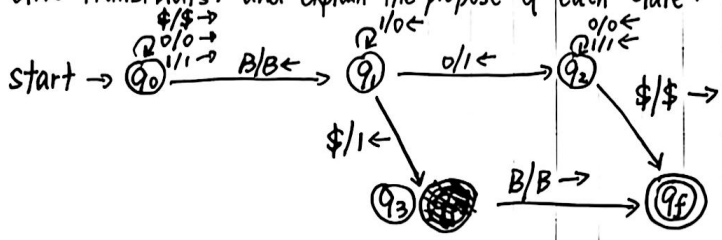
Week A. By Deng Yufan.

Prob 1. Design a TM that turns $(N)_2$ into $(N+1)_2$.

a. Give transitions. and explain the propose of each state.



q_0 : straight forward to end of string.
q_1 : turn the continous 1 in the end to 0, and turn the following 0 to 1.
q_2 : back to beginning of string.
q_3 : similar to q_2.

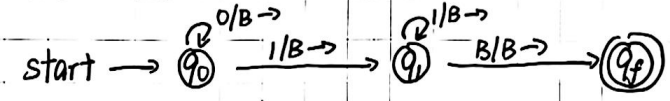
b. show sequence of ID when given input $111.

$q_0\$111 \vdash \$q_0111 \vdash \$1q_011 \vdash \$11q_01 \vdash \$111q_0B$

$\vdash \$11q_11 \vdash \$1q_10 \vdash \$q_100 \vdash q_1\$000$

$\vdash q_3B1000 \vdash q_f1000$.

Prob 2. Consider TM:



describe $L(M)$.

Obviously $L(M) = L(0^*1^*)$.