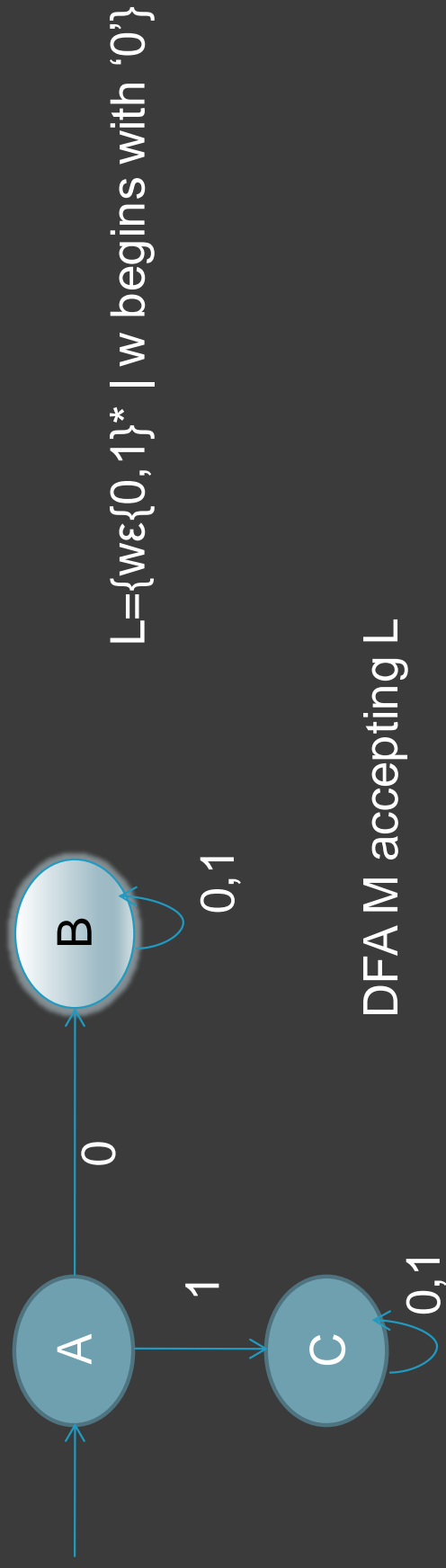


Complement operation is closed for RL

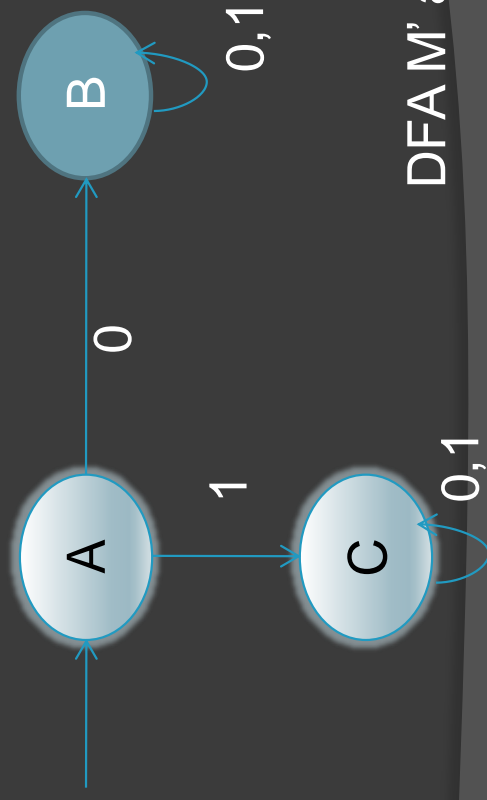
- If L is a regular language then L' is also regular.
- **Proof by construction**
- Given L is RL so there exists a DFA M such that $L(M)=L$
- Suppose DFA $M=(Q, \Sigma, \delta, q_0, F)$
- Now we construct a DFA $M'=(Q, \Sigma, \delta, q_0, F')$ such that $L(M')=L(M)'=L'$
- $F'=Q-F$
- Interchange final and non final states of M to design M' .

Complement operation is closed for RL



DFA M accepting L

Interchange final and non final states of M



DFA M' accepting L'

Set Difference operation is closed for RL

- If L_1 and L_2 are regular language then
- $L_1 - L_2$ and $L_2 - L_1$ are also regular.
- **Proof by set theory**
- $L_1 - L_2 = L_1 \cap L_2'$
- We know RL is closed for complement and intersection operation
- So L_2' is regular
- $L_1 \cap L_2'$ is also regular