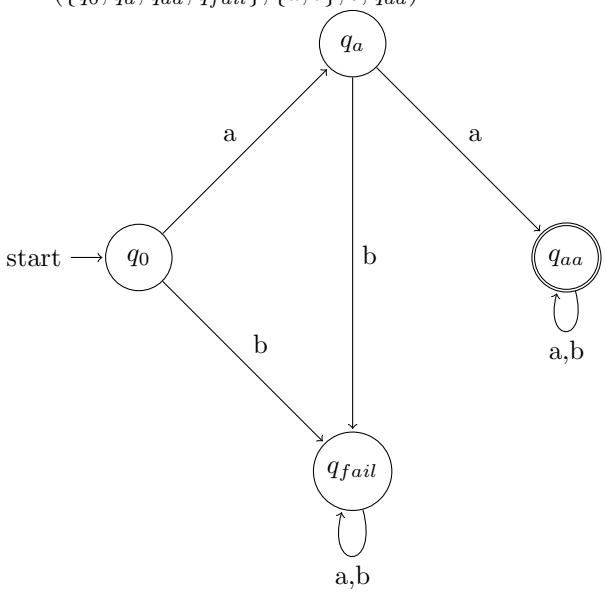
1 Automatas:

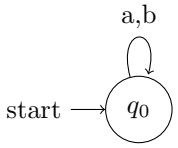
1.1 Accept words starting with two consecutive a's:

$A = (\{q_0, q_a, q_{aa}, q_{fail}\}, \{a, b\}, \delta, q_{aa})$



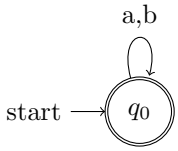
1.2 Accept no words:

$A = (\{q_0\}, \{a, b\}, \delta, \emptyset)$



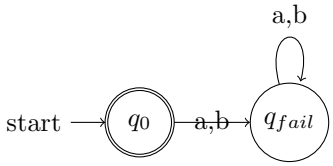
1.3 Accept all words:

$A = (\{q_0\}, \{a, b\}, \delta, \Sigma^*)$



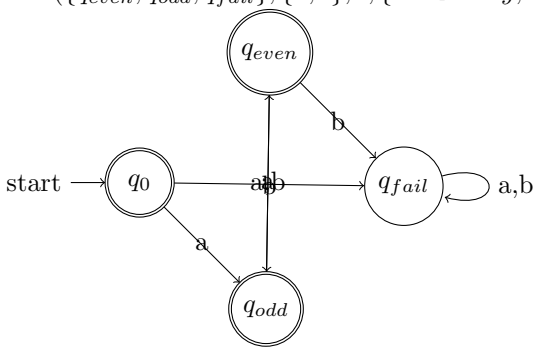
1.4 Only accept empty words (ϵ):

$A = (\{q_0, q_{fail}\}, \{a, b\}, \delta, \{\epsilon\})$



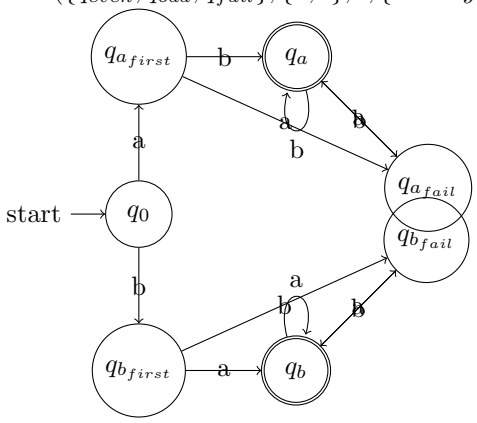
1.5 Only accept words which have their odd characters set to a:

$A = (\{q_{even}, q_{odd}, q_{fail}\}, \{a, b\}, \delta, \{\exists x \in \Sigma^* \exists y, z \in \Sigma \mid x = yz \wedge z = a\})$

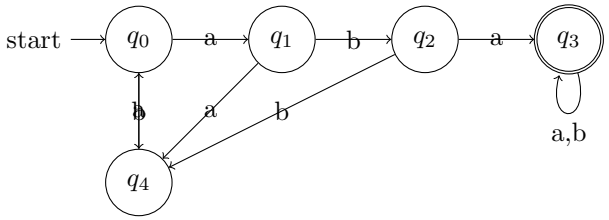


1.6 Only accept words which have their first character set differently than the last:

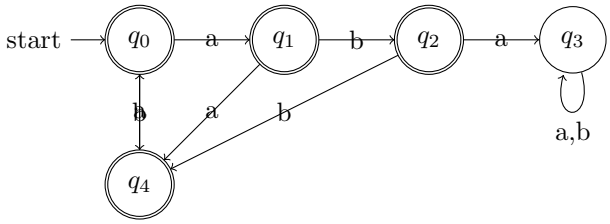
$A = (\{q_{even}, q_{odd}, q_{fail}\}, \{a, b\}, \delta, \{x = wyz \mid w, z \in \Sigma \wedge y \in \Sigma^* \wedge w \neq z\})$



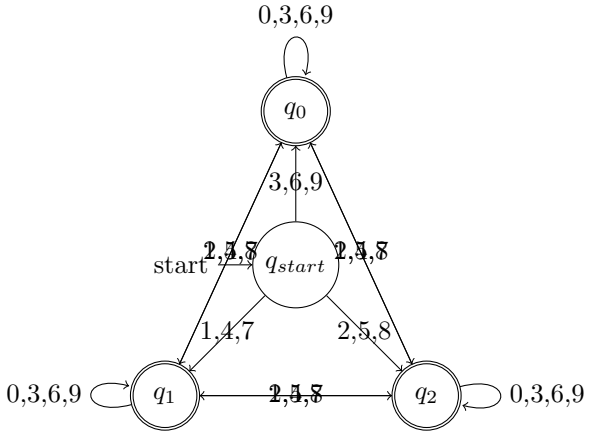
1.7 Only accept words which contain the string aba:



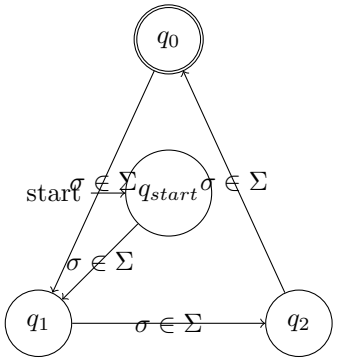
1.8 Only accept words which do not contain the string aba:



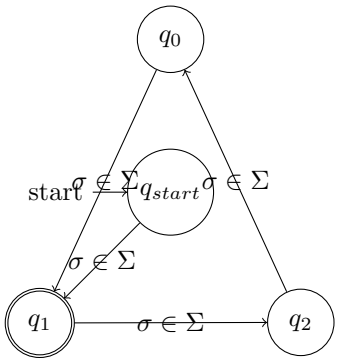
1.9 Only accept words which are numbers divisible by 3:



1.10 Only accept words which's length is divisible by 3:



1.11 Only accept words which have a length such that it returns 1 when paired with modulu 3:



1.12 Only accept words which have a length such that it does not return 1 when paired with modulu 3: