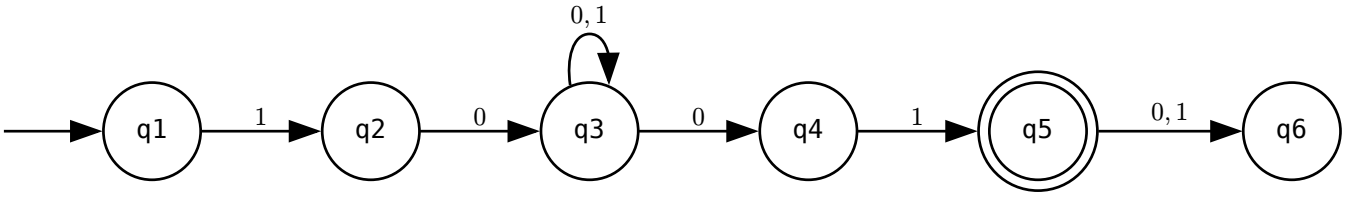
CS 4384 — Automata Theory, Homework 2

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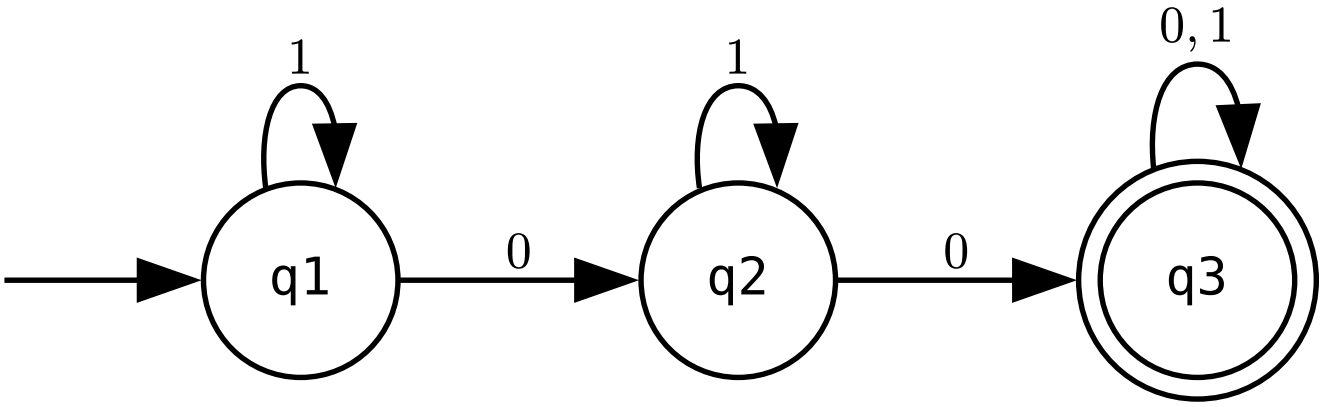
Let L1, L2 $\subseteq$ {0, 1}$*$ be two languages and defined as follows: $L_1 = \{w \mid w \text{ begins with a 10 and ends with a 01}\}$; $L_2 = \{w \mid w \text{ contains with at least two } 0s\}$

Construct NFAs M_1 and M_2 that accept L_1 and L_2 respectively

$M_1 =$

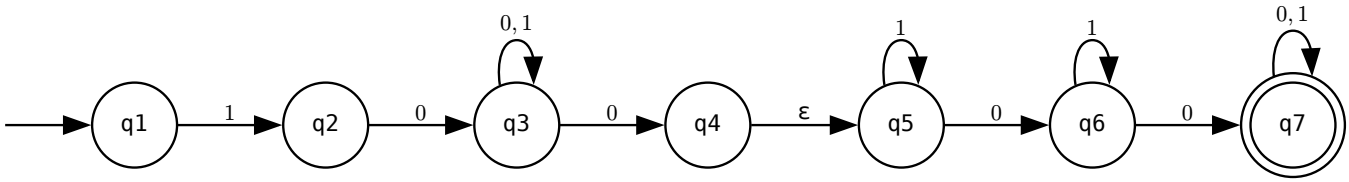


$M_2 =$

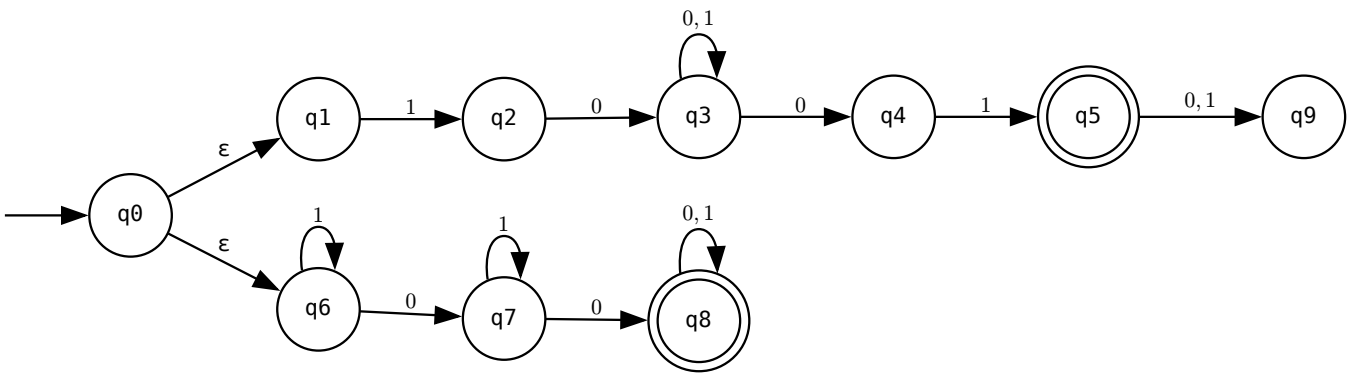


Let α_1 and α_2 be the regular expressions representing L_1 and L_2, respectively. Design NFAs for

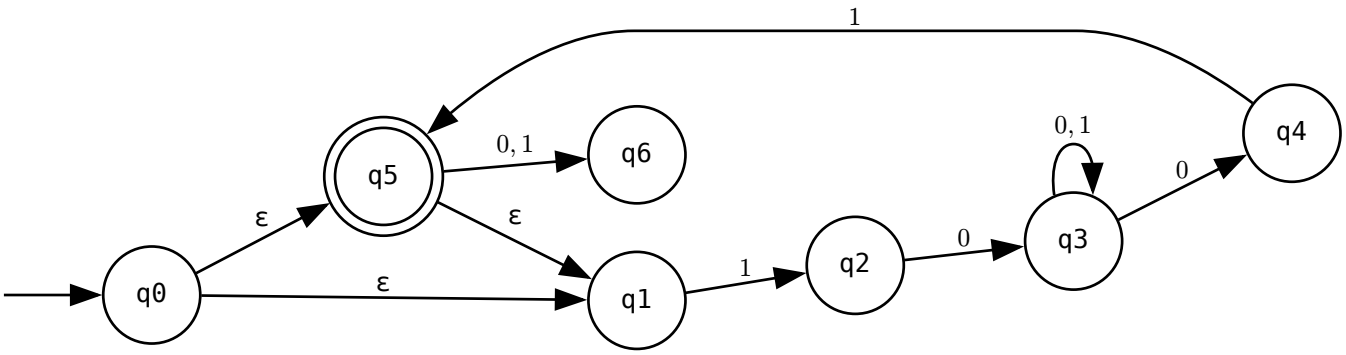
$\alpha_1 \cdot \alpha_2$



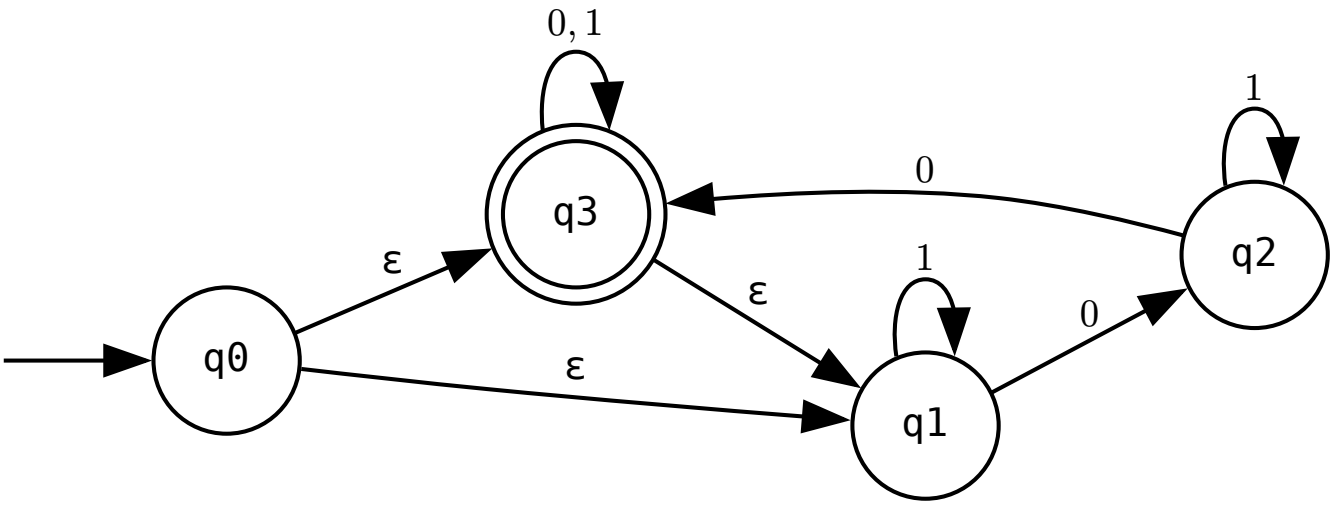
$\alpha_1 + \alpha_2$



$(\alpha_1)^*$

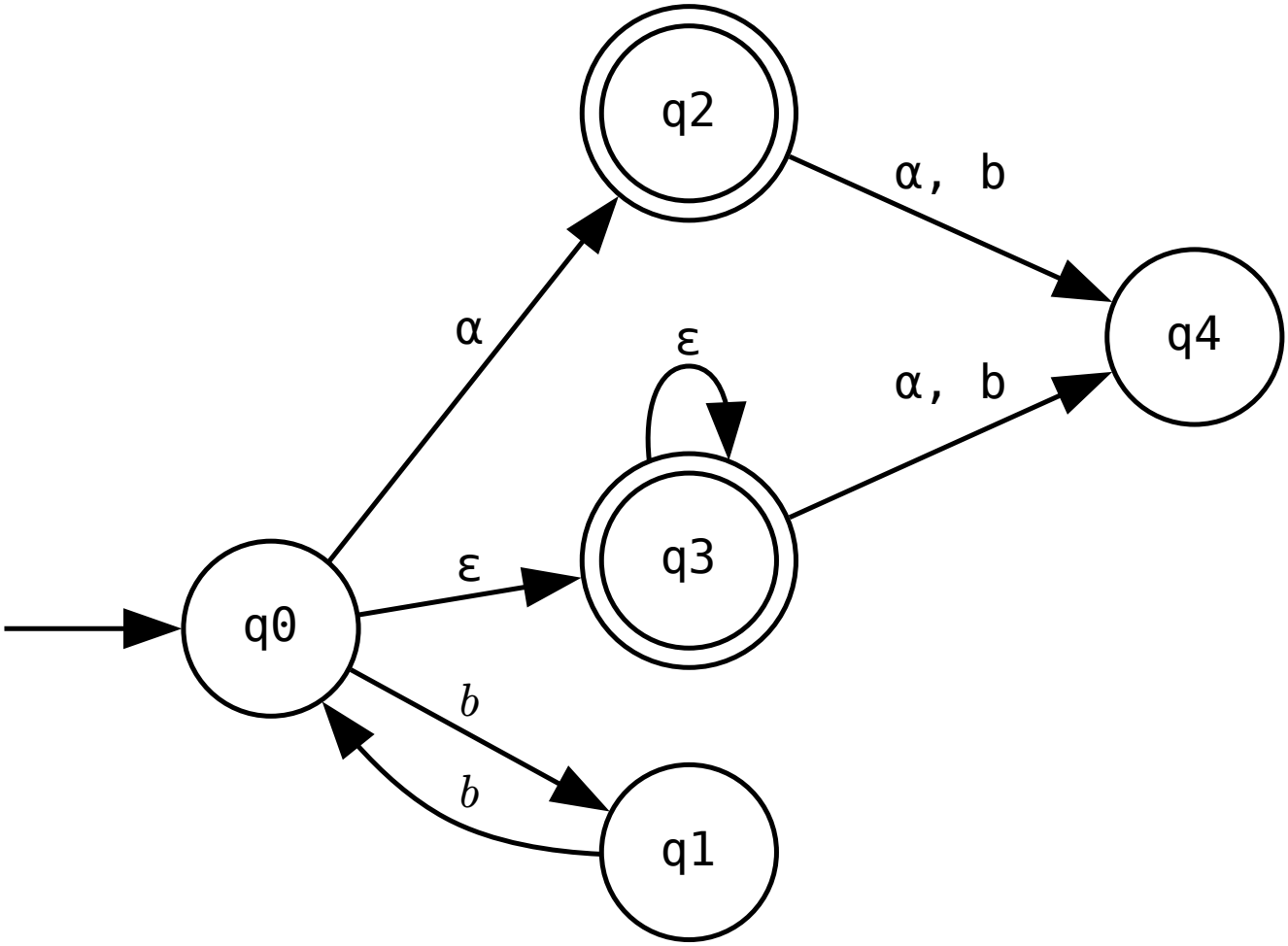


$(\alpha_2)^*$

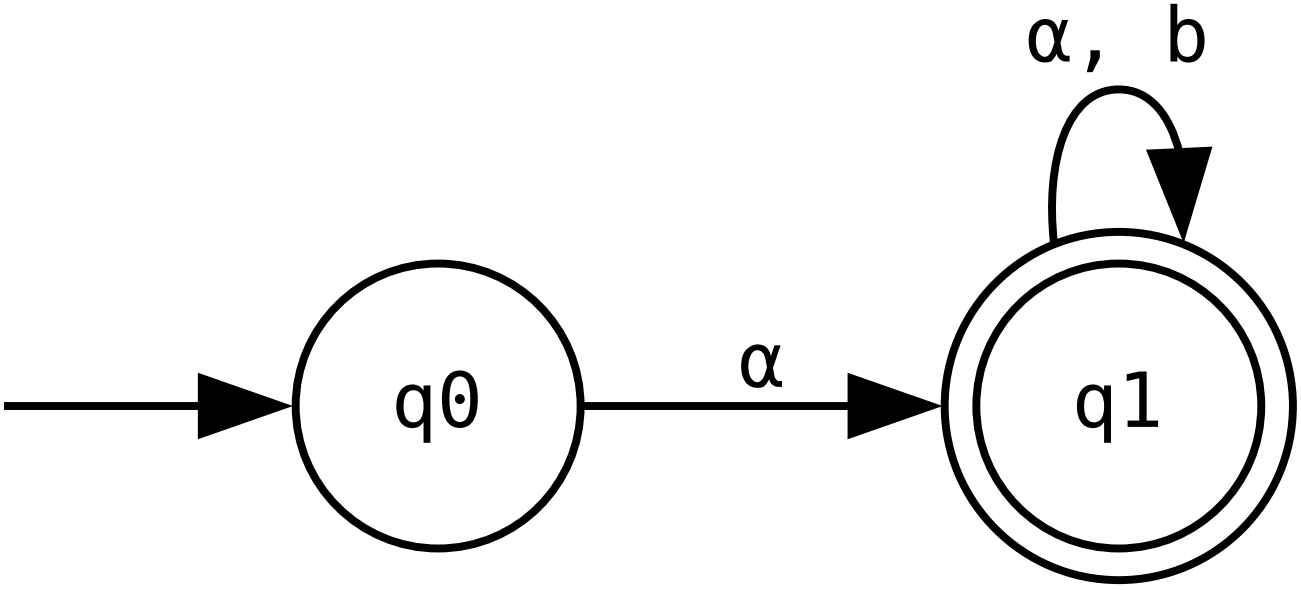


Convert the following regular expressions to NFAs.

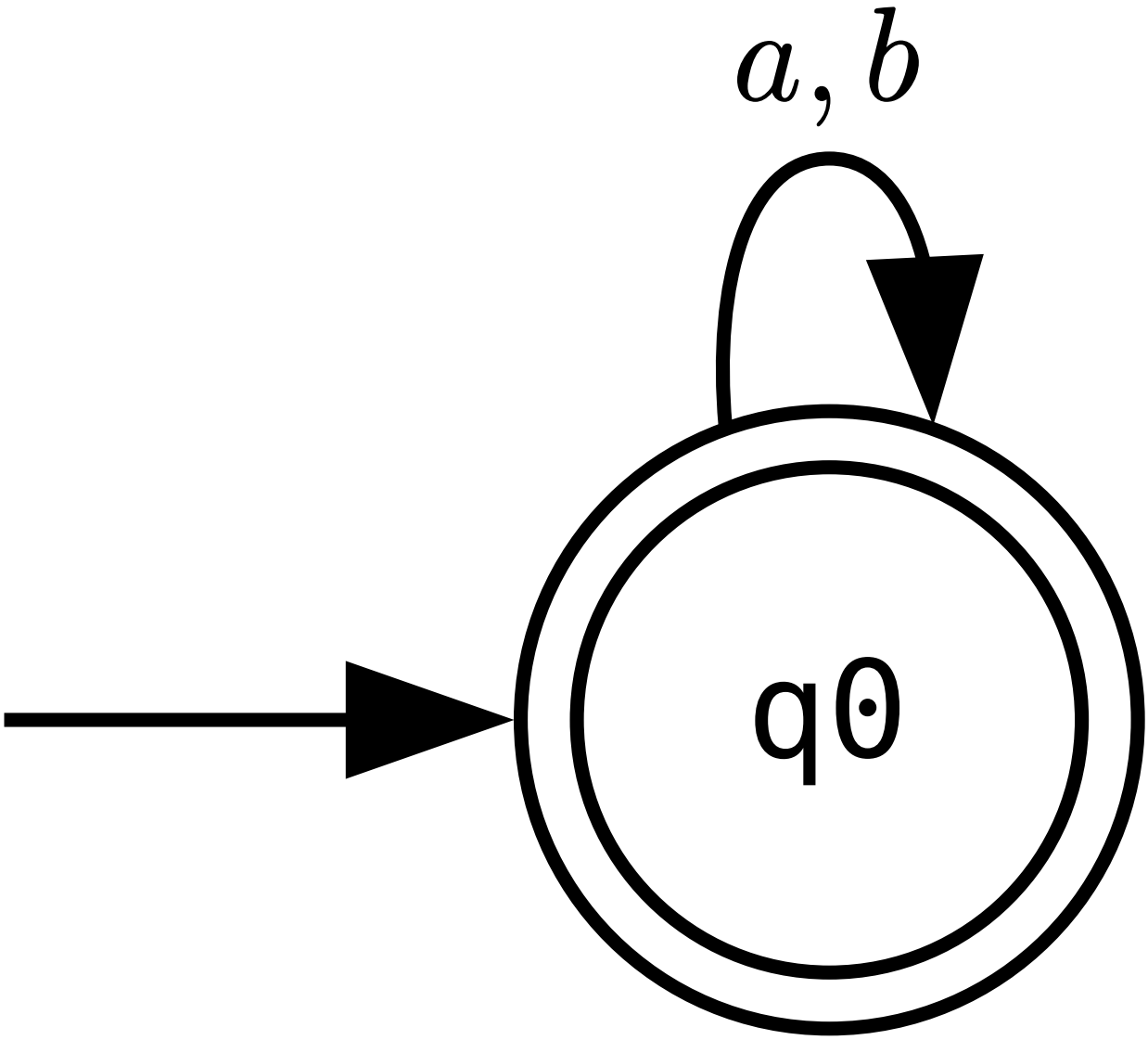
$(bb)^*\alpha + \varepsilon^*$



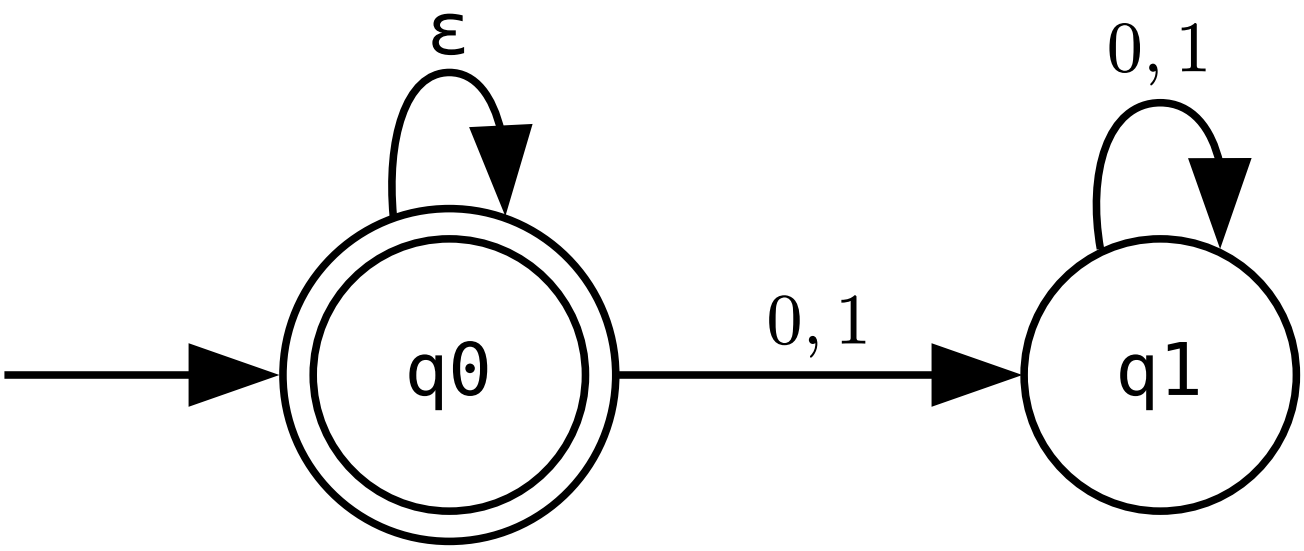
$\alpha^*\alpha + \alpha(\alpha + b)^*$



$(a+b)^*b^*a^*$



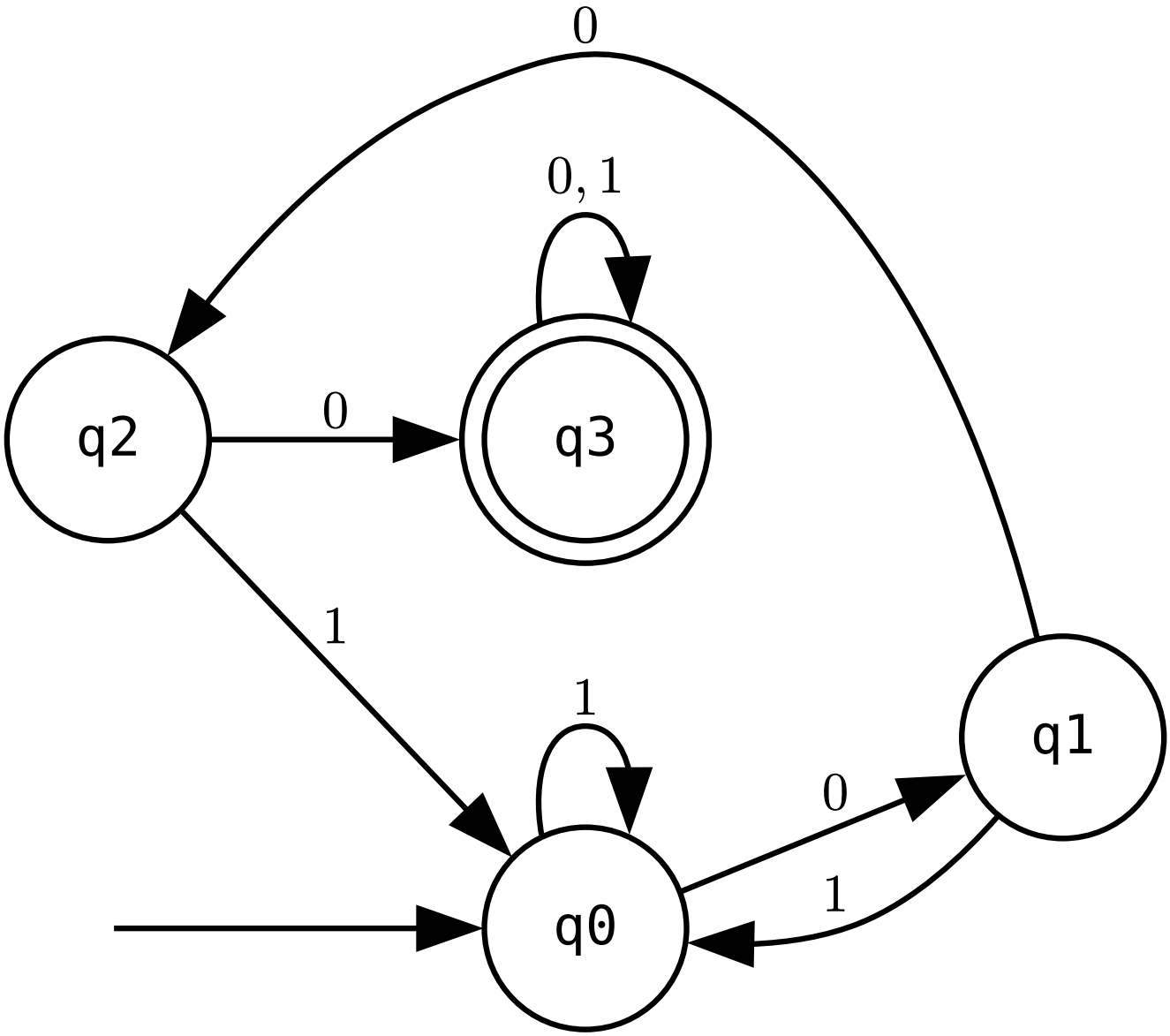
$\varnothing^*\varepsilon^*$



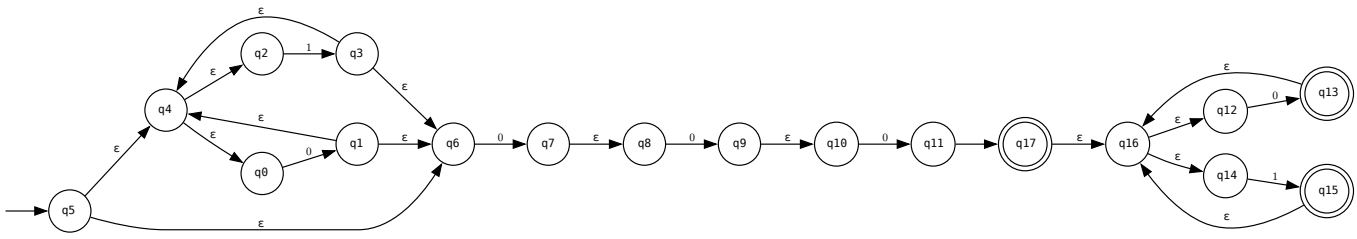
Convert the REs mentioned in the Exercise 1.19 on page 86 to equivalent DFAs

$(0 \cup 1)^*000(0 \cup 1)^*$

Ad Hoc:

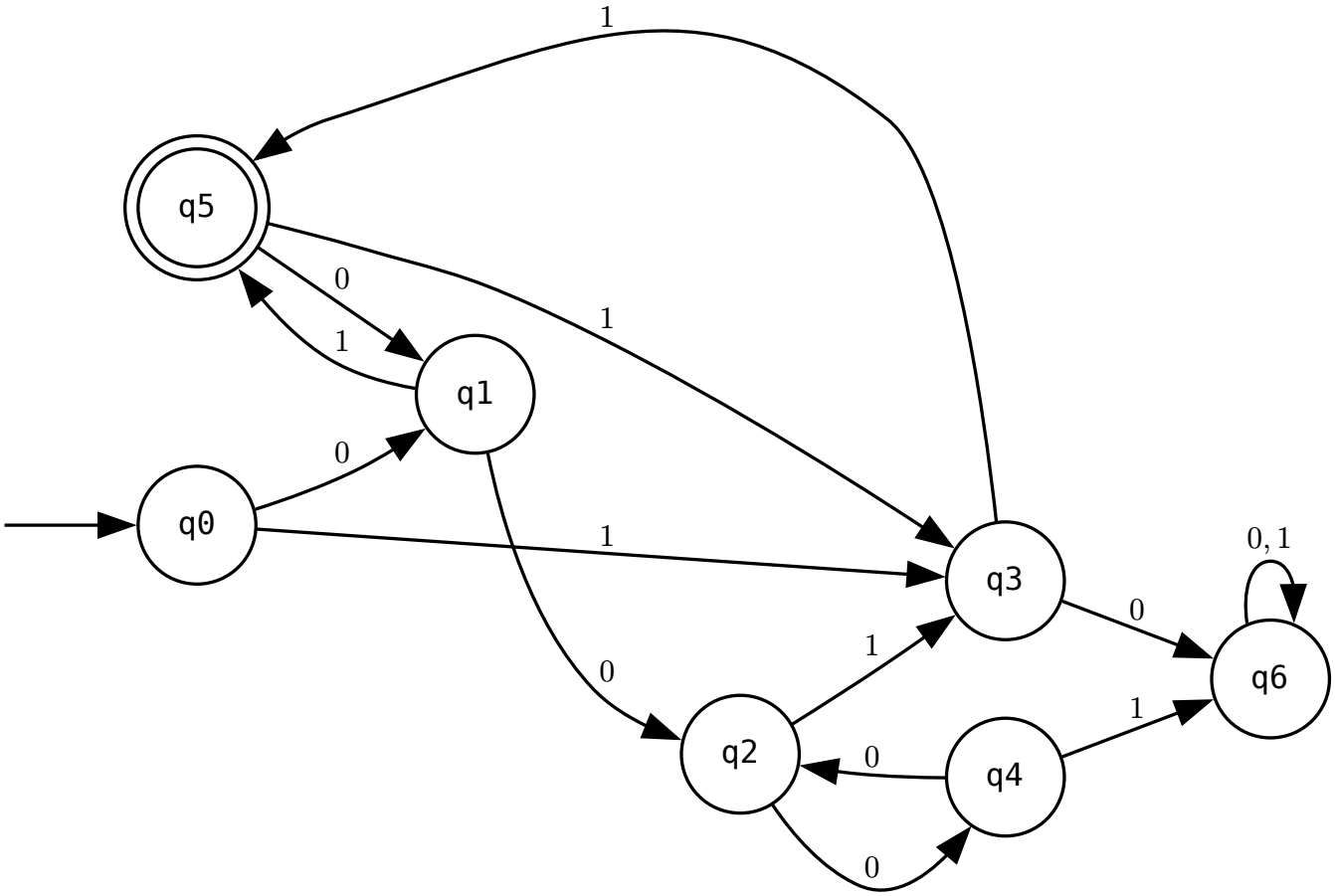


RE to NFA Conversion:

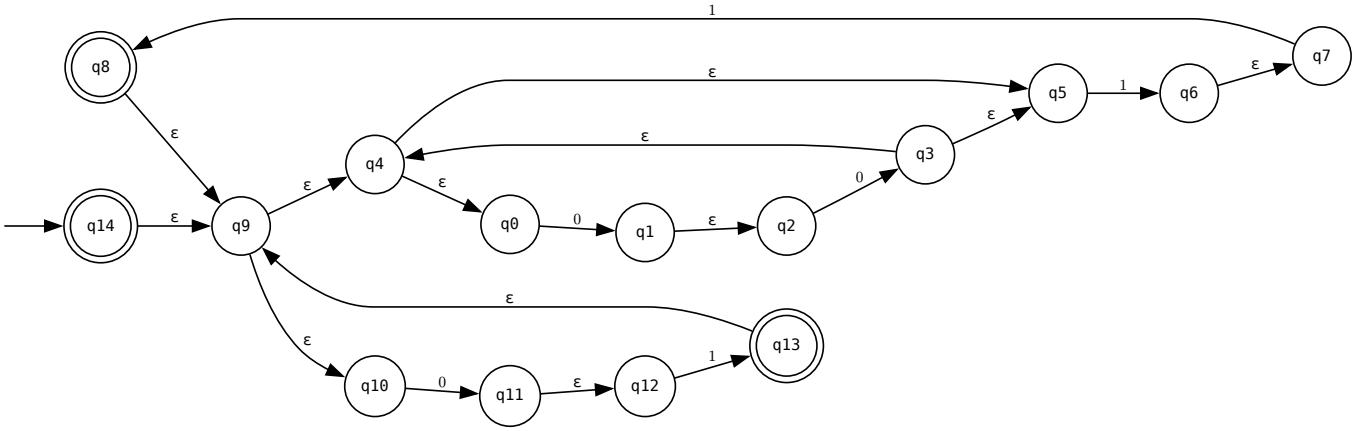


$(((00)^*(11)) \cup 01)^*$

Ad Hoc:

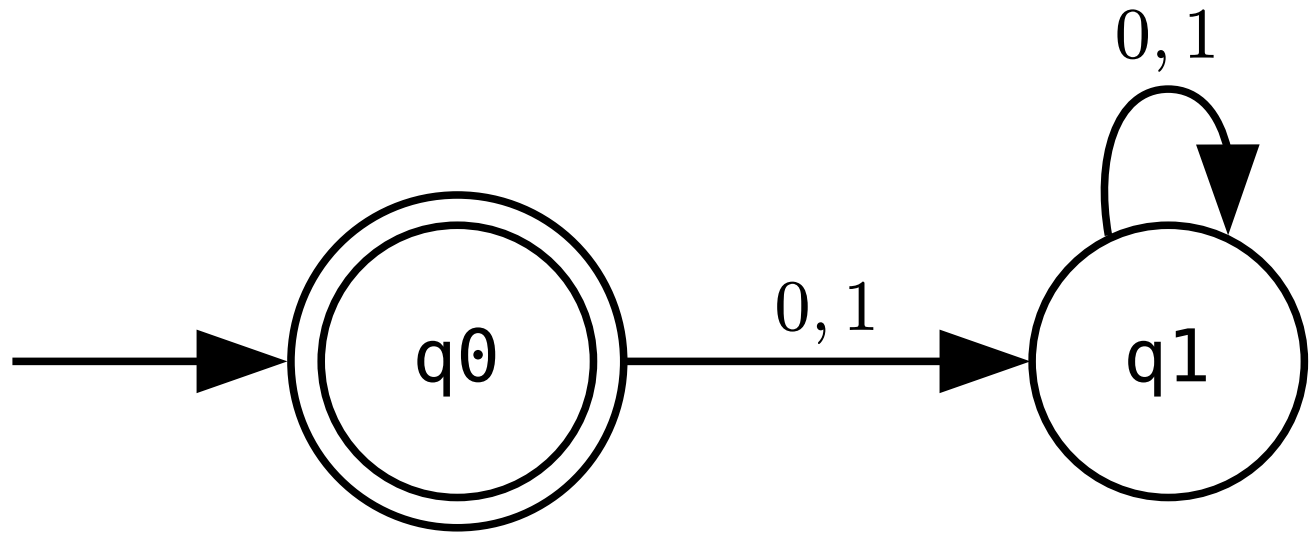


RE to NFA Conversion

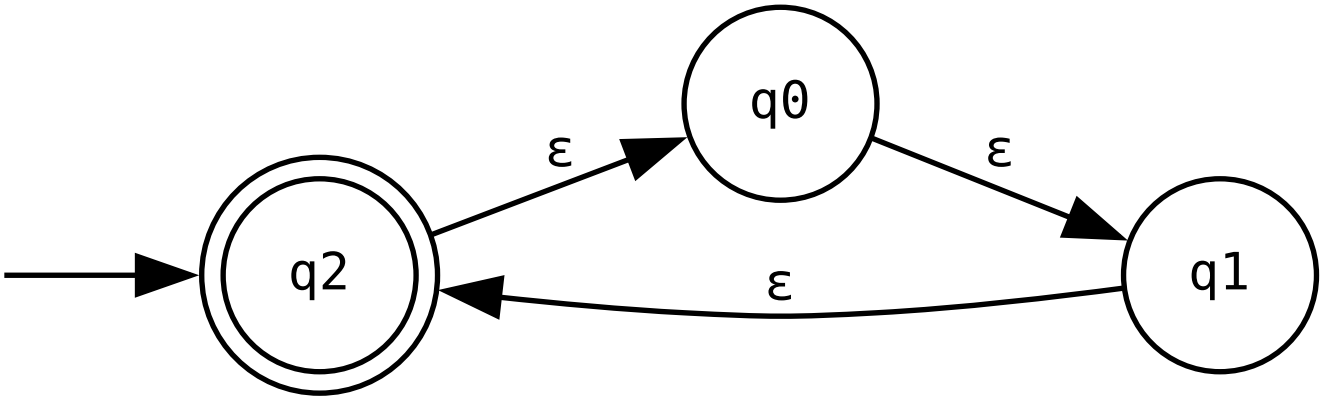


$\varnothing^*$

Ad Hoc:



RE to NFA:



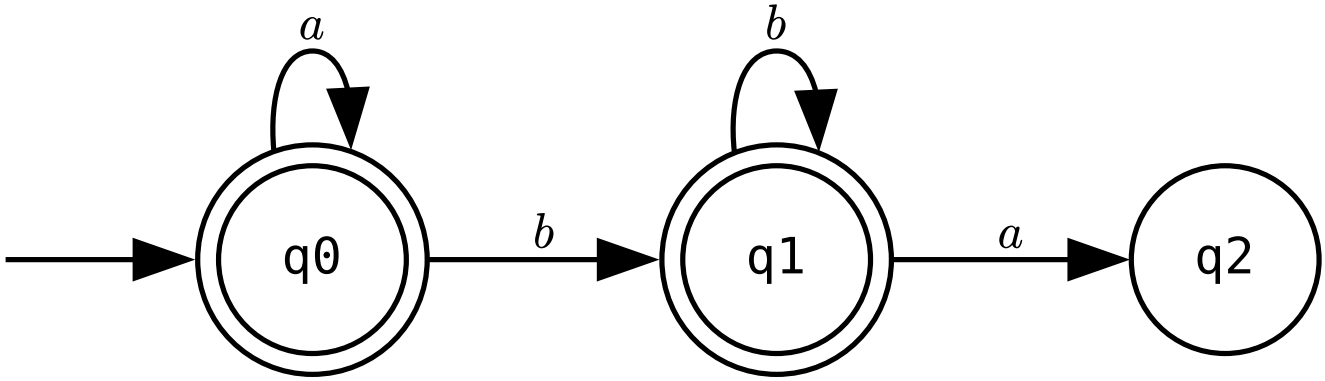
Convert the NFAs mentioned in the Exercise 1.16 on page 86 to equivalent REs.

$(a^*((a+b)b)^*)^*$

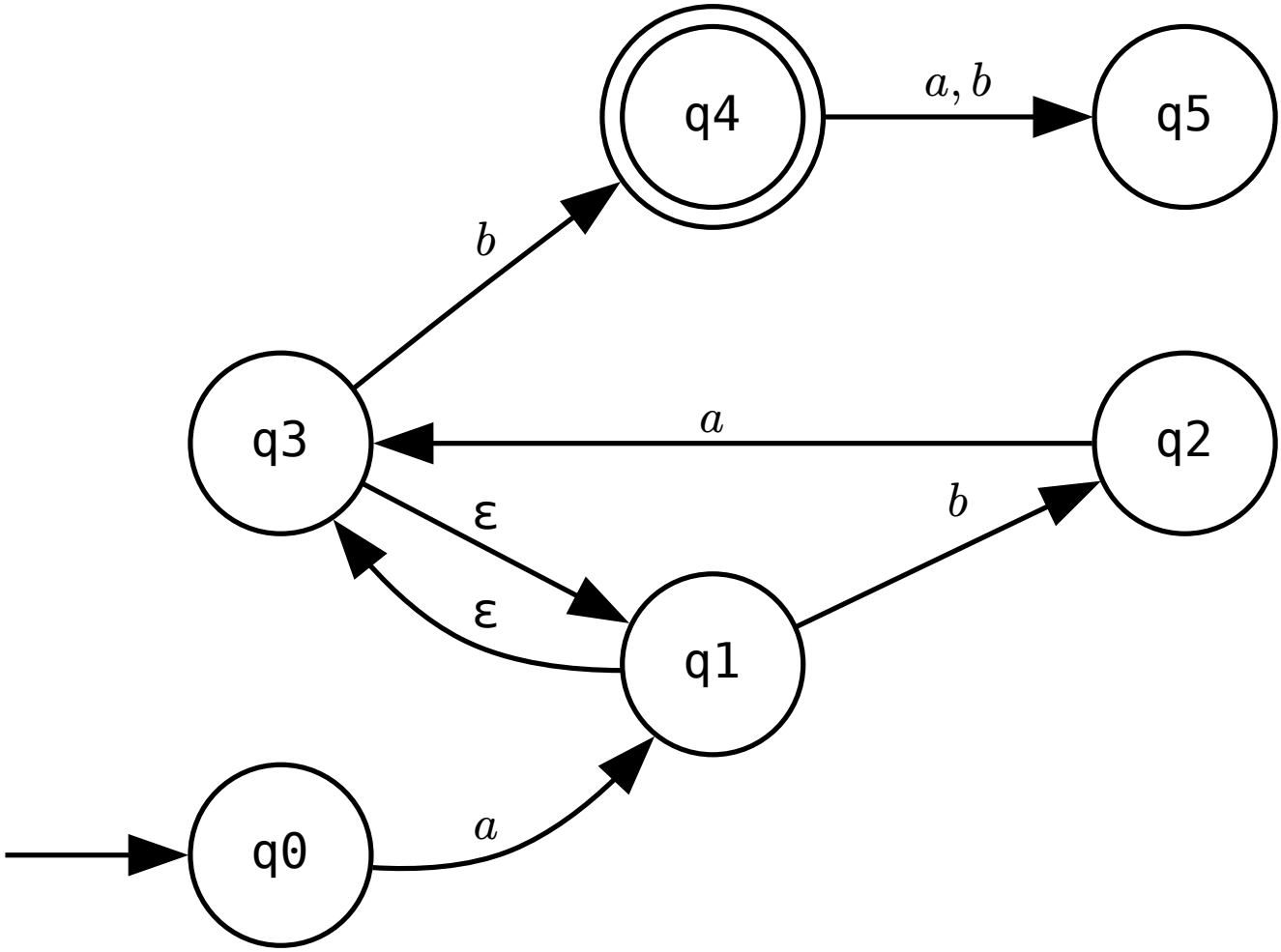
$\varepsilon + (a^*a(b^*)(a+b))(a(a^*)a(b^*)(a+b))^*$

Convert the REs mentioned in the Exercise 1.20 (parts a, b, e, g only) on page 86 to equivalent NFAs

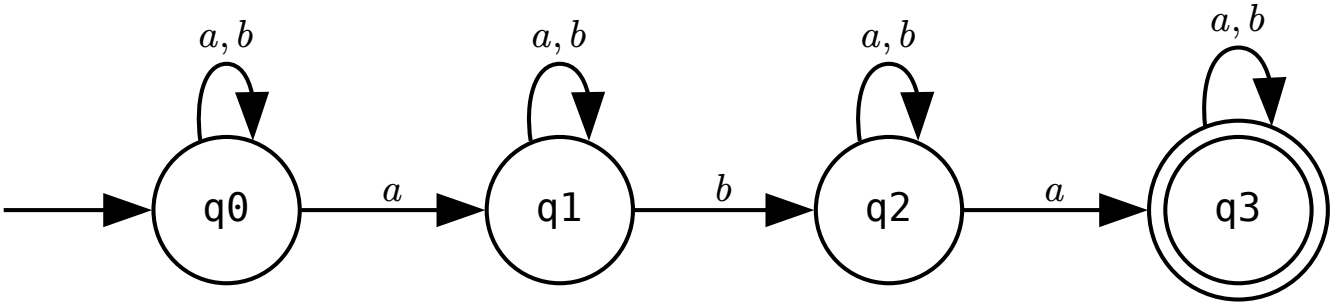
a a^*b^*



b $a(ba)^*b$



e $\Sigma^* a \Sigma^* b \Sigma^* a \Sigma^*$



g $(\varepsilon \cup a)b$

