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Question 4.3

$S \rightarrow aSb / bSa / aSa / bSb / A$

$A \rightarrow aa / bb$

Question 4.10

d. $\{(a^i)(b^j) \mid i \leq j \leq 2i\}$

Sol: $S \rightarrow aSb / aSbb / \lambda$

e. $\{(a^i)(b^j) \mid j \leq 2i\}$

Sol: $S \rightarrow aSb / aSbb / aS / \lambda$

Question 4.13

a. $\{(a^i)(b^j) \mid i \leq j \leq 3i/2\}$

let $i \leq j \leq 3i/2$ be $2i \leq 2j \leq 3i$.

$S \rightarrow aSb / aaSbbb / \lambda$

Question 4.28

$S \rightarrow abA \mid bB \mid aba$

$A \rightarrow b \mid aB \mid bA$

$B \rightarrow aB \mid aA$

So, the strings in Language L are:

$L = \{aba, bab, baab, abb, \dots\}$

It is a language consisting of strings starting with either ab or b and ending with either a or b.

Regular expression: $(ab+b)(a+b)^*(a+b)$

NFA:

