# CS-206: Assignments 1, 2

## Soumen Pradhan – 1912176

14 . 02 . 2021

1. $L^*$ –

    ab aa baa ab aa

    aa aa baa aa

    baa aa ab aa

    $L^4$ –

    aa aa baa aa

    baa aa ab aa

2. Given,
$$\Sigma = \{a, b\}$$
$$L = \{aa, bb\}$$

    So,
$$\overline{L} = \Sigma^* - L = \{a, b\}^* - \{aa, bb\}$$

3.  a) $P : S \rightarrow bS \mid Sb \mid a$
    $G = (\{S\}, \{a, b\}, S, P)$

    b) $P : S \rightarrow aS \mid bS \mid Sb \mid a$
    $G = (\{S\}, \{a, b\}, S, P)$

4.  a) $P : S \rightarrow aSb \mid Sb \mid b$
    $G = (\{S\}, \{a, b\}, S, P)$

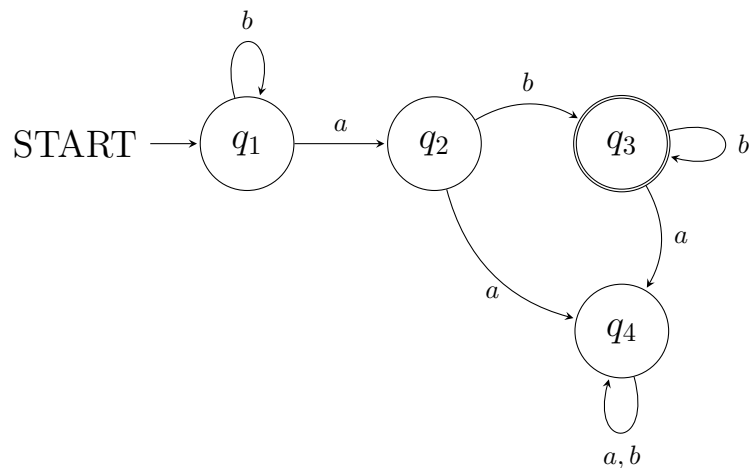    b) $P : S \rightarrow aSbb \mid \lambda$
    $G = (\{S\}, \{a, b\}, S, P)$

    c) $P : S \rightarrow aSb \mid aa$
    $G = (\{S\}, \{a, b\}, S, P)$

    d) $P : S \rightarrow aSb \mid aaa$
    $G = (\{S\}, \{a, b\}, S, P)$

    e) $P :$
    $$S \rightarrow S_1 S_2 B$$
    $$S_1 \rightarrow aS_1 b \mid S_1 b \mid b$$
    $$S_2 \rightarrow aS_2 bb \mid \lambda$$

    $G = (\{S, S_1, S_2\}, \{a, b, \lambda\}, S, P)$

    f) It can be observed that all elements of $a^n b^{2n}$ are part of $a^n b^m$ except
    $\lambda$. Hence $L_1 \cup L_2 = L_1 \cup \{\lambda\}$.
    $P : S \rightarrow aSb \mid Sb \mid b \mid \lambda$
    $G = (\{S\}, \{a, b, \lambda\}, S, P)$

5. grammar

6.    a)

7. dfa