$$P = \underbrace{ \begin{cases} z \to XZ \\ a \left[X \to XX \right] \end{cases} b \left[X \to \epsilon \right] }_{\epsilon \text{ start } [Z] \xrightarrow{q_0}} \underbrace{ \begin{cases} q_1 \\ e \left[Z \to Z \right] \end{cases} q_2 }_{\epsilon \left[X \to X \right]}$$

$$P = \underbrace{ \begin{cases} Z \to XZ \\ a \ [X \to XX] \end{cases} b \ [X \to \epsilon]}_{\epsilon \ [Z \to Z]} \underbrace{ \begin{cases} Q \to Z \\ q_1 \\ e \ [X \to X] \end{cases} }_{\epsilon \ [Z \to Z]} \underbrace{ \begin{cases} Q \to Z \\ q_2 \\ q_2 \\ e \ [X \to X] \end{cases} }_{\epsilon \ [X \to X]} \underbrace{ \begin{cases} Q \to Z \\ q_2 \\ q_3 \\ q_4 \\ q_5 \\ q_5 \\ q_6 \\ q_7 \\ q_8 \\ q_9 \\ q$$

$$P = \underbrace{ \begin{cases} z \to XZ \\ a [X \to XX] \end{cases} b [X \to \epsilon]}_{\epsilon [Z \to Z]}$$
start $[Z] \xrightarrow{q_0} \underbrace{ \begin{cases} [Z \to Z] \\ \epsilon [X \to X] \end{cases} } \underbrace{ \begin{cases} q_1 \\ q_2 \end{cases} }_{\epsilon [X \to X]}$

$$L_F(P) = \{ \mathbf{a}^n \mathbf{b}^n \mid n \ge 0 \}$$
Word $w = \begin{bmatrix} \mathbf{a} & \mathbf{a} & \mathbf{b} & \mathbf{b} & \mathbf{b} \end{bmatrix}$
Stack $\alpha = \begin{bmatrix} \mathbf{X} & \mathbf{X} & \mathbf{Z} \end{bmatrix}$

$$P = \underbrace{ \begin{cases} z \to XZ \\ a [X \to XX] \end{cases} b [X \to \epsilon]}_{\epsilon [Z \to Z]}$$
start $[Z] \xrightarrow{q_0} \underbrace{ \begin{cases} [Z \to Z] \\ \epsilon [X \to X] \end{cases} }_{\epsilon [X \to X]} \underbrace{ \begin{cases} q_1 \\ q_2 \end{cases} }_{\epsilon [X \to Z]}$

$$L_F(P) = \{a^n b^n \mid n \ge 0\}$$
Word $w = \begin{bmatrix} a & a & a & b & b & b \end{bmatrix}$
Stack $\alpha = \begin{bmatrix} & & X \mid X \mid X \mid Z \end{bmatrix}$

$$P = \underbrace{ \begin{cases} Z \to XZ \\ a [X \to XX] \end{cases} b [X \to \epsilon]}_{\epsilon [Z \to Z]}$$

$$e [Z \to Z]$$

$$e [X \to X]$$

$$L_F(P) = \{a^n b^n \mid n \ge 0\}$$
Word $w = \begin{bmatrix} a & a & a & b & b & b \end{bmatrix}$
Stack $\alpha = \begin{bmatrix} & & X & X & X & Z \end{bmatrix}$

$$P = \underbrace{ \begin{cases} z \to XZ \\ a [X \to XX] \end{cases} b [X \to \epsilon]}_{\epsilon [Z \to Z]}$$
start $[Z] \xrightarrow{q_0} \underbrace{ \begin{cases} [Z \to Z] \\ \epsilon [X \to X] \end{cases} } \underbrace{ \begin{cases} q_1 \\ q_2 \end{cases} }_{\epsilon [X \to X]}$

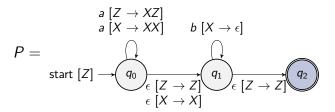
$$P = \underbrace{\begin{cases} z \to XZ \\ a [X \to XX] \end{cases}}_{\text{start } [Z] \xrightarrow{q_0}} \underbrace{\begin{cases} z \to Z \\ \epsilon [X \to X] \end{cases}}_{\text{e} [X \to X]} \underbrace{\begin{cases} q_1 \\ q_2 \end{cases}}_{\text{e} [X \to X]}$$

$$P = \underbrace{ \begin{cases} Z \to XZ \\ a \left[X \to XX \right] \end{cases} b \left[X \to \epsilon \right] }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_2 \\ q_1 \\ e \left[Z \to Z \right] \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_2 \\ Q_2 \\ q_2 \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_2 \\ Q_2 \\ q_3 \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_1 \\ Q_2 \\ Q_3 \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_2 \\ Q_3 \\ Q_3 \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_1 \\ Q_2 \\ Q_3 \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_2 \\ Q_3 \\ Q_3 \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_1 \\ Q_2 \\ Q_3 \\ Q_3 \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_2 \\ Q_3 \\ Q_3 \\ Q_3 \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_3 \\ Q_3 \\ Q_3 \\ Q_3 \\ Q_3 \end{cases} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_1 \\ Q_3 \\ Q_3 \\ Q_3 \\ Q_3 \\ Q_3 \\ Q_3 \end{aligned} }_{\epsilon \left[Z \to Z \right]} \underbrace{ \begin{cases} Q_1 \\ Q_3 \\$$

$$L_F(P) = \{ \mathbf{a}^n \mathbf{b}^n \mid n \geq 0 \}$$
 Word $w = \begin{bmatrix} \mathbf{a} & \mathbf{a} & \mathbf{a} & \mathbf{b} & \mathbf{b} & \mathbf{b} \end{bmatrix}$ Stack $\alpha = \begin{bmatrix} \mathbf{z} & \mathbf{z} & \mathbf{z} & \mathbf{z} \end{bmatrix}$

$$P = \underbrace{\begin{cases} z \to XZ \\ a [X \to XX] \end{cases}}_{\text{start } [Z] \xrightarrow{q_0}} \underbrace{\begin{cases} z \to Z \\ \epsilon [Z \to Z] \end{cases}}_{\text{e} [Z \to Z]} \underbrace{\begin{cases} q_1 \\ q_2 \end{cases}}_{\text{e} [Z \to Z]}$$

$$L_F(P) = \{a^n b^n \mid n \ge 0\}$$
Word $w =$ a a a b b b Stack $\alpha =$ Z



aaabbb $\in L_F(P)!$