$$L_{E}(P) = \{w \in \{a,b\}^* \mid N_a(w) \neq N_b(w)\}$$
Word  $w = \begin{bmatrix} a & b & b & a & a & a \\ & b & a & a & a & a \end{bmatrix}$ 
Stack  $\alpha = \begin{bmatrix} a & [Z \rightarrow PZ] \\ & a & [P \rightarrow PP] \\ & a & [N \rightarrow \epsilon] \\ & b & [Z \rightarrow NZ] & \epsilon & [Z \rightarrow \epsilon] \\ & b & [P \rightarrow \epsilon] & \epsilon & [P \rightarrow \epsilon] \\ & b & [N \rightarrow NN] & \epsilon & [N \rightarrow \epsilon] \end{bmatrix}$ 

$$\text{start } [Z] \xrightarrow{q_0} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{E[N \rightarrow \epsilon]} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}}_{A} \underbrace{ \begin{bmatrix} P & e \\ & P & e \end{bmatrix}$$

$$L_{E}(P) = \{w \in \{a,b\}^* \mid N_a(w) \neq N_b(w)\}$$
Word  $w = a b b a a a a a$ 
Stack  $\alpha = | N Z |$ 

$$a [Z \rightarrow PZ]$$

$$a [P \rightarrow PP]$$

$$a [N \rightarrow \epsilon]$$

$$b [Z \rightarrow NZ] \qquad \epsilon [Z \rightarrow \epsilon]$$

$$b [P \rightarrow \epsilon] \qquad \epsilon [P \rightarrow \epsilon]$$

$$b [N \rightarrow NN] \qquad \epsilon [N \rightarrow \epsilon]$$
Start  $[Z] \longrightarrow q_0$ 

$$\epsilon [P \rightarrow \epsilon]$$

$$L_{E}(P) = \{w \in \{a,b\}^* \mid N_a(w) \neq N_b(w)\}$$
Word  $w = a b b a a a a a$ 
Stack  $\alpha = \boxed{ } \boxed{ Z}$ 

$$a \begin{bmatrix} Z \rightarrow PZ \\ a \begin{bmatrix} P \rightarrow PP \end{bmatrix} \\ a \begin{bmatrix} N \rightarrow \epsilon \end{bmatrix} \\ b \begin{bmatrix} Z \rightarrow NZ \end{bmatrix} \\ b \begin{bmatrix} P \rightarrow \epsilon \end{bmatrix} \\ b \begin{bmatrix} N \rightarrow NN \end{bmatrix} \end{aligned}$$

$$P = \begin{bmatrix} b \begin{bmatrix} P \rightarrow \epsilon \end{bmatrix} \\ b \begin{bmatrix} N \rightarrow NN \end{bmatrix} \end{aligned}$$

$$\epsilon \begin{bmatrix} N \rightarrow \epsilon \end{bmatrix}$$

$$\epsilon \begin{bmatrix} N \rightarrow \epsilon \end{bmatrix}$$

$$\epsilon \begin{bmatrix} N \rightarrow \epsilon \end{bmatrix}$$

$$L_{E}(P) = \{w \in \{a,b\}^* \mid N_a(w) \neq N_b(w)\}$$
Word  $w = a b b a a a a a$ 
Stack  $\alpha = PZ$ 

$$a [Z \rightarrow PZ]$$

$$a [P \rightarrow PP]$$

$$a [N \rightarrow \epsilon]$$

$$b [Z \rightarrow NZ] \qquad \epsilon [Z \rightarrow \epsilon]$$

$$b [P \rightarrow \epsilon] \qquad \epsilon [P \rightarrow \epsilon]$$

$$b [N \rightarrow NN] \qquad \epsilon [N \rightarrow \epsilon]$$
start  $[Z] \longrightarrow q_0$ 

$$L_{E}(P) = \{w \in \{a,b\}^* \mid N_a(w) \neq N_b(w)\}$$
Word  $w = a b b a a a a a$ 
Stack  $\alpha = PZ$ 

$$a [Z \rightarrow PZ]$$

$$a [P \rightarrow PP]$$

$$a [N \rightarrow \epsilon]$$

$$b [Z \rightarrow NZ] \qquad \epsilon [Z \rightarrow \epsilon]$$

$$b [P \rightarrow \epsilon] \qquad \epsilon [P \rightarrow \epsilon]$$

$$b [N \rightarrow NN] \qquad \epsilon [N \rightarrow \epsilon]$$
start  $[Z] \rightarrow q_0$ 

$$L_{E}(P) = \{w \in \{a, b\}^* \mid N_{a}(w) \neq N_{b}(w)\}$$
Word  $w = a b b a a a a a$ 
Stack  $\alpha = PZ$ 

$$a [Z \rightarrow PZ]$$

$$a [P \rightarrow PP]$$

$$a [N \rightarrow \epsilon]$$

$$b [Z \rightarrow NZ] \qquad \epsilon [Z \rightarrow \epsilon]$$

$$b [P \rightarrow \epsilon] \qquad \epsilon [P \rightarrow \epsilon]$$

$$b [N \rightarrow NN] \qquad \epsilon [N \rightarrow \epsilon]$$
start  $[Z] \rightarrow q_0$ 

$$\epsilon [P \rightarrow \epsilon] \qquad q_1$$

$$L_{E}(P) = \{w \in \{a,b\}^* \mid N_a(w) \neq N_b(w)\}$$
Word  $w = a b b a a a a a$ 
Stack  $\alpha = \boxed{\qquad \qquad } \boxed{Z}$ 

$$a \begin{bmatrix} Z \to PZ \\ a \begin{bmatrix} P \to PP \end{bmatrix} \\ a \begin{bmatrix} N \to \epsilon \end{bmatrix} \\ b \begin{bmatrix} Z \to NZ \end{bmatrix} \\ b \begin{bmatrix} P \to \epsilon \end{bmatrix} \\ b \begin{bmatrix} N \to \epsilon \end{bmatrix} \\ b \begin{bmatrix} N \to \epsilon \end{bmatrix}$$
start  $[Z] \xrightarrow{q_0} \overbrace{q_1}$ 

$$L_{E}(P) = \{w \in \{a,b\}^* \mid N_a(w) \neq N_b(w)\}$$
Word  $w = a b b a a a a a$ 
Stack  $\alpha = \boxed{\qquad \qquad \qquad }$ 

$$a \begin{bmatrix} Z \to PZ \\ a \begin{bmatrix} P \to PP \end{bmatrix} \\ a \begin{bmatrix} N \to \epsilon \end{bmatrix} \\ b \begin{bmatrix} Z \to NZ \end{bmatrix} \qquad \epsilon \begin{bmatrix} Z \to \epsilon \end{bmatrix} \\ b \begin{bmatrix} P \to \epsilon \end{bmatrix} \qquad \epsilon \begin{bmatrix} P \to \epsilon \end{bmatrix} \\ b \begin{bmatrix} N \to NN \end{bmatrix} \qquad \epsilon \begin{bmatrix} N \to \epsilon \end{bmatrix}$$

$$\text{start } [Z] \xrightarrow{q_0} \xrightarrow{\epsilon \begin{bmatrix} P \to \epsilon \end{bmatrix}} \xrightarrow{\epsilon \begin{bmatrix} N \to \epsilon \end{bmatrix}}$$

abbaaaa  $\in L_E(P)!$