

Construct a **PDA** that accepts the language by **empty stacks**:

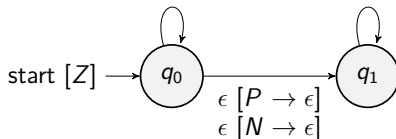
$$L_E(P) = \{w \in \{a, b\}^* \mid N_a(w) \neq N_b(w)\}$$

Word $w =$ a b b a a a a

Stack $\alpha =$

						Z
--	--	--	--	--	--	---

$$P = \begin{array}{ll} a [Z \rightarrow PZ] & \\ a [P \rightarrow PP] & \\ a [N \rightarrow \epsilon] & \\ b [Z \rightarrow NZ] & \epsilon [Z \rightarrow \epsilon] \\ b [P \rightarrow \epsilon] & \epsilon [P \rightarrow \epsilon] \\ b [N \rightarrow NN] & \epsilon [N \rightarrow \epsilon] \end{array}$$



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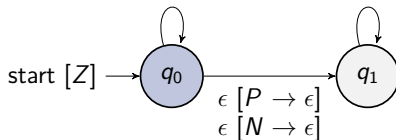
Word $w =$

a	b	b	a	a	a	a
---	---	---	---	---	---	---

Stack $\alpha =$

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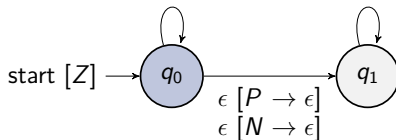
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					P	Z
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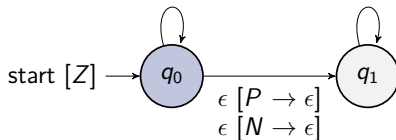
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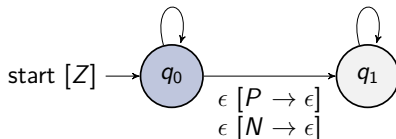
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					N	Z
--	--	--	--	--	---	---

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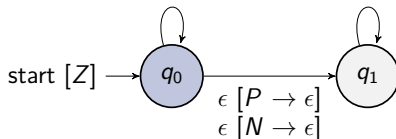
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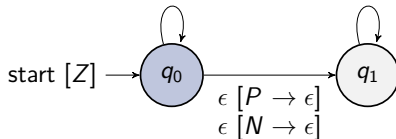
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Word $w =$ a b b a a **a** a

Stack $\alpha =$

					P	Z
--	--	--	--	--	---	---

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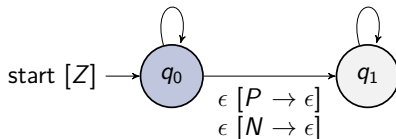
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				<i>P</i>	<i>P</i>	<i>Z</i>
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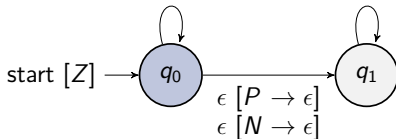
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			P	P	P	Z
--	--	--	---	---	---	---

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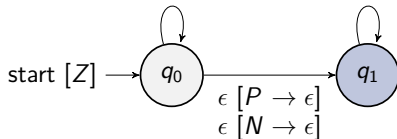
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				P	P	Z
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a	$[Z \rightarrow PZ]$	
a	$[P \rightarrow PP]$	
a	$[N \rightarrow \epsilon]$	
b	$[Z \rightarrow NZ]$	$\epsilon [Z \rightarrow \epsilon]$
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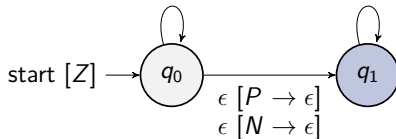
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					P	Z
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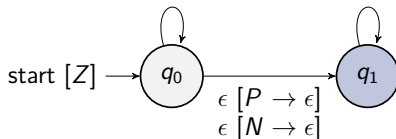
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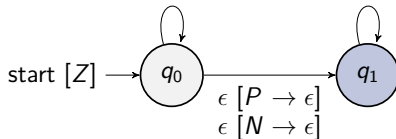
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abbaaaa $\in L_E(P)$!