

س

P:

1.1 → $m = 2n \vee m = 3n \implies S \rightarrow S_1 \mid S_2$

$m = 2n \implies S_1 \rightarrow aS_1bb \mid \lambda$

$m = 3n \implies S_2 \rightarrow aS_2bbb \mid \lambda$

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

ل کر ام

2.1 → P:

$S \rightarrow S_1 \mid S_2 \xrightarrow{h_a > h_b} h_b > h_a$

$S_1 \rightarrow S_1S_1 \mid aS_1b \mid bS_1a \mid A, A \rightarrow aA \mid a$

$S_2 \rightarrow S_2S_2 \mid aS_2b \mid bS_2a \mid B, B \rightarrow bB \mid b$

$G = (\{S, S_1, S_2, A, B\}, \{a, b\}, S, P) \leftarrow \text{ل کر ام}$

3.1 →

P:

$S \rightarrow \lambda \mid ss \mid aasb \mid bsaa \mid asba \mid asab \mid absa \mid basa$

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

4.1 →

P:

$m = n + k \implies a^h b^{n+k} c^k = \underbrace{a^h b^n}_{S_1} \underbrace{b^k c^k}_{S_2}$

$S \rightarrow S_1S_2$

$S_1 \rightarrow aS_1b \mid \lambda$

$S_2 \rightarrow bS_2c \mid \lambda$

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

۵.۱ →

P:

$$K = h + rm \rightarrow a^h b^m c^K = a^h b^m c^{rm} c^h$$

$$S \rightarrow aSc \mid B$$

$$B \rightarrow bBcc \mid \lambda$$

$$G = (\{S, B\}, \{a, b, c\}, S, P)$$

۹.۱ →

P:

$$S \rightarrow xAz$$

$$A \rightarrow aAa \mid bAb \mid aya \mid byb$$

$$x \rightarrow ax \mid bx \mid \lambda$$

$$y \rightarrow ay \mid by \mid \lambda$$

$$z \rightarrow az \mid bz \mid \lambda$$

$$G = (\{S, A, x, y, z\}, \{a, b\}, S, P)$$

۲س →

$$\text{فرم لرام ساده} \rightarrow A \rightarrow aX \quad X \in V^*, a \in T, A \in V$$

$$S \rightarrow asb \mid ab \xrightarrow{\text{تبدیل}} S \rightarrow asB \mid aB$$

$$B \rightarrow b$$

$$\leftarrow \dots \text{بار } 2(S, a) \text{ تکرار شده} \xrightarrow{\text{س}} \text{س}$$

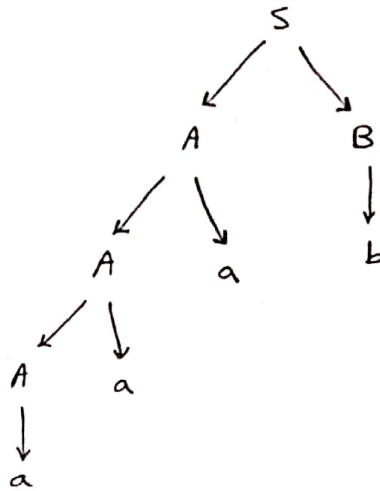
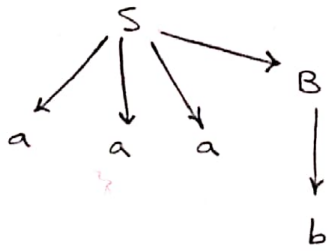
$$\begin{array}{l} S \rightarrow aA \\ A \rightarrow aAB \mid b \\ B \rightarrow b \end{array} \leftarrow P$$

$$G = (\{S, A, B\}, \{a, b\}, S, P)$$

→ ۳

→ ۱۰۳

→ رشته $w = aaab$ را تولید می کنیم



در این گرامر برای جمله $aaab$ دو درخت اشتقاق وجود دارد پس مبهم است

س

→ گرامری که مبهم نباشد

$S \rightarrow AB$

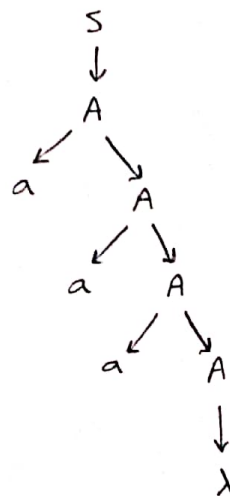
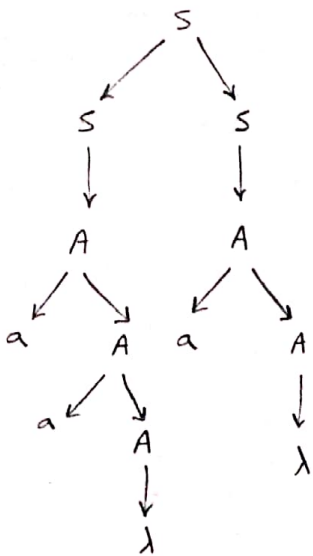
$A \rightarrow aA \mid a$

$B \rightarrow b$

$G = (\{S, A, B\}, \{a, b\}, S, P)$

→ ۲۰۳

رشته $w = aaa$ را تولید می کنیم



در این گرامر برای جمله aaa دو درخت

اشتقاق وجود دارد پس مبهم است

→ گرامری که مبهم نباشد

$S \rightarrow \lambda \mid A \mid B$

$A \rightarrow aA \mid aS$

$B \rightarrow bB \mid bS$

$P \rightarrow G = (\{S, A, B\}, \{a, b\}, S, P)$

→ س

$$\frac{1}{\text{مقایسه}} \rightarrow S \rightarrow aA \mid aBB \mid a$$

$$A \rightarrow aa \mid aaA$$

$$B \rightarrow bB \mid bBc$$

$$C \rightarrow B$$

$$\frac{2}{\text{مقایسه}} \rightarrow S \xrightarrow{*} A \mid X$$

$$A \xrightarrow{*} A \mid X$$

$$B \xrightarrow{*} B \mid X$$

$$B \xrightarrow{*} C \mid X$$

$$C \xrightarrow{*} B \mid \checkmark \rightarrow \text{مقایسه}$$

$$\Rightarrow S \rightarrow a \mid aA \mid aBB$$

$$A \rightarrow aa \mid aaA$$

$$B \rightarrow bB \mid bBb$$

$$\frac{3}{\text{مقایسه}} \rightarrow B \rightarrow bB \mid bBb \quad \text{این تولیدی است و مقایسه نمی‌شود}$$

$$S \rightarrow a \mid aA$$

$$A \rightarrow aa \mid aaA$$

$$\text{عبارت مقایسه} \rightarrow r = (aa)^* a$$

س →

فرم نهال جاسی

$$A \rightarrow BC$$

$$A, B, C \in V$$

$$a \in T$$

$$A \rightarrow a$$

$$\frac{1}{2} r b'' \rightarrow$$

$$S \rightarrow B_a S B_a A \mid B_a B_b A \mid B_b B_b$$

$$A \rightarrow B_a B_b A \mid b$$

$$B_a \rightarrow a$$

$$B_b \rightarrow b$$

$$\frac{1}{2} r b'' \xrightarrow{h > 2}$$

$$S \rightarrow B_a S D_1 \mid D_2 A \mid B_b B_b$$

$$A \rightarrow D_2 A \mid b$$

$$D_1 \rightarrow B_a A$$

$$D_2 \rightarrow B_a B_b$$

$$B_a \rightarrow a$$

$$B_b \rightarrow b$$

$$\frac{1}{2} r b'' \xrightarrow{h > 2}$$

$$S \rightarrow B_a D_3 \mid D_2 A \mid B_b B_b$$

$$A \rightarrow D_2 A \mid b$$

$$D_3 \rightarrow S D_1$$

$$D_1 \rightarrow B_a A$$

$$D_2 \rightarrow B_a B_b$$

$$B_a \rightarrow a$$

$$B_b \rightarrow b$$

$$s \rightarrow w = aabb \quad s \rightarrow asb|b$$

$$\begin{array}{lcl} \text{نرمال سازی} \rightarrow & s \rightarrow B_a s B_b | b & s \rightarrow B_a A | b \\ & B_a \rightarrow a & \xRightarrow{h>r} A \rightarrow s B_b \\ & B_b \rightarrow b & B_a \rightarrow a \\ & & B_b \rightarrow b \end{array}$$

$$w_{11} = a \rightarrow x_{11} = \{B_a\} \quad , \quad w_{rr} = a \rightarrow x_{rr} = \{B_a\} \quad , \quad w_{rr} = b \rightarrow x_{rr} = \{s, B_b\}$$

$$w_{rr} = b \rightarrow x_{rr} = \{s, B_b\} \quad , \quad w_{\omega\omega} = b \rightarrow x_{\omega\omega} = \{s, B_b\}$$

$$x_{1r} = \{x: (x \rightarrow yz) \in P, y \in x_{11}, z \in x_{rr}\} \rightarrow x_{11} \times x_{rr} = \{B_a B_a\} \rightarrow x_{1r} = \emptyset$$

$$x_{rr} = x_{rr} \times x_{rr} = \emptyset \quad , \quad x_{rr} = x_{rr} \times x_{rr} = \{A\} \quad , \quad x_{r\omega} = \{A\}$$

$$x_{1r} = (x_{11} \times x_{rr}) \cup (x_{1r} \times x_{rr}) = \emptyset \quad , \quad x_{rr} = \{s\} \quad , \quad x_{r\omega} = \emptyset$$

$$x_{1r} = \emptyset \quad , \quad x_{r\omega} = \{A\} \quad , \quad x_{1\omega} = \{s\}$$

ω	$\{s\}$				
r	\emptyset	$\{A\}$			
r	\emptyset	$\{s\}$	\emptyset		
r	\emptyset	\emptyset	$\{A\}$	$\{A\}$	
1	$\{B_a\}$	$\{B_a\}$	$\{s, B_b\}$	$\{s, B_b\}$	$\{s, B_b\}$
	a	a	b	b	b

$$w \in L(G) \quad s \in x_{1\omega}$$