CFG 13

$$L_{13} = \{ a^{n_0} b a^{n_1} b \dots b a^{n_m} \mid m \geq 1 \land \exists i \subseteq \{1, m\} . n_0 = n_i \}$$

$$\overbrace{\underbrace{aaaa}_{n_0}\ \boxed{b}\ \underbrace{aab \dots b}_{Y}\ \underbrace{aaaa}_{n_i}}^{X \quad \lambda \quad \Sigma^* b}\ \underbrace{babbb}_{Z}$$

$$a^{n_0} = a^{n_i}$$

$$n_0 = n_i$$

$$a^n b \boxed{\dots} a^n \begin{cases} b \\ \lambda \end{cases}$$

$S \to X \cdot Z$

$X \to aXa \mid bY$

$Y \to \lambda \cup \Sigma^* b$

$Z \to \lambda \cup b\Sigma^*$

$$\underbrace{(a^n b (\underbrace{\lambda \cup \Sigma^* b}_{Y}) a^n)}_{X} (\underbrace{\lambda \cup b \Sigma^*}_{Z})$$

$$\overbrace{\underbrace{aaaa}\;\underbrace{b\,aa\,b\ldots}_{Y}\;\boxed{b}\;\underbrace{aaaa}}^{X}\;\underbrace{babbb}_{Z=Y}$$

$S \rightarrow X \cdot Y$

$X \rightarrow aXa \mid Yb$

$Y \rightarrow \lambda \cup b\Sigma^*$

Nos simplifica la vida esta opción dado que

$Y \rightarrow bZ \mid \lambda$

$Z \rightarrow aZ \mid bZ \mid \lambda$

Aprovechamos la Y dado que es un lenguaje cualquiera igual que la Z anterior