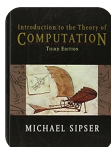


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Exercício 1

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Introduction to the Theory of Computation

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Solução  Certificado

Passo 1

1 de 10

Grammar is

$$\begin{aligned} E &\rightarrow E+T \mid T \\ T &\rightarrow T \times F \mid F \\ F &\rightarrow (E) \mid a. \end{aligned}$$

Parse trees and derivations for given strings are below.

Passo 2

2 de 10

Part a.

Derivation is simple: $E \rightarrow T \rightarrow F \rightarrow a$. Parse tree as well.

Passo 3

3 de 10

$$\begin{array}{c}
 E \\
 \downarrow \\
 T \\
 \downarrow \\
 F \\
 \downarrow \\
 a
 \end{array}$$
Passo 4

4 de 10

Part b.

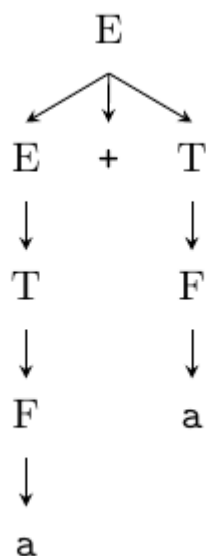
Derivation is

$$E \rightarrow E+T \rightarrow T+T \rightarrow F+T \rightarrow a+T \rightarrow a+F \rightarrow a+a,$$

and parse tree is

Passo 5

5 de 10



Passo 6

6 de 10

Part c.

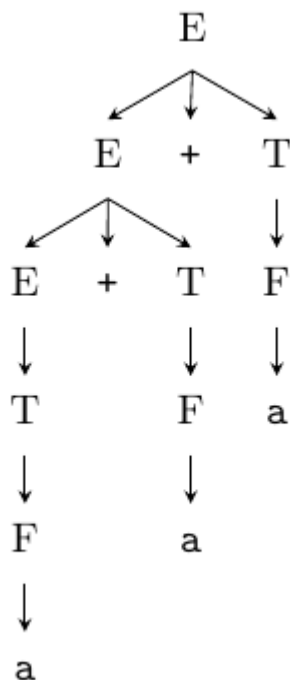
Derivation is

$$\begin{aligned}
 E &\rightarrow E+T \rightarrow E+T+T \rightarrow T+T+T \rightarrow F+T+T \\
 &\rightarrow a+T+T \rightarrow a+F+T \rightarrow a+a+T \rightarrow a+a+F \rightarrow a+a+a,
 \end{aligned}$$

and parse tree is

Passo 7

7 de 10

**Passo 8**

8 de 10

Part d.

Derivation is

$$E \rightarrow T \rightarrow F \rightarrow (E) \rightarrow (T) \rightarrow (F) \rightarrow ((E)) \rightarrow ((T)) \rightarrow ((F)) \rightarrow ((a)),$$

and parse tree is

Passo 9

9 de 10

$$\begin{array}{c} E \\ \downarrow \\ T \\ \downarrow \\ F \\ \downarrow \\ (E) \\ \downarrow \\ (T) \\ \downarrow \\ (F) \\ \downarrow \\ ((E)) \\ \downarrow \\ ((T)) \\ \downarrow \\ ((F)) \\ \downarrow \\ ((a)) \end{array}$$

Resultado

10 de 10

We write derivations and draw parse trees.

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