程序设计语言概论 第一次作业

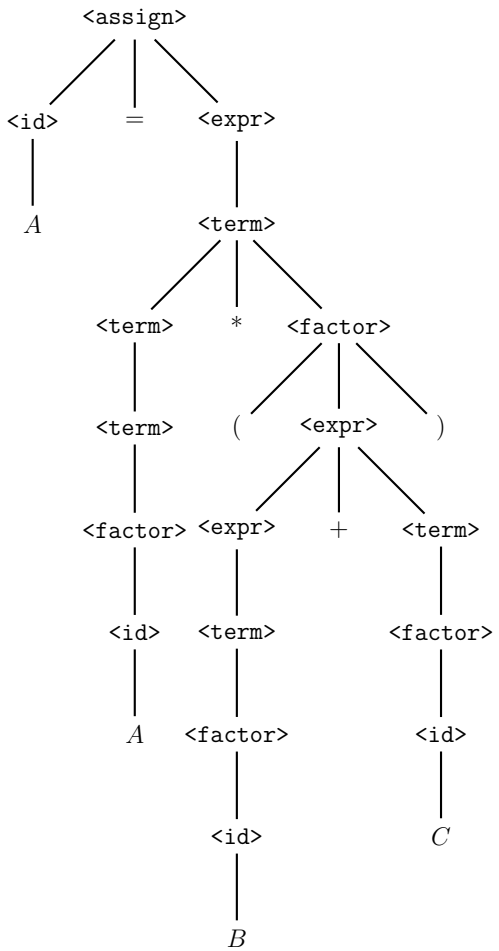
周书予
2000013060@stu.pku.edu.cn

March 3, 2023

3

$$
\begin{aligned}
\texttt{<assign>} &\to \texttt{<id>} = \texttt{<expr>} \\
\texttt{<id>} &\to A|B|C \\
\texttt{<expr>} &\to \texttt{<term>} * \texttt{<expr>}|\texttt{<term>} \\
\texttt{<term>} &\to \texttt{<term>} + \texttt{<factor>}|\texttt{<factor>} \\
\texttt{<factor>} &\to (\texttt{<expr>})|\texttt{<id>}
\end{aligned}
$$

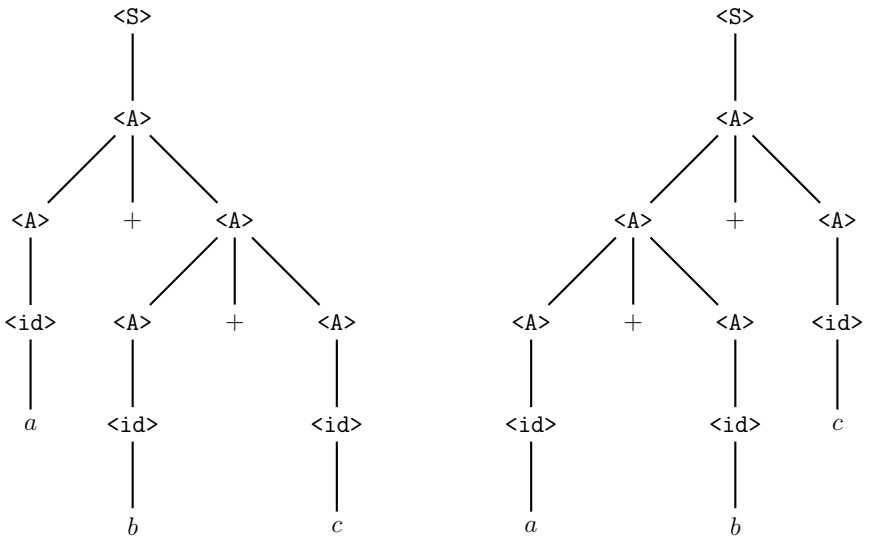
7



$$
\begin{aligned}
\texttt{<assign>} &\Rightarrow \texttt{<id>} = \texttt{<expr>} \\
&\Rightarrow A = \texttt{<expr>} \\
&\Rightarrow A = \texttt{<term>} \\
&\Rightarrow A = \texttt{<term>} * \texttt{<factor>} \\
&\Rightarrow A = \texttt{<factor>} * \texttt{<factor>} \\
&\Rightarrow A = \texttt{<id>} * \texttt{<factor>} \\
&\Rightarrow A = A * \texttt{<factor>} \\
&\Rightarrow A = A * (\texttt{<expr>}) \\
&\Rightarrow A = A * (\texttt{<expr>} + \texttt{<term>}) \\
&\Rightarrow A = A * (\texttt{<term>} + \texttt{<term>}) \\
&\Rightarrow A = A * (\texttt{<factor>} + \texttt{<term>}) \\
&\Rightarrow A = A * (\texttt{<id>} + \texttt{<term>}) \\
&\Rightarrow A = A * (B + \texttt{<term>}) \\
&\Rightarrow A = A * (B + \texttt{<factor>}) \\
&\Rightarrow A = A * (B + \texttt{<id>}) \\
&\Rightarrow A = A * (B + C)
\end{aligned}
$$

8

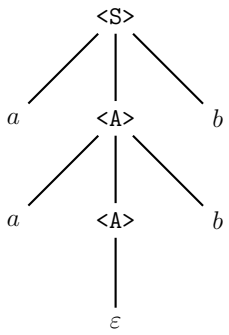
$a + b + c$ 有两种不同的 parse tree.



9

$$
\begin{aligned}
\texttt{<assign>} &\rightarrow \texttt{<id>} = \texttt{<expr>} \\
\texttt{<id>} &\rightarrow A|B|C \\
\texttt{<expr>} &\rightarrow \texttt{<expr>} + \texttt{<term>}|\texttt{<term>} \\
\texttt{<term>} &\rightarrow \texttt{<term>} * \texttt{<factor>}|\texttt{<factor>} \\
\texttt{<factor>} &\rightarrow (\texttt{<expr>})|\texttt{<id>}| - (\texttt{<expr>})| - \texttt{<id>}
\end{aligned}
$$

13

$$
\begin{aligned}
\texttt{<S>} &\rightarrow a\texttt{<A>}b \\
\texttt{<A>} &\rightarrow a\texttt{<A>}b|\varepsilon
\end{aligned}
$$

14