Lab Nine

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CRAFTING A COMPILER

EXERCISE 5.5

Transform the following grammar into LL(1) form using the techniques presented in Section 5.5:

$$
\begin{aligned}
DeclList \quad &\rightarrow \quad DeclList \ ; \ Decl \\
&| \quad Decl \\
Decl \quad &\rightarrow \quad IdList \ : \ Type \\
IdList \quad &\rightarrow \quad IdList \ , \ id \\
&| \quad id \\
Type \quad &\rightarrow \quad ScalarType \\
&| \quad array \ (\ ScalarTypeList \ ) \ of \ Type \\
ScalarType \quad &\rightarrow \quad id \\
&| \quad Bound \ .. \ Bound \\
Bound \quad &\rightarrow \quad Sign \ intconstant \\
&| \quad id \\
Sign \quad &\rightarrow \quad + \\
&| \quad - \\
&| \quad \lambda \\
ScalarTypeList \quad &\rightarrow \quad ScalarTypeList \ , \ ScalarType \\
&| \quad ScalarType
\end{aligned}
$$

Above grammar after eliminating left recursion:

$$
\begin{aligned}
DeclList \quad &\rightarrow\ A\ B \\
A \quad &\rightarrow\ Decl \\
B \quad &\rightarrow\ ;\ Decl\ B \\
&\ |\ \lambda \\
Decl \quad &\rightarrow\ IdList\ :\ Type \\
IdList \quad &\rightarrow\ C\ D \\
C \quad &\rightarrow\ id \\
D \quad &\rightarrow\ ,\ id\ D \\
&\ |\ \lambda \\
Type \quad &\rightarrow\ ScalarType \\
&\ |\ array\ (\ ScalarTypeList\ )\ of\ Type \\
ScalarType \quad &\rightarrow\ id \\
&\ |\ Bound\ ..\ Bound \\
Bound \quad &\rightarrow\ Sign\ intconstant \\
&\ |\ id \\
Sign \quad &\rightarrow\ + \\
&\ |\ - \\
&\ |\ \lambda \\
ScalarTypeList \quad &\rightarrow\ E\ F \\
E \quad &\rightarrow\ ScalarType \\
F \quad &\rightarrow\ ,\ ScalarType\ F \\
&\ |\ \lambda
\end{aligned}
$$