

# Lab Nine

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## 1 CRAFTING A COMPILER

### EXERCISE 5.5

1.  $\text{DeclList} \rightarrow \text{Decl}; \text{DeclList}$
2.  $\text{DeclList} \rightarrow \text{Decl}$
3.  $\text{Decl} \rightarrow \text{IdList} : \text{Type}$
4.  $\text{IdList} \rightarrow \text{IdList}$
5.  $\text{IdList}$
6.  $\text{Type} \rightarrow \text{ScalarType}$
7.  $\text{Type} \rightarrow \text{array}(\text{ScalarTypeList}) \text{ of } \text{Type}$
8.  $\text{ScalarType} \rightarrow \text{id}$
9.  $\text{ScalarType} \rightarrow \text{Bound}.. \text{Bound}$
10.  $\text{Bound} \rightarrow \text{Signintconstant}$
11.  $\text{Bound} \rightarrow \text{id}$
12.  $\text{Sign} \rightarrow +$
13.  $\text{Sign} \rightarrow -$
14.  $\text{Sign} \rightarrow \lambda$
15.  $\text{ScalarTypeList} \rightarrow \text{ScalarType}, \text{ScalarTypeList}$
16.  $\text{ScalarTypeList} \rightarrow \text{ScalarType}$

Next

1.  $\text{DeclList} \rightarrow \text{DeclDeclList2}$
2.  $\text{DeclList2} \rightarrow ; \text{DeclList}$

3.  $\text{DeclList2} \rightarrow \lambda$
4.  $\text{Decl} \rightarrow \text{IdList} : \text{Type}$
5.  $\text{IdList} \rightarrow \text{idIdList2}$
6.  $\text{IdList2} \rightarrow, \text{IdList}$
7.  $\text{IdList2} \rightarrow \lambda$
8.  $\text{Type} \rightarrow \text{ScalarType}$
9.  $\text{Type} \rightarrow \text{array}(\text{ScalarTypeList})\text{ofType}$
10.  $\text{ScalarType} \rightarrow \text{id}$
11.  $\text{ScalarType} \rightarrow \text{Bound}..\text{Bound}$
12.  $\text{Bound} \rightarrow \text{Signintconstant}$
13.  $\text{Bound} \rightarrow \text{id}$
14.  $\text{Sign} \rightarrow +$
15.  $\text{Sign} \rightarrow -$
16.  $\text{Sign} \rightarrow \lambda$
17.  $\text{ScalarTypeList} \rightarrow \text{ScalaTypeScalaTypeList2}$
18.  $\text{ScalarTypeList2} \rightarrow \text{ScalaTypeList}$
19.  $\text{ScalarTypeList2} \rightarrow \lambda$

The only conflict will be with `ScalarType` and `Bound` because they both have the first set of IDs. So delete the id from `ScalarType`.

`ScalarType`  $\rightarrow \text{BoundBound2}$

`Bound2`  $\rightarrow ..\text{Bound}$

`Bound2`  $\rightarrow \lambda$

## 2 DRAGON

### EXERCISE 4.5.3

a) Grammar:  $S \rightarrow 0S1|01$

Stack: empty, Input: 000111. Shift

Stack: 0, Input: 00111. Shift

Stack: 00, Input: 0111. Shift

Stack: 000, Input: 111. Shift

Stack: 0001, Input: 11. Reduce 01 to S

Stack: 00S, Input: 11. Shift

Stack: 00S1, Input: 1. Reduce 0S1 to S

Stack: 0S, Input: 1. Shift

Stack: 0S1, Input: empty. Reduce 0S1 to S

Stack: S, Input: empty. Accept!

b)

Stack: empty, Input:aaa\*a++. Shift

Stack: a, Input: aa\*a++. Reduce a to S

Stack: S, Input: aa\*a++. Shift

Stack: Sa, Input: a\*a++. Reduce a to S

Stack: SS, Input:a\*a++. Shift

Stack: SSa, Input:\*a++. Reduce a to S

Stack: SSS, Input:\*a++. Shift

Stack: SSS\*, Input:a++. Reduce SS\* to S

Stack: SS, Input: a++. Shift

Stack: SSa, Input: ++. Reduce a to S

Stack: SSS, Input: ++. Shift

Stack: SSS+, Input:+. reduce SS+ to S

Stack: SS, Input: +. Shift

Stack: SS+, Input: empty. Reduce SS+ to S

Stack: S, Input:empty. Accept!