

Lab Nine

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1 CRAFTING A COMPILER 5.5:

Make the grammar LL(1).

```
DeclList → DeclList ; Decl | Decl
Decl → IdList : Type
IdList → IdList, id | id
Type → ScalarType | array (ScalarTypeList) of Type
ScalarType → id | Bound .. Bound
Bound → Sign inconstant | id
Sign → + | - | λ
ScalarTypeList → ScalarTypeList, ScalarType | ScalarType
```

```
DeclList → Decl ; DeclList
DeclList → Decl
Decl → IdList : Type
IdList → id , IdList
IdList → id
Type → ScalarType
Type → array(ScalarTypeList) of Type
ScalarType → id
ScalarType → Bound .. Bound
Bound → Sign inconstant
Bound → id
Sign → +
Sign → -
Sign → λ
ScalarTypeList → ScalarType , ScalarTypeList
ScalarTypeList → ScalarType
```

Remove Left Factoring

2 DRAGON BOOK 4.5.3:

Give bottom up parse for the following input strings:

a)

String: 000111

Grammar:

$S \rightarrow 0 S 1$

$S \rightarrow 0 1$

input	stack	next move
000111	ϵ	shift
00111	0	shift
0111	00	shift
111	000	shift
11	0001	reduce by $01 \rightarrow S$
11	00S	shift
1	00S1	reduce by $0S1 \rightarrow S$
1	0S	shift
ϵ	0S1	reduce by $0S1 \rightarrow S$
ϵ	S	

b)

String: aaa*a++

Grammar:

$S \rightarrow S S +$

$S \rightarrow S S *$

$S \rightarrow a$

input	stack	next move
aaa*a++	ϵ	shift
aa*a++	a	reduce by $a \rightarrow S$
aa*a++	S	shift
a*a++	Sa	reduce by $a \rightarrow S$
a*a++	SS	shift
*a++	SSa	reduce by $a \rightarrow S$
*a++	SSS	shift
a++	SSS*	reduce by $SS* \rightarrow S$
a++	SS	shift
++	SSa	reduce by $a \rightarrow S$
++	SSS	shift
+	SSS+	reduce by $SS+ \rightarrow S$
+	SS	shift
ϵ	SS+	reduce by $SS+ \rightarrow S$
ϵ	S	