

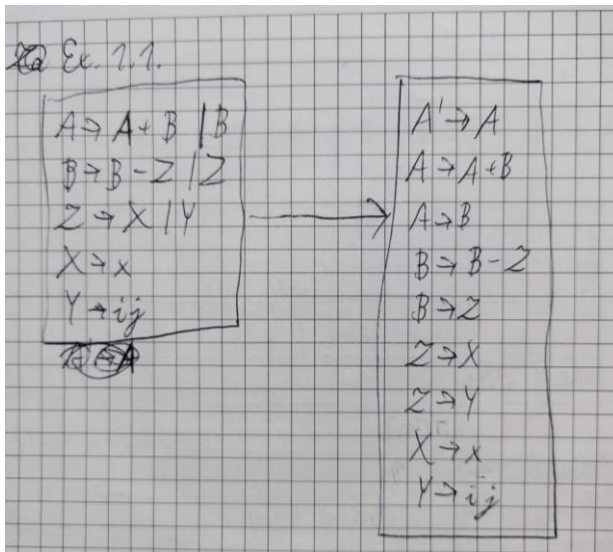
Assignment 3

Compiler Construction

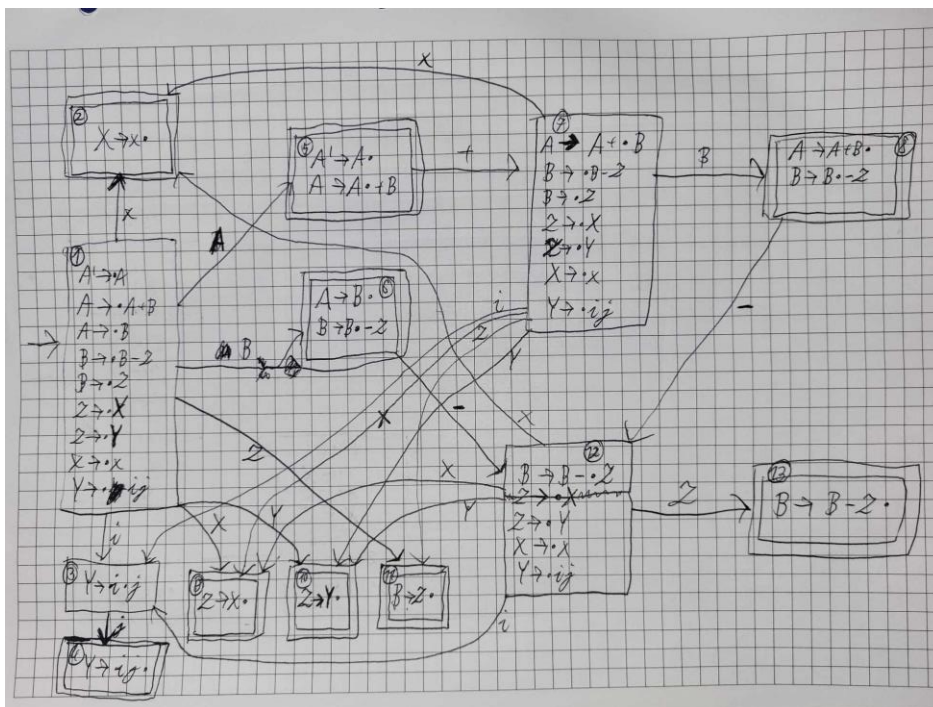
Kacper Multan

1.1

New Augmented Grammar:



Automaton:



Automaton table: (slashed states are states removed after shift/reduce conflict reduction)

	x	i	j	+	-	\$	A	B	Z	X	Y	Reduce rules:
1	s2	s3					r5	r6	r7	r9	r10	0. A' → A
2	r8	r8	r7	r7	r7	r7						1. $A \rightarrow A \cdot B$
3			s4									2. $A \rightarrow B$
4	r8	r8	r8	r8	r8	r8						3. $B \rightarrow B \cdot Z$
5	r8	r8	r0	r8	r8	a			r8	r8	r8	4. $B \rightarrow Z$
6	r8	r8	r8	r8	r8	r8						5. $Z \rightarrow X$
7	s2	s3						r8	r11	r9	r10	6. $Z \rightarrow Y$
8	r7	r7	r7	r7	r7	r7						7. $X \rightarrow x$
9	r5	r5	r5	r5	r5	r5						8. $Y \rightarrow ij$
10	r6	r6	r6	r6	r6	r6						
11	r4	r4	r4	r4	r4	r4						
12								r13				
13	r3	r3	r3	r3	r3	r3						

Follow sets:

$A \rightarrow A \cdot B$	$\text{Follow}(A) = \{ + \}$
$A \rightarrow B$	$\text{Follow}(A) = \{ \$ \}$
$B \rightarrow B \cdot Z$	$\text{Follow}(B) = \{ - \}$
$B \rightarrow Z$	$\text{Follow}(B) = \{ \$ \}$
$Z \rightarrow X$	$\text{Follow}(Z) = \{ \$ \}$
$Z \rightarrow Y$	$\text{Follow}(Z) = \{ \$ \}$
$X \rightarrow x$	$\text{Follow}(X) = \{ \$ \}$
$Y \rightarrow ij$	$\text{Follow}(Y) = \{ \$ \}$

1.2

Shift/reduce conflicts happen in transition from:

- state 6 with "-" (s12, r2)
- state 8 with "-" (s12, r1)
- state 5 with "+" (s7, r0)

1.3

This grammar at beginning was not SLR parsable because of 3 shift/reduce conflicts. After removal of these conflicts new grammar is SLR parsable.

Final SLR table:

States	x	i	j	+	-	\$	A	B	Z	X2	Y
1	s2	s3					g5	g6	g11	g9	g10
2						r7					
3			s4								
4						r8					
5				s7		a					
6					s12	r2					
7	s2	s3						g8	g11	g9	g10
8				r1	s12	r1					
9						r5					
10						r6					
11						r4					
12									g13		
13					r3	r3					

Exercise 2:

Result after implementation of functions:

```

● zzzdream@KacperMultanLap:~/compiler/assignment_3/ps3_skeleton/vsl_programs$ make ps3-check
../build/vslc -T < ps3-simplify/peephole.vsl > ps3-simplify/peephole.ast
../build/vslc -T < ps3-simplify/arrays.vsl > ps3-simplify/arrays.ast
../build/vslc -T < ps3-simplify/constant_folding.vsl > ps3-simplify/constant_folding.ast
cd ps3-simplify; \
find * -wholename "suggested/*.ast" | awk -F/ '{print $0 " " "$2}' | xargs -L 1 diff -s --unified=0
Files suggested/arrays.ast and arrays.ast are identical
Files suggested/peephole.ast and peephole.ast are identical
Files suggested/constant_folding.ast and constant_folding.ast are identical
No differences found in PS3!

```