

1) a) baaab valid

b) bbb7b invalid

c) bbaaaaqaaaq invalid

d) bbaab valid

2) token | lexeme

ASS	=
Add	+
Sub	-
Mul	*
Lpr	(
Rpr)
id	A, B, C

3) Assign $\rightarrow id = expr$

$\rightarrow B = expr$

$\rightarrow B = id + expr$

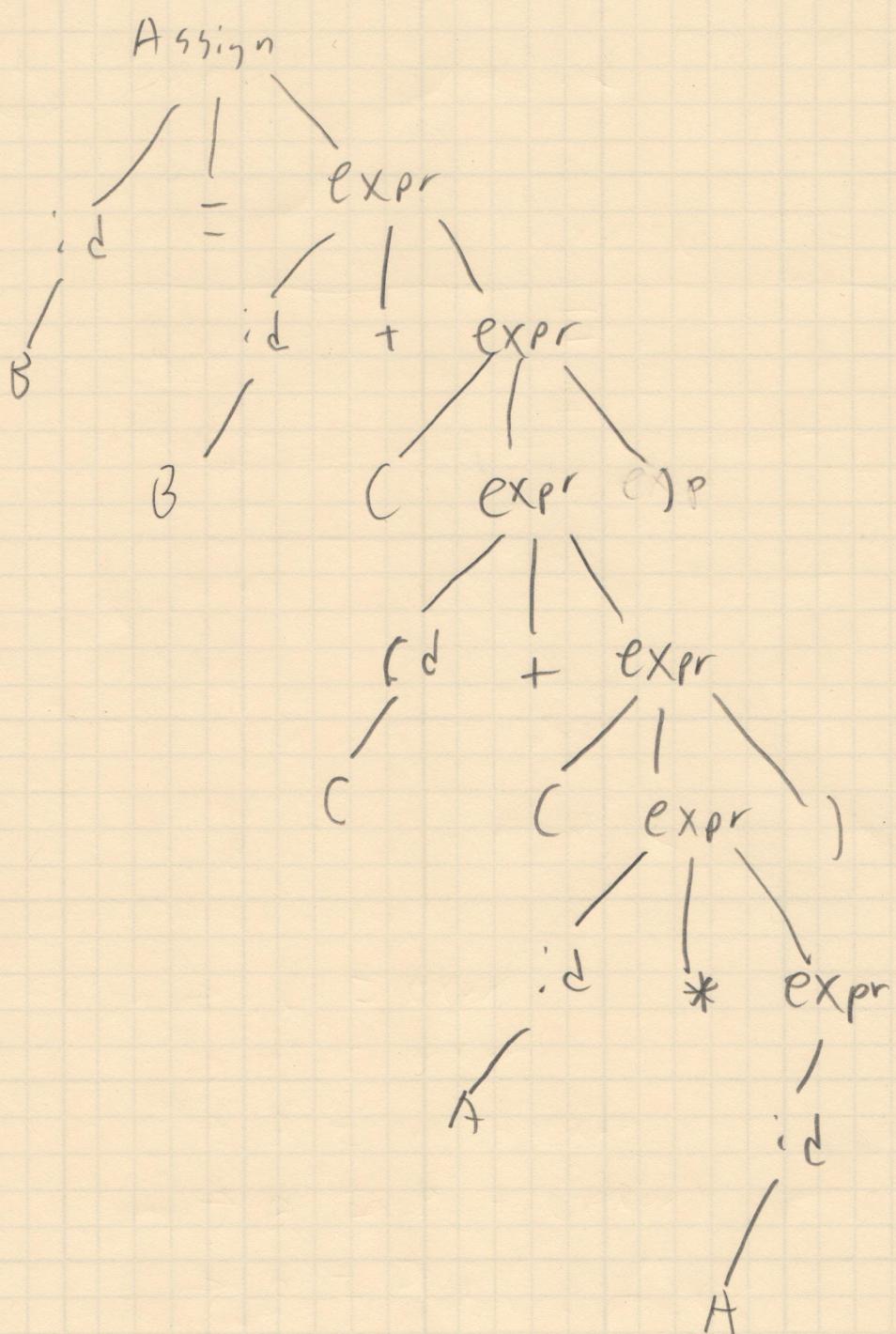
$\rightarrow B = B + (expr)$

$\rightarrow B = B + (id + expr)$

$\rightarrow B = B + (C + expr)$

$\rightarrow B = B + (C + (expr))$

3 cont

$$\begin{aligned} & \rightarrow B = B + (C + (id * expr)) \\ & \rightarrow B = B + (C + (A * expr)) \\ & \rightarrow B = B + (C + (A * id)) \\ & \rightarrow B = B + (C + (A * A)) \end{aligned}$$


4)

$$S \rightarrow A^a | B^b$$

$$A \rightarrow C A'$$

$$A' \rightarrow a A' | b C A' | \epsilon$$

$$B \rightarrow A a b B | b b B'$$

$$B' \rightarrow b b B' | \epsilon$$

$$C \rightarrow C$$

5) $A \rightarrow a A'$

$$A' \rightarrow B C | C | \epsilon$$

$$B \rightarrow b | a B$$

6) $OS' \rightarrow E S P$

$$1 \quad E \rightarrow E + T$$

$$2 \quad E \rightarrow E * T$$

$$3 \quad E \rightarrow T$$

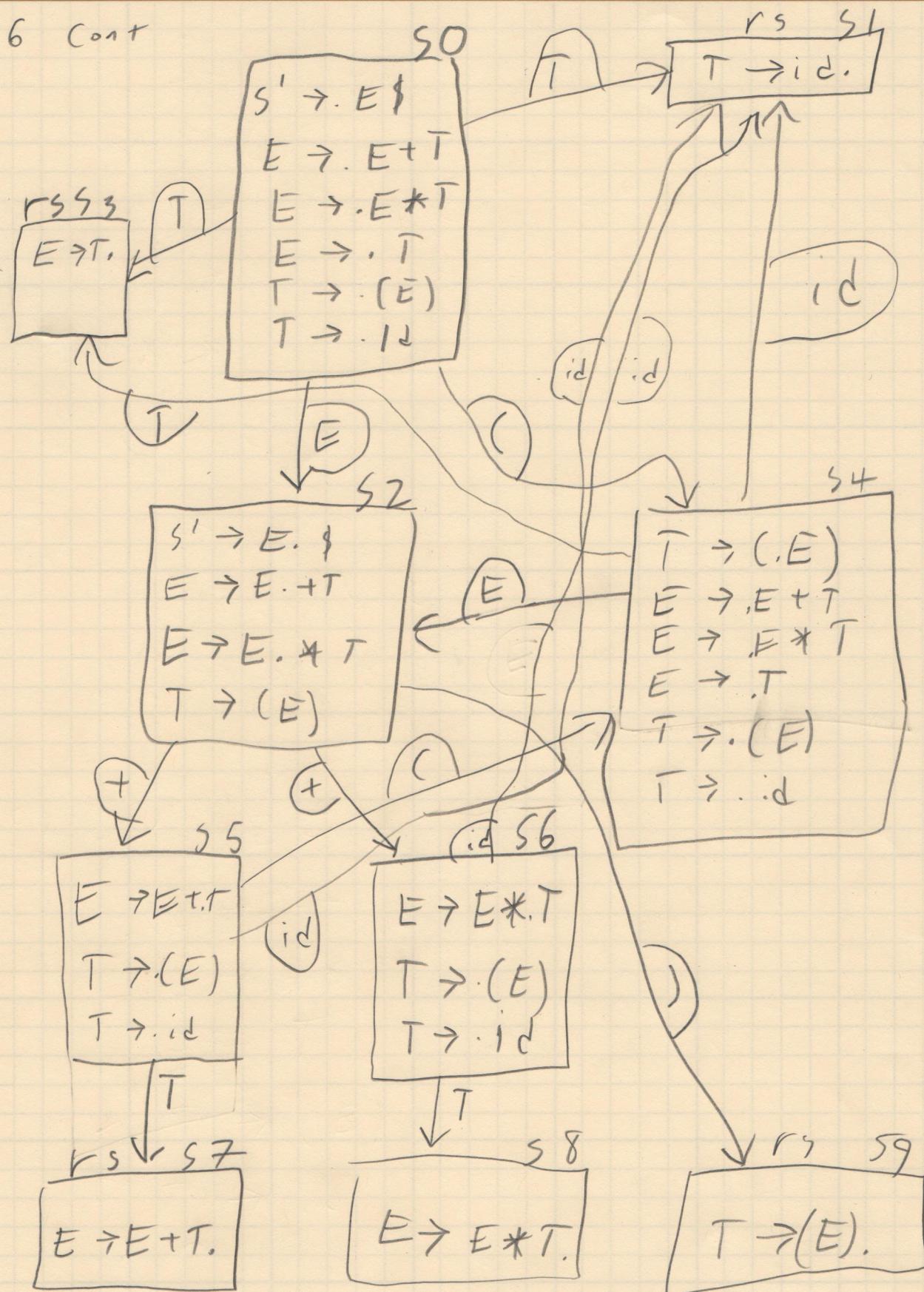
$$4 \quad T \rightarrow (E)$$

$$5 \quad T \rightarrow id$$

next parse

rs = reduction state 3

6 Cont



6 Cont

	+	*	()	: d	E	T	- -
0			4	1	2	3	
1							
2	s	s	9				
3							
4		4		1	2	3	
5		4		1		7	
6		4		1		8	
7							
8							
9							

	actions						go	to	- -
0	f	*	()	: d	\$	g	E	T	- -
1	r ₅	r ₃	r ₅	r ₅	r ₅	r ₅	2	3	- -
2	s ₅	s ₆		s ₉		acc			- -
3	r ₃			- -					
4		s ₄		s ₁			2	3	- -
5		s ₄		s ₁				7	- -
6		s ₄		s ₁				8	- -
7	r ₁			- -					
8	r ₂			- -					
9	r ₄			- -					

7)

 $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0$ $O:$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0\text{C}4$ $O:$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0(4\text{id})$ $O:$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0(4T)$ $O: 5$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0\text{C}4T3$ $O: 5$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0\text{C}4E$ $O: 53$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0(4E2)$ $O: 53$  $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0(4EZ+5)$ $O: 53$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0(4EZ+5;d)$ $O: 53$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0(4EZ+5T7)$ $O: 535$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0(4E)$ $O: 5351$ $\text{in: } (\text{id} + \text{id}) * \text{id}$ $S: 0(4EZ)$ $O: 5351$ $\text{in: } (\text{id} + \text{id}), * \text{id}$ $S: 0(4EZ)$ $O: 5351$

$\neq \text{cont}$

in: $(\text{id} + \text{id}) * \text{id}$

s: $0C4E2)$

o: 5351

in: $(\text{id} + \text{id}). * \text{id}$

s: $0C4E2))$

o: 5351

in: $(\text{id} + \text{id}). * \text{id}$

s: $0T3$

o: 53514

in: $(\text{id} + \text{id}) * . \text{id}$

s: $0 E32 * 6$

o: 535143

in: $(\text{id} + \text{id}) * \text{id}.$

s: $0 E2 * 6 \text{id}1$

o: 535143

in: $(\text{id} + \text{id}) * \text{id}.$

s: $0 E2 * 6 T8$

o: 5351435

in: $(\text{id} + \text{id}) * \text{id} \$$

s: $0 E2 \$$

o: 53514352

accept

final out

53514352

8) handle is underlined

- ② $E \rightarrow E * \underline{T}$
- ③ $\vdash \rightarrow E * \underline{id}$
- ④ $\rightarrow \underline{T} * id$
- ⑤ $\rightarrow (\underline{E}) * id$
- ⑥ $\rightarrow (E + T) * id$
- ⑦ $\rightarrow (E + \underline{id}) * id$
- ⑧ $\rightarrow (\underline{I} + id) * id$
- ⑨ $\rightarrow (\underline{id} + id) * id$

↓ handle simple phrase

states

in

