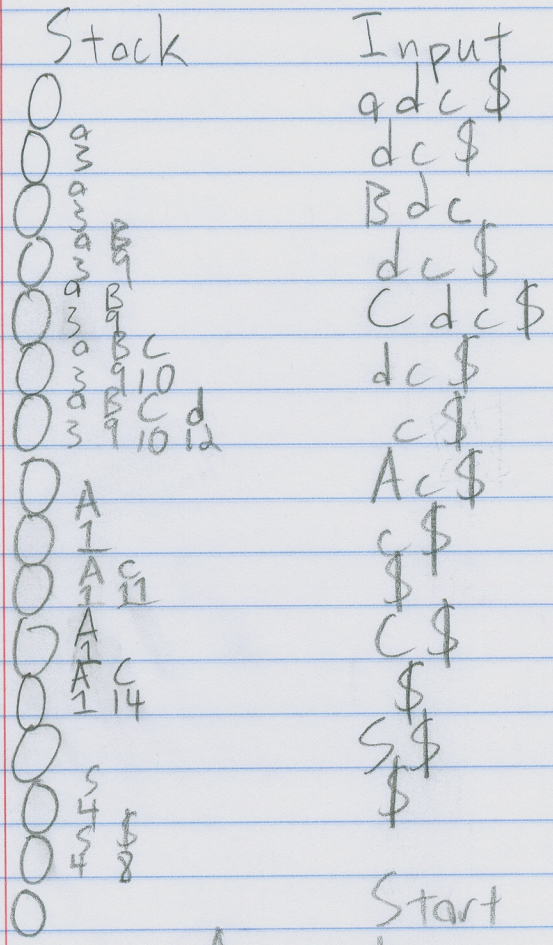
Assignment #2 key

Stack	Input
0	bbqc$
0 b 2	bqc$
0 b 2 b 2	qc$
0 b 2 b 2 B 13	Bqc$
0 b 2 b 2	qc$
0 b 2 B 13	Bqc$
0 B 5	qc$
0 B 5 Q 7	Bqc$
0 B 5 Q 6	qc$
0 A 1	c$
0 A 1 C 11	Q c$
0 A 1 C 14	c$
0 S 4	A c$
0 S 4 $ 8	c$
0	$
	c$
	$
	S $
	$

start

accept

1b.



State 0	Goto
Prog → · Block $	1
Block → · begin StmtList end	2

State 1	Goto
Prog → Block · $	3

State 2	Goto
Block → begin · StmtList end	4
StmtList → · StmtList semi Stmt	4
StmtList → · Stmt	5
Stmt → · Block	6
Stmt → · Var assign Expr	7
Block → · begin StmtList end	2
Var → · id	8
Var → · id lb Expr rb	8

State 3
Prog → Block $ ·

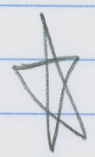
State 4	Goto
Block → begin StmtList · end	9
StmtList → StmtList · semi Stmt	10

State 5
StmtList → Stmt ·

State 6
Stmt → Block ·

State 7	Goto
Stmt → Var · assign Expr	11

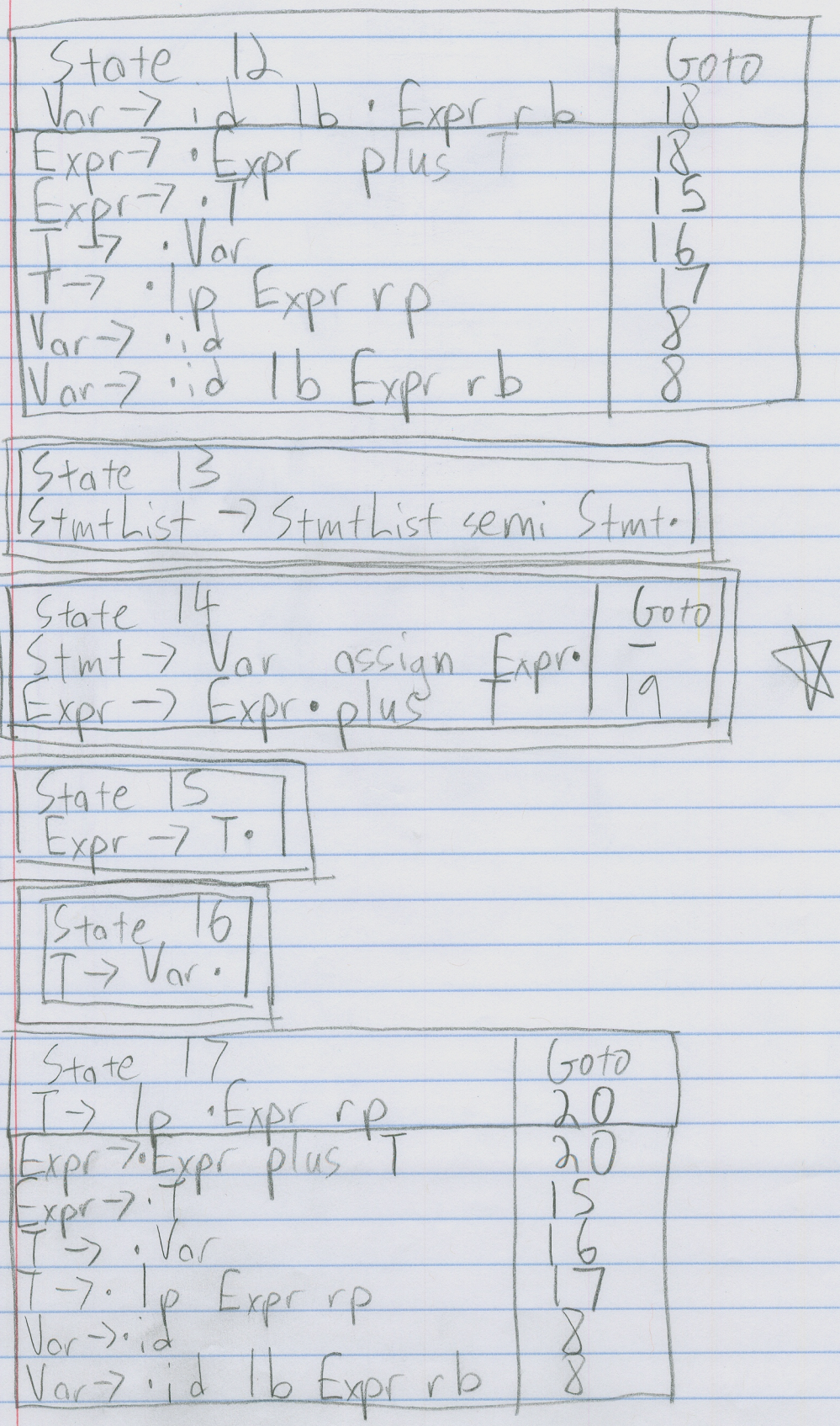
State 8	Goto
Var → id ·	
Var → id · lb Expr rb	12



State 9
Block → begin StmtList end ·

State 10	Goto
StmtList → StmtList semi · Stmt	13
Stmt → · Block	3
Stmt → · Var assign Expr	7
Block → · begin StmtList end	2
Var → · id	8
Var → · id lb Expr rb	8

State 11	Goto
Stmt → Var assign · Expr	14
Expr → · Expr plus T	14
Expr → · T	15
T → · Var	16
T → · lp Expr rp	17
Var → · id	8
Var → · id lb Expr rb	8


State 12
Var → id lb · Expr rb
Expr → · Expr plus T
Expr → · T
T → · Var
T → · lp Expr rp
Var → · id
Var → · id lb Expr rb
Goto
18
18
15
16
17
8
8
State 13
StmtList → StmtList semi Stmt ·
State 14
Stmt → Var assign Expr ·
Expr → Expr · plus T
Goto
—
19
State 15
Expr → T ·
State 16
T → Var ·
State 17
T → lp · Expr rp
Expr → · Expr plus T
Expr → · T
T → · Var
T → · lp Expr rp
Var → · id
Var → · id lb Expr rb
Goto
20
20
15
16
17
8
8

State 18	Goto
Var → id lb Expr · rb	21
Expr → Expr · plus T	19

State 19	Goto
Expr → Expr plus · T	22
T → · Var	16
T → · lp Expr rp	17
Var → · id	8
Var → · id lb Expr rb	8

State 20	Goto
T → lp Expr · rp	23
Expr → Expr · plus T	19

State 21
Var → id lb Expr rb ·

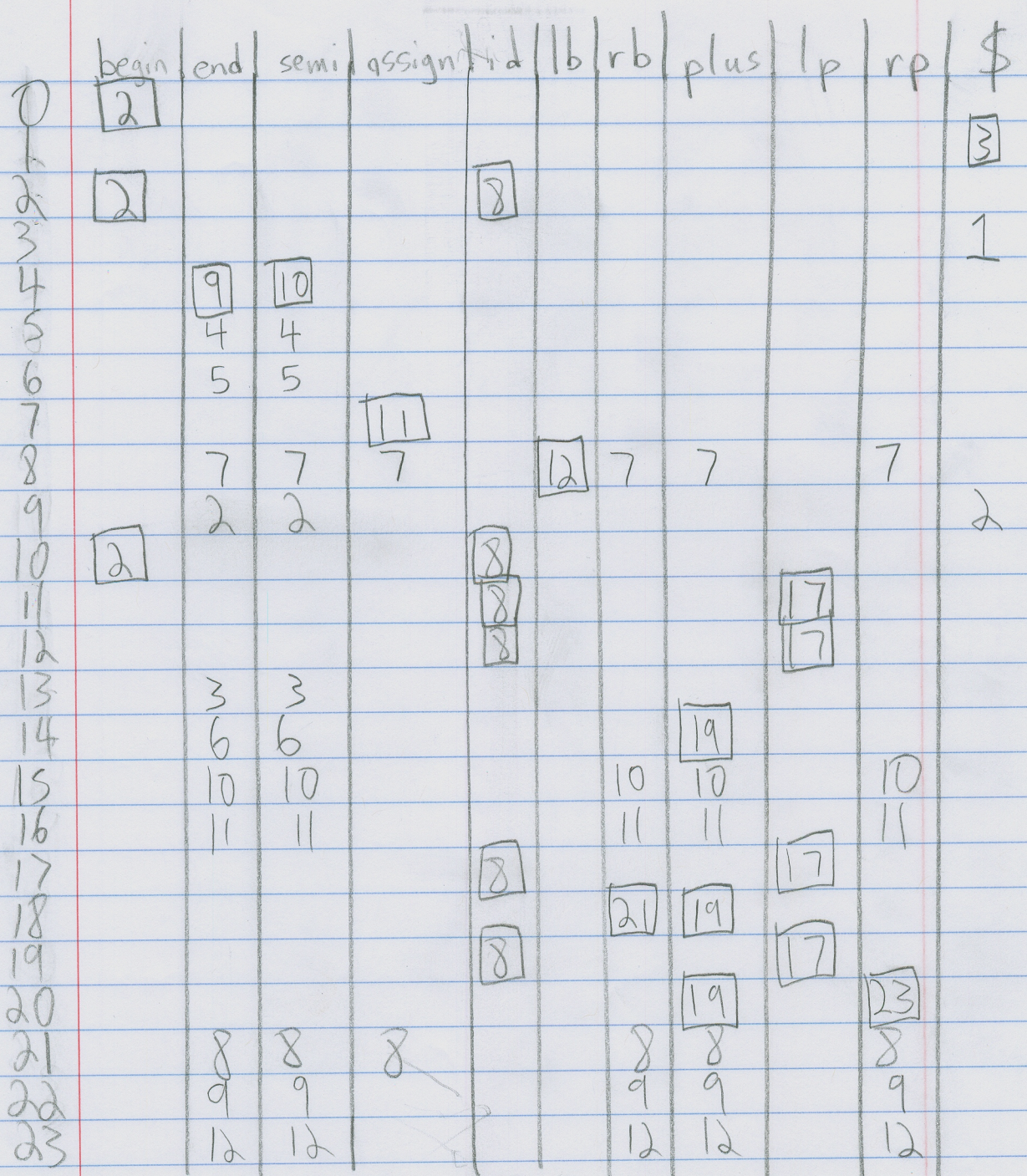
State 22
Expr → Expr plus T ·

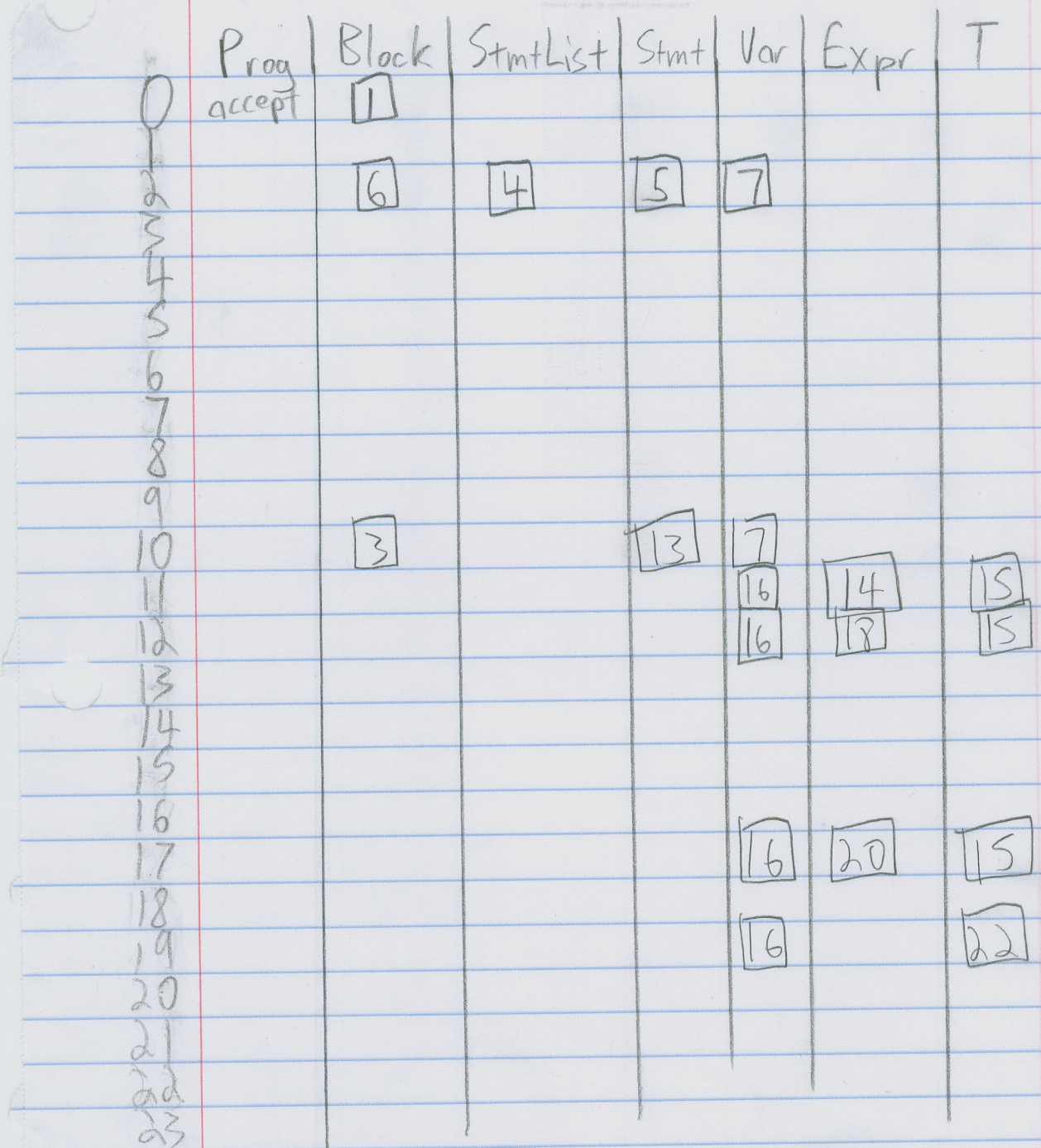
State 23
T → lp Expr rp ·

3. There are shift-reduce conflicts in states 8 and 14. First try SLR to resolve the conflicts.

	Follow
Prog	—
Block	$, end, semi
StmtList	end, semi
Stmt	end, semi
Var	assign, end, semi, rb, plus, rp
Expr	end, semi, rb, plus, rp
T	end, semi, rb, plus, rp

Because FOLLOW(Var) does not contain lb, the conflict in State 8 is resolved.
Because FOLLOW(Stmt) does not contain plus, the conflict in State 14 is resolved


begin
end
semi
assign
id
lb
rb
plus
lp
rp
$


Prog
Block
StmtList
Stmt
Var
Expr
T
0
accept
1
2
6
4
5
7
3
13
7
16
16
14
18
15
15
16
20
15
16
22

4.

State 0	Goto
Start → · S $	1
S → · A_1 B	2
S → · a c	3
S → · x A_2 c	4
A_1 → · a	5

State 1	Goto
Start → S · $	6

State 2	Goto
S → A_1 · B	7
B → · b	
B → ·	

State 3	Goto
S → a · c	8
A_1 → a ·	

State 4	Goto
S → x · A_2 c	9
A_2 → · a	10

State 5
A_1 → a ·

State 5
Start → S $ ·

State 6
S → A_1 B ·

State 7
B → b ·

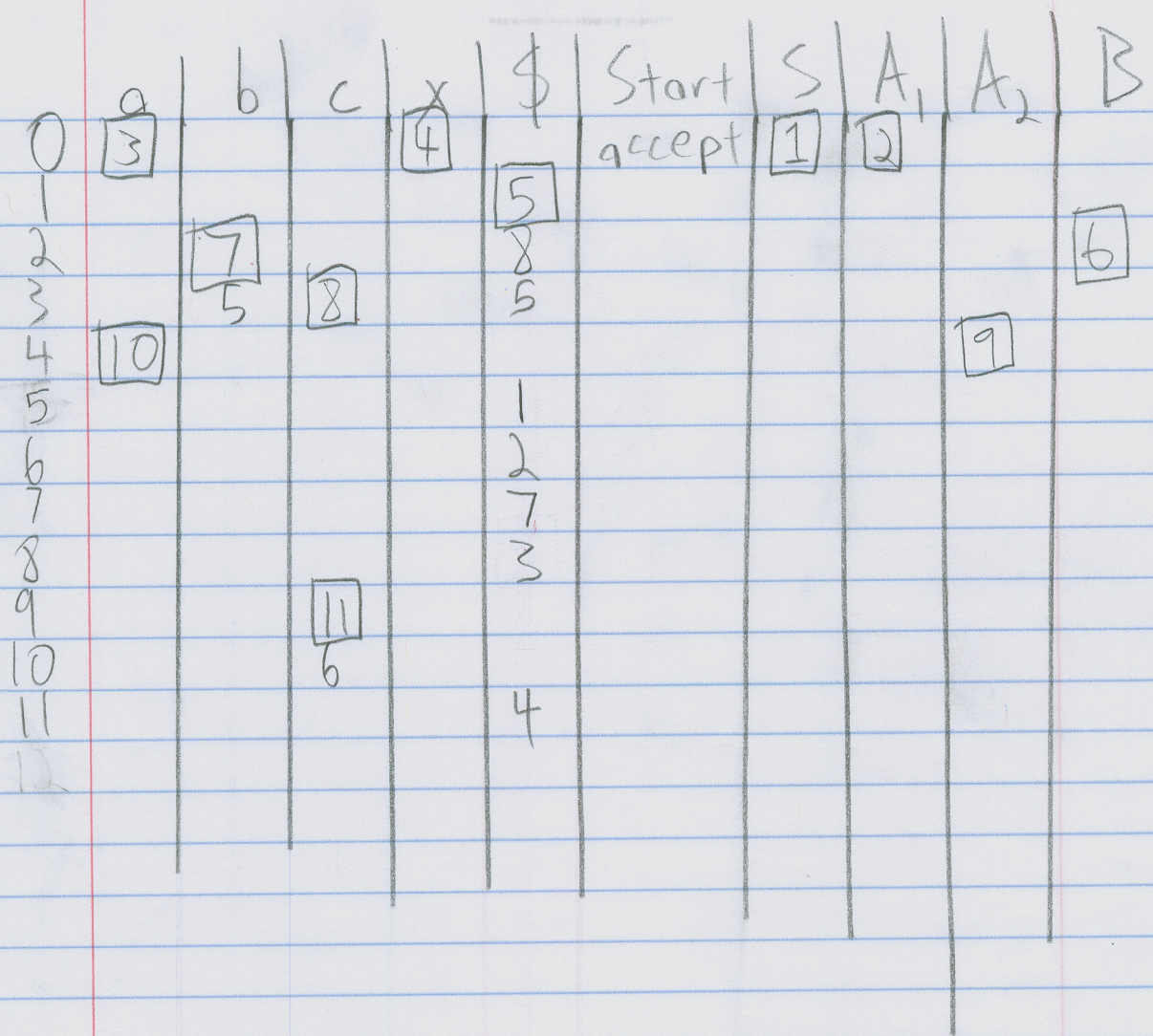
State 8
S → a c ·

State 9	Goto
S → x A_2 · c	11

State 10
A_2 → a ·

State 11
S → x A_2 c ·

	Follow
Start	—
S	$
A_1	b, $
A_2	c
B	$


a
b
c
x
$
Start
accept
S
A1
A2
B

5.

Item	State 0	Goto
1	Start → · S $	1
2	S → · x C1 y | C2 y2 C3 y3	2
3	S → · A1	3
4	A1 → · b1 | C1	4
5	A1 → · a1	5

Item	State 1	Goto
6	Start → S · $	6

Item	State 2	Goto
7	S → x · C1 y | C2 y2 C3 y3	7
8	C1 → · A2	8
9	A2 → · b2 C2	9
10	A2 → · a2	10

Item	State 3
11	S → A1 ·

Item	State 4	Goto
12	A1 → b1 · C1	11
13	C1 → · A2	8
14	A2 → · b2 C2	9
15	A2 → · a2	10

Item	State 5
16	A1 → a1 ·

Item	State 6
17	Start → S $ ·

Item	State		Goto
18	S → x	C1 · y1 | C2 y2 | C3 y3	12

Item	State 8
19	C1 → A2 ·

Item	State 9		Goto
20	A2 → b2 · C2		13
21	C2 → · A1		14
22	C2 → · A3		15
23	A1 → · b	C1	4
24	A1 → · a		5
25	A3 → · b3	C3	16
26	A3 → · a3		17

Item	State 10
27	A2 → a2 ·

Item	State 11
28	A1 → b1 C1 ·

Item	State 12		Goto
29	S → x	C1 y1 · C2 y2 C3 y3	18
30	C2 → · A1		14
31	C2 → · A3		15
32	A1 → · b1	C1	4
33	A1 → · a1		5
34	A3 → · b3	C3	16
35	A3 → · a3		17

Item	State 13
36	A2 → b2 C2 ·

Item	State 14
37	C2 → A1 ·

Item	State 15
38	C2 → A3 ·

Item	State 16	Goto
39	A3 → b3 · C3	19
40	C3 → · A2	20
41	A2 → · b2 C2	9
42	A2 → · a2	10

Item	State 17
43	A3 → a3 ·

Item	State 18	Goto
44	S → x C1 y1 C2 · y2 C3 y3	21

Item	State 19
45	A3 → b3 C3 ·

Item	State 20
46	C3 → A2 ·

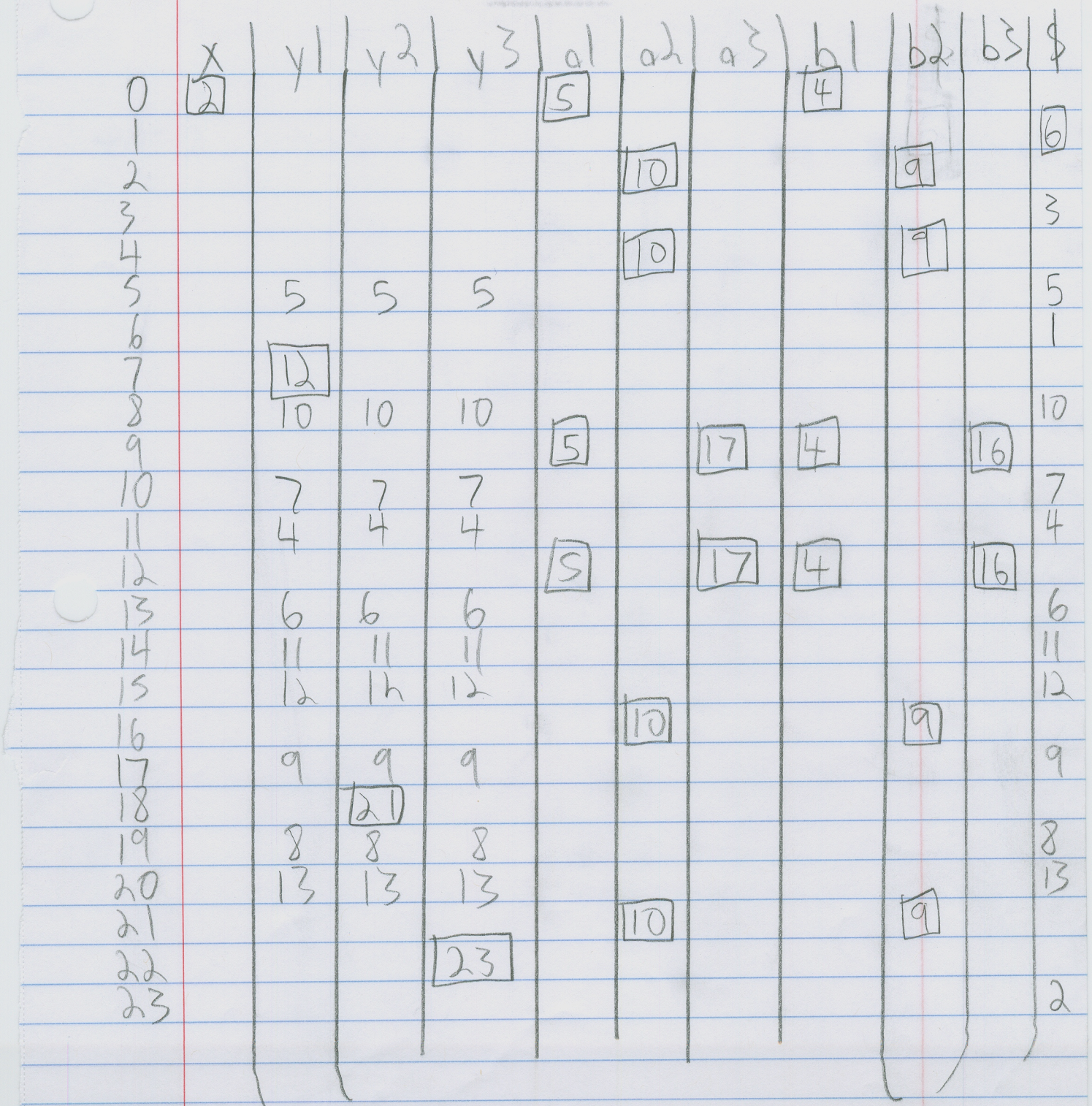
Item	State 2	Goto
47	S → x C1 y | C2 y2 · C3 y3	22
48	C3 → · A2	20
49	A2 → · b2 C2	9
50	A2 → · a2	10

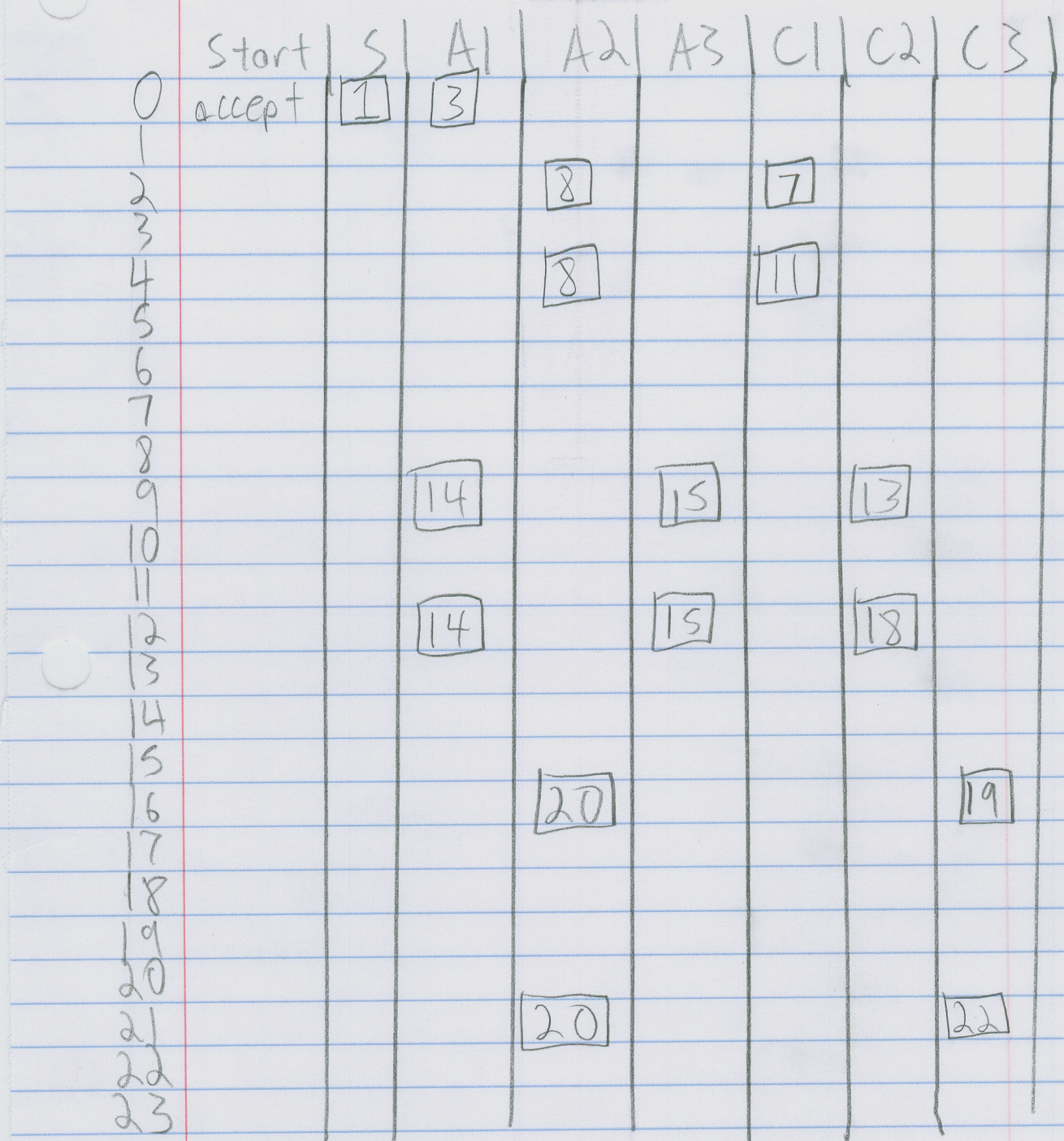
Item	State 22	Goto
51	S → x C1 y | C2 y2 C3 · y3	23

Item	State 23
52	S → x C1 y | C2 y2 C3 y3 ·

	Initial	Propagate From	Final
1	$		$
2	$		$
3	$		$
4	$	3	$
5		3	$
6		1	$
7		2	$
8	y1		y1
9		8	y1
10		8	y1
11		3	$
12		4, 23, 32	$, y1, y2, y3
13		12	$, y1, y2, y3
14		13	$, y1, y2, y3
15		13	$, y1, y2, y3
16		5, 24, 33	$, y1, y2, y3
17		6	$
18		7	$
19		8, 13, 14	$, y1, y2, y3
20		9, 14, 41, 49	$, y1, y2, y3
21		20	$, y1, y2, y3
22		20	$, y1, y2, y3
23		21	$, y1, y2, y3
24		21	$, y1, y2, y3
25		22	$, y1, y2, y3
26		22	$, y1, y2, y3
27		10, 15, 42, 50	y1, $, y2, y3
28		12	$, y1, y2, y3
29		18	$
30	y2		y2
31	y2		y2

	Initial	Propagate from	Final
32		30	y2
33		30	y2
34		31	y2
35		31	y2
36		20	$, y1, y2, y3
37		21, 30	$, y1, y2, y3
38		22, 31	$, y1, y2, y3
39		25, 34	$, y1, y2, y3
40		39	$, y1, y2, y3
41		40	$, y1, y2, y3
42		40	$, y1, y2, y3
43		26, 35	$, y1, y2, y3
44		29	$
45		39	$, y1, y2, y3
46		40, 48	$, y1, y2, y3
47		44	$
48	y3		y3
49		48	y3
50		48	y3
51		47	$
52		51	$


x
y1
y2
y3
a1
a2
a3
b1
b2
b3
$
0
1
2
3
4
5
6
7
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2


Start
S
A1
A2
A3
C1
C2
C3
accept
0
1
2
3
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12
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14
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