

CS 2210 – Homework 3 Answers

1.) Construct the DFA of LR(0) items for the following grammar:

$A \rightarrow a B D$

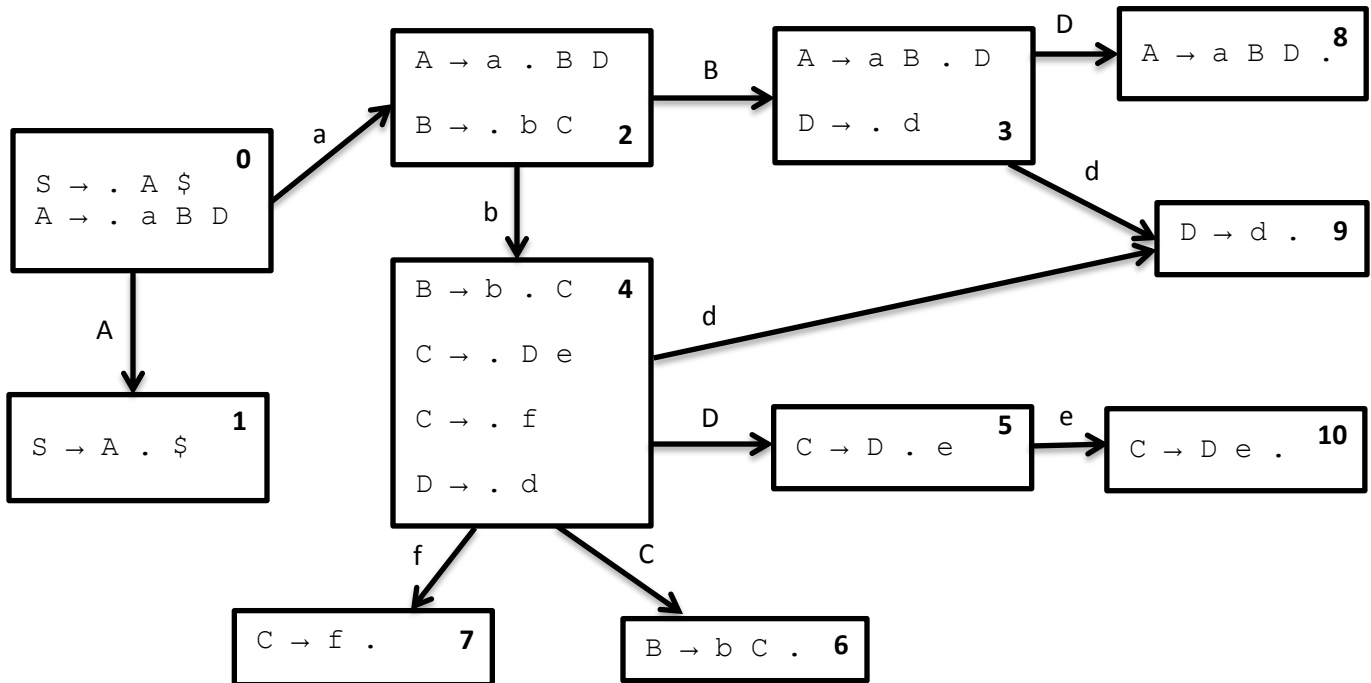
$B \rightarrow b C$

$C \rightarrow D e \mid f$

$D \rightarrow d$

Augment and number the grammar productions:

- 0.) $S \rightarrow A \$$
- 1.) $A \rightarrow a B D$
- 2.) $B \rightarrow b C$
- 3.) $C \rightarrow D e$
- 4.) $C \rightarrow f$
- 5.) $D \rightarrow d$



2.) Build the SLR parse table for the above grammar. Show the Follow sets you built to determine the reduce actions.

- 0.) $S \rightarrow A \$$
- 1.) $A \rightarrow a B D$
- 2.) $B \rightarrow b C$
- 3.) $C \rightarrow D e$
- 4.) $C \rightarrow f$
- 5.) $D \rightarrow d$

Follow	
A	\$
B	d
C	d
D	e, \$

	\$	d	f	e	b	a	A	B	C	D
0						s2	g1			
1	a									
2					s4			g3		
3		s9								g8
4		s9	s7						g6	g5
5				s10						
6		r2								
7		r4								
8	r1									
9	r5			r5						
10		r3								

3.) Show an SLR parse for the input:

a b f d

Show the stack, input, and actions in an action table as was done in the slides.

Stack	Input	Action
\$ s0	a b f d \$	Shift 2
\$ s0 a s2	b f d \$	Shift 4
\$ s0 a s2 b s4	f d \$	Shift 7
\$ s0 a s2 b s4 f s7	d \$	Reduce $C \rightarrow f$, Goto s6
\$ s0 a s2 b s4 C s6	d \$	Reduce $B \rightarrow b C$, Goto s3
\$ s0 a s2 B s3	d \$	Shift 9
\$ s0 a s2 B s3 d s9	\$	Reduce $D \rightarrow d$, Goto s8
\$ s0 a s2 B s3 D s8	\$	Reduce $A \rightarrow a B D$, Goto s1
\$ s0 A s1	\$	Accept

4.) Identify the basic blocks in the following sequence of IR code and construct the Control Flow Graph:

```
x := 0
L1: a := x * 2
    b := a < 5
    iftrue b goto L2
    a := a + 2
L2: c := a + x
    b := x < 10
    iftrue b goto L1
    return c
```

