Feedback — Quiz #3

Help

You submitted this quiz on **Mon 21 Apr 2014 9:21 PM PDT**. You got a score of **8.70** out of **11.00**. You can attempt again, if you'd like.

Question 1

Consider the following grammar:

$S \rightarrow A\ (\ S\ )\ B \mid \epsilon$

$A \rightarrow S \mid S\ B \mid x \mid \epsilon$

$B \rightarrow S\ B \mid y$

What are the first and follow sets of S?

Your Answer		Score	Explanation
First: {x, y, '('}, Follow: {$, y, x, '(', ')'}	✖	0.00	
First: {x, y, '(', ϵ}, Follow: {$, y, x, '(', ')'}			
First: {x, y, '(', ϵ}, Follow: {y, x, '(', ')'}			
First: {x, y, '(', ϵ}, Follow: {$, '(', y}			
First: {x, ϵ}, Follow: {$, y, x, '(', ')'}			
First: {x, '('}, Follow: {$, y, x}			
Total		0.00 / 1.00	

Question Explanation

Follow the rules given in the lecture and construct the first and follow sets of S.

Question 2

What are the items in the initial state of the SLR(1) parsing automaton for the grammar in last question(Question 1)?

Do not add an extra symbol to the grammar; just use the grammar as is.

[Choose all that apply]

Your Answer		Score	Explanation
☐ A→S.B	✔	0.10	
☐ A→.	✖	0.00	
☑ A→.SB	✔	0.10	
☑ A→.S	✔	0.10	
☑ S→.	✔	0.10	
☐ B→.SB	✔	0.10	
☐ B→.	✔	0.10	
☑ A→.x	✔	0.10	
☐ B→.y	✔	0.10	
☑ S→.A (S) B	✔	0.10	
Total		0.90 / 1.00	

Question Explanation

The initial state of the SLR(1) parsing automaton for this grammar is:
S → .A(S) B
S → .
A → .S
A → .SB
A → .x
A → .

Question 3

Which of the following are true of the initial state of the SLR(1) parsing automaton from the last question (Question 2)?

[Choose all that apply]

Your Answer		Score	Explanation
☑ This state has a shift-reduce conflict on input x.	✔	0.12	A $\rightarrow$ .x is in the initial state, so the state can shift on x, x is in Follow(S), the state can reduce, then the state has a shift-reduce conflict on x.
☑ The state has a reduce-reduce conflict on input '('.	✔	0.12	'(' is in Follow(S) and Follow(A) at the same time, so the state has a reduce-reduce conflict.
☐ The state has a reduce-reduce conflict on input x.	✔	0.12	x is in Follow(S) but not in Follow(A), so the state has no reduce-reduce conflict on x.
☐ This state has a shift-reduce conflict on transition S.	✔	0.12	The state cannot reduce on S, so the state has no shift-reduce conflict on S.
☐ The state has a reduce-reduce conflict on end-of-input.	✔	0.12	'$' is in Follow(S) but not in Follow(A), so the state has no reduce-reduce conflict on the end-of-input.
☐ This state has a shift-reduce conflict on input '('.	✔	0.12	On input '(', the state doesn't shift, so the state has no shift-reduce conflict on '('.
☐ This state has a shift-reduce conflict on end-of-input.	✔	0.12	On end-of-input, the state doesn't shift, so the state has no shift-reduce conflict on end-of-input.
☐ The state has a reduce-reduce conflict on transition S.	✔	0.12	S in not in Follow(S) or Follow(A), so the state has no reduce-reduce conflict on S.
Total		1.00 / 1.00	

Question Explanation

We have First(S) = {x, y, '(', ϵ}, Follow(S) = {$, y, x, '(', ')'}; First(A) = {}, Follow(A) = {x, y, '(', ϵ}, Follow(A) = {'('}.

Question 4

Consider grammars G1, G2, and G3.

G1: $E \rightarrow idT \mid (E)T$

$T \rightarrow + id \mid * id$

G2: $S \rightarrow bSb \mid A \mid \epsilon$

$A \rightarrow aA \mid \epsilon$

G3: $R \rightarrow aR' \mid (R)R'$

$R' \rightarrow \epsilon \mid XR'$

$X \rightarrow . R \mid + R \mid *$

The number of symbols in the first sets for the *non-terminals* are:

Your Answer		Score	Explanation
○ G1: E = 2; T = 2 G2: S = 3; A = 1 G3: R = 2; R' = 3; X = 3			
◉ G1: E = 2; T = 2 G2: S = 3; A = 2 G3: R = 2; R' = 4; X = 3	✔	1.00	
○ G1: E = 4; T = 2 G2: S = 2; A = 2 G3: R = 2; R' = 3; X = 3			
○ G1: E = 2; T = 2 G2: S = 3; A = 2 G3: R = 2; R' = 3; X = 3			
○ G1: E = 4; T = 2 G2: S = 2; A = 2 G3: R = 2; R' = 4; X = 3			
Total		1.00 / 1.00	

Question Explanation

G1: First(E) = { id, '(' }; First(T) = {'+', '*' }
G2: First(S) = { b, a, ϵ }; First(A) = { a, ϵ }
G3: First(R) = { a, '(' }, First(R') = { ϵ, '.', '+', '*' }; First(X) = { '.', '+', '*' }

Question 5

Given the following grammar,

stmt→var | if_stmt

if_stmt→if var then stmt | if var then stmt else stmt

var→a | b | win | loss

Which of the following series is a valid bottom-up parsing for the string:

if a then if b then win else loss

[Choose all that apply]

Your Answer		Score	Explanation
☑ if a then if b then win else loss if var then if b then win else loss if var then if var then win else loss if var then if var then var else loss if var then if var then stmt else loss if var then if_stmt else loss if var then stmt else loss if var then stmt else var if var then stmt else stmt if_stmt stmt	✔	0.20	
☐ if a then if b then win else loss if var then if b then win else loss if var then if var then win else loss if var then if var then var else loss if var then if var then var else var if var then if var then stmt else var if var then if var then stmt else stmt if var then if_stmt if var then stmt if_stmt stmt	✔	0.20	if var then if var then var else var if var then if var then stmt else var is not correct.

☐ if a then if b then win else loss if var then if b then win else loss if var then if var then win else loss if var then if var then var else loss if var then if var then stmt else var if var then if var then stmt else stmt if var then if_stmt if var then stmt if_stmt stmt	✔	0.20	if var then if var then var else loss if var then if var then stmt else var is not correct.
☐ if a then if b then win else loss if var then if b then win else loss if var then if b then win else loss if var then if b then var else loss if var then if b then stmt else var if var then if var then stmt else var if var then if var then stmt else stmt if var then if_stmt if var then stmt if_stmt stmt	✔	0.20	if var then if b then stmt else var if var then if var then stmt else var is not correct.
☐ if a then if b then win else loss if var then if b then win else loss if var then if var then win else loss if var then if var then var else loss if var then if var then stmt else loss if var then if var then stmt else var if var then if var then stmt else stmt if var then if_stmt if var then stmt if_stmt stmt	✖	0.00	
Total		0.80 / 1.00	

Question 6

For the grammar in last question (Question 5), when applying shift-reduce parsing to the same

string:

if a then if b then win else loss

What kind of conflicts will we have?

Your Answer		Score	Explanation
◉ Shift-reduce conflict	✔	1.00	
○ Reduce-reduce conflict			
○ No conflict			
○ Both conflicts			
Total		1.00 / 1.00	

Question Explanation

Follow the rules to construct the First, Follow sets, and the automaton. Then we can find there is a shift-reduce conflict but no reduce-reduce conflict. The parse tree is an example of the conflict.

Question 7

Consider the following grammar:

$E \rightarrow T * E \mid T$

$T \rightarrow int + T \mid int \mid (E)$

Using shift-reduce parsing, how many shift and how many reduce moves does it take to accept the input string:

((int + int)*int)

Your Answer		Score	Explanation
○ shift = 10; reduce = 7			
○ shift = 9; reduce = 9			
◉ shift = 9; reduce = 8	✖	0.00	

shift = 9; reduce = 7		
shift = 10; reduce = 6		
Total	0.00 / 1.00	

Question Explanation

Build the automaton for this grammar and do the shift-reduce parsing.

Question 8

Consider the following grammar:

$S \rightarrow Sb \mid a$

This grammar is:

Your Answer		Score	Explanation
LL(1)			
not SLR(1)			
SLR(1) but not LL(1)	✔	1.00	
Total		1.00 / 1.00	

Question Explanation

We can build the automaton for the grammar and check if there are any conflicts. In this way, we can conclude this grammar is SLR(1). This grammar is left-recursive, so it's not LL(1).

Question 9

Consider the following grammar:

$S \rightarrow SbS \mid a$

This grammar is:

Your Answer		Score	Explanation
○ SLR(1) but not LL(1)			
○ LL(1)			
◉ not SLR(1)	✔	1.00	
Total		1.00 / 1.00	

Question Explanation

We can build the automaton for the grammar and check conflicts. This grammar is not SLR(1).

Question 10

Consider the following grammar:

$S \rightarrow bS \mid a$

This grammar is:

Your Answer		Score	Explanation
○ SLR(1) but not LL(1)			
◉ LL(1)	✔	1.00	
○ not SLR(1)			
Total		1.00 / 1.00	

Question Explanation

We can build the LL1 parsing table and check if any entry is multiply defined. In this question, we can conclude this grammar is LL(1).

Question 11

Which of the following statements are true about this grammar:

$S \rightarrow aTUb \mid \epsilon$

$T \rightarrow cUc \mid bUb \mid aUa$

$U \rightarrow Sb \mid cc$

Your Answer		Score	Explanation
☐ The first set of S is {ϵ, a, b}	✔	0.25	The first set of S is {ϵ, a}.
☑ The first set of U is {a, b, c}	✔	0.25	
☑ The follow set of T is {a, b, c}	✔	0.25	
☑ The follow set of S is {$, b}	✔	0.25	
Total		1.00 / 1.00	