Gradiance Online Accelerated Learning

Zayd

- Home Page
- Assignments Due
- Progress Report
- Handouts
- Tutorials
- Homeworks
- Lab Projects
- Log Out

Help

Submission number: 71195
Submission certificate: AC317221
Submission time: 2014-03-22 16:44:25 PST (GMT - 8:00)

Number of questions: 6
Positive points per question: 3.0
Negative points per question: 1.0
Your score: 10

Based on Chapter 6 of HMU.

1. Here are the transitions of a determininstic pushdown automaton. The start state is q_0, and f is the accepting state.

State-Symbol	a	b	ε
q_0-Z_0	(q_1,AAZ_0)	(q_2,BZ_0)	(f,ε)
q_1-A	(q_1,AAA)	$(q_1,ε)$	-
q_1-Z_0	-	-	(q_0,Z_0)
q_2-B	$(q_3,ε)$	(q_2,BB)	-
q_2-Z_0	-	-	(q_0,Z_0)
q_3-B	-	-	$(q_2,ε)$
q_3-Z_0	-	-	(q_1,AZ_0)

Describe informally what this PDA does. Then, identify below the one input string that the PDA accepts.

a) bababba
b) abbbab
c) bbbaabbb
d) abbbabaab

Answer submitted: **b)**

You have answered the question correctly.

2. If we convert the context-free grammar G:

S → AS | A

```
A → 0A | 1B | 1
B → 0B | 0
```

to a pushdown automaton that accepts L(G) by empty stack, using the construction of Section 6.3.1, which of the following would be a rule of the PDA?

a) $\delta(q,0,B) = \{(q,B), (q,\varepsilon)\}$

b) $\delta(q,0,A) = \{(q,A)\}$

c) $\delta(q,\varepsilon,S) = \{(q,AS)\}$

d) $\delta(q,\varepsilon,A) = \{(q,0A), (q,1B), (q,1)\}$

Answer submitted: **d)**

You have answered the question correctly.

3. Consider the pushdown automaton with the following transition rules:

1. $\delta(q,0,Z_0) = \{(q,XZ_0)\}$
2. $\delta(q,0,X) = \{(q,XX)\}$
3. $\delta(q,1,X) = \{(q,X)\}$
4. $\delta(q,\varepsilon,X) = \{(p,\varepsilon)\}$
5. $\delta(p,\varepsilon,X) = \{(p,\varepsilon)\}$
6. $\delta(p,1,X) = \{(p,XX)\}$
7. $\delta(p,1,Z_0) = \{(p,\varepsilon)\}$

The start state is *q*. For which of the following inputs can the PDA first enter state *p* with the input empty and the stack containing XXZ_0 [i.e., the ID (p,ε,XXZ_0)]?

a) 011011011

b) 1001101

c) 0100110

d) 011001101

Answer submitted: **a)**

You have answered the question correctly.

4. Here are the transitions of a deterministic pushdown automaton. The start state is q_0, and *f* is the accepting state.

State-Symbol	a	b	ε
q_0-Z_0	(q_1,AAZ_0)	(q_2,BZ_0)	(f,ε)
q_1-A	(q_1,AAA)	(q_1,ε)	-
q_1-Z_0	-	-	(q_0,Z_0)
q_2-B	(q_3,ε)	(q_2,BB)	-
q_2-Z_0	-	-	(q_0,Z_0)
q_3-B	-	-	(q_2,ε)
q_3-Z_0	-	-	(q_1,AZ_0)

Describe informally what this PDA does. Then, identify below, the one input string that takes the PDA into state q_3 (with any stack).

a) aabbbbb

b) baabba

c) babbbaa

d) bbabbba

Answer submitted: **c)**

Your answer is incorrect.

Hint: try proving that whenever you see twice as many *b*'s as *a*'s, such as when reading the input babbba, you go from ID $(q_0,babbba,Z_0)$ to ID (q_0,ε,Z_0). Pushdown automata are the subject of Section 6.1 (p. 225). See especially the informal description of how these automata move in Section 6.1.1 (p. 225) and the formal definition of their behavior in terms of instantaneous descriptions in Section 6.1.4 (p. 230).

5. Suppose one transition rule of some PDA P is $\delta(q,0,X) = \{(p,YZ), (r,XY)\}$. If we convert PDA P to an equivalent context-free grammar G in the manner described in Section 6.3.2 (p. 247), which of the following could be a production of G derived from this transition rule? You may assume *s* and *t* are states of P, as well as *p, q*, and *r*.

a) $[qXq] \rightarrow [rXr][rYq]$

b) $[qXq] \rightarrow 0[pYr][sZq]$

c) $[qXq] \rightarrow 0[pYr][rZq]$

d) $[qXq] \rightarrow 0[qXr][rYr]$

Answer submitted: **d)**

Your answer is incorrect.

Remember that reading input symbol 0 results in a state transition out of state q. See the complete algorithm for construction of the grammar in Section 6.3.2 (p. 247).

6. Consider the pushdown automaton with the following transition rules:

1. $\delta(q,0,Z_0) = \{(q,XZ_0)\}$
2. $\delta(q,0,X) = \{(q,XX)\}$
3. $\delta(q,1,X) = \{(q,X)\}$
4. $\delta(q,\varepsilon,X) = \{(p,\varepsilon)\}$
5. $\delta(p,\varepsilon,X) = \{(p,\varepsilon)\}$
6. $\delta(p,1,X) = \{(p,XX)\}$
7. $\delta(p,1,Z_0) = \{(p,\varepsilon)\}$

From the ID $(p,1101,XXZ_0)$, which of the following ID's can NOT be reached?

a) $(p,101,XZ_0)$

b) $(p,01,Z_0)$

c) $(p,01,XXXXXZ_0)$

d) $(p,1101,Z_0)$

Answer submitted: **c)**

You have answered the question correctly.