Pushdown Automuta:

Question 1

0.5 out of 0.5 points

There is -at least- one equivalent push-down automata for every regular expression.

Selected Answer: True

Answers: True

False

Question 2

0.5 out of 0.5 points

To proof that a given language L belon

context-free family; it is sufficient to bu

down automata for that L.

Selected Answer: True

Answers: True

False

Response Feedback:

Question 3

0.5 out of 0.5 points

The language $L = \{0^p 1^q | p \geq 1 \wedge q \geq 1\}$ cannot be recognized by a push-down automata.

Selected Answer: False

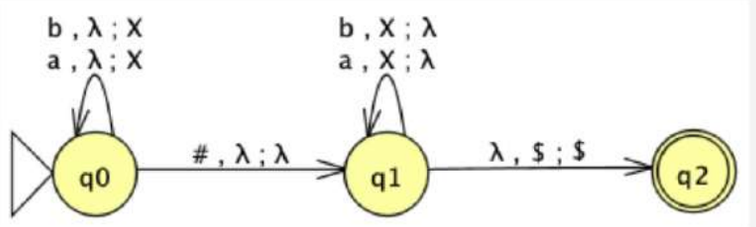
Answers: True

False

Question 4

1 out of 1 points

Consider the following push-down auto mata (PDA):



Which of the following strings is accepted by the above PDA?

Selected Answer: b. $abb\#aba$

Answers: a. $aaa\#bb$

b. $abb\#aba$

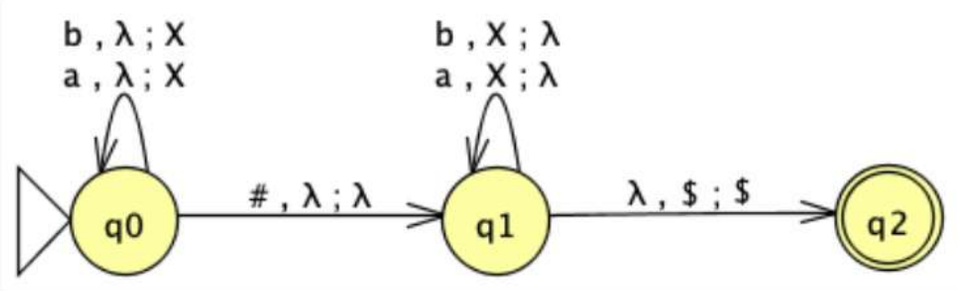
c. λ

d. None

Question 5

1 out of 1 points

Recall **Question 4** PDA, which is:



The language recognized by that PDA is:

Selected Answer: c. $L=\{u\#v \mid u \wedge v \in \{a,b\}^* \wedge |u| = |v|\}$

Answers:

a. $L=\{u\#v \mid u \wedge v \in \{a,b\}^+ \wedge |u| = |v|\}$

b. None

c. $L=\{u\#v \mid u \wedge v \in \{a,b\}^* \wedge |u| = |v|\}$

d. $L=\{u\#v \mid u \in \{a\}^+ \wedge v \in \{b\}^+\}$

Response Feedback:

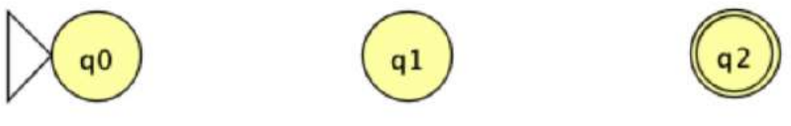
Question 6

4 out of 4 points

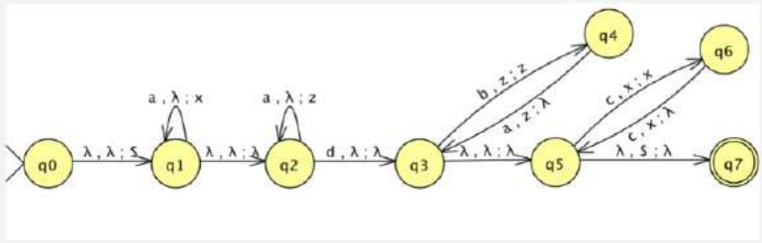
Consider the following context-free grammar where $\Sigma = \{a, b, \&\}$:

$$S \rightarrow aaaSb \mid \&$$

Match each transition(s) with its corresponding state in-order to complete the construction of an equivalent push-down automata for the above grammar.



Question 7 1 out of 1 points (Extra Credit)



Which of the following represents the language generated by the above push-down automata?

Selected Answer: a. $L=\{a^n a^s d(ba)^s c^{2n} \in \{a,b,c,d\}^* | n \geq 0 \wedge s \geq 0\}$

Answers: a. $L=\{a^n a^s d(ba)^s c^{2n} \in \{a,b,c,d\}^* | n \geq 0 \wedge s \geq 0\}$

b. $L=\{a^{ns} d(ba)^s c^{2n} \in \{a,b,c,d\}^* | n \geq 0 \wedge s \geq 0\}$

c. $L=\{a^{ns} d(ba)^n c^{2n} \in \{a,b,c,d\}^* | n \geq 0 \wedge s \geq 0\}$

d. $L=\{a^s a^n d(ba)^s c^{2n} \in \{a,b,c,d\}^* | n \geq 0 \wedge s \geq 0\}$

Response Feedback:

Context-Free Languages:

Question 1

0.5 out of 0.5 points

Some of context-free language can be generated by a regular expression.

Selected Answer: True

Answers: True

False

Response Feedback:

Question 2

0.5 out of 0.5 points

All ambiguous context-free grammars have equivalent unambiguous context-free grammars.

Selected Answer: False

Answers: True

False

Response Feedback:

Question 3

0 out of 0.5 points

Let $\Sigma = \{a, b\}$ and $L = \{a^n b^3 a^n \mid n \geq 1\}$. L is not a context-free language.

Selected Answer: True

Answers: True

False

Response Feedback:

Question 4

0 out of 1 points

Which string is generated by the following grammar:

$S \rightarrow xSy \mid SS \mid \lambda$

Selected Answer: None

d.

Answers: *xxyxxy*

a. *xyxxyxyy*

b.

c. Both ***a*** and ***b***

Question 5 The language $L = \{xy^*\}$ is:

Selected Answer: d. Regular and context-free language

Answers:

a. Regular language

b. None

c. Context-free language

d. Regular and context-free language

Response Feedback:

Question 6

0 out of 1 points

The unambiguous grammar corresponding to the following grammar is:

$$S \rightarrow AB \mid aaB$$
$$A \rightarrow a \mid Aa$$
$$B \rightarrow b$$

Selected Answer: c. None

Answers:

a.
$$S \rightarrow A \mid B$$
$$A \rightarrow aS$$
$$B \rightarrow bS$$
$$S \rightarrow AB$$

b.
$$A \rightarrow a \mid Aa$$
$$B \rightarrow b$$

c. None

d.
$$S \rightarrow AS \mid BS \mid \lambda$$
$$A \rightarrow aA$$
$$B \rightarrow bB$$

Response Feedback:

Question 7

1 out of 1 points

Given the following context-free grammar G, where $\Sigma = \{x, y\}$:

$$S \rightarrow TS \mid \lambda$$
$$T \rightarrow Ty \mid xTy \mid xy$$

The grammar G can derrive:

Selected Answer: b. *xxyyy*

Answers:

a. *xxxy*

b. *xxyyy*

c. *xxx*

d. None

Response Feedback:

Question 8

Recall **Question 7** grammar G; the language described by the grammar is:

Selected Answer: b. $L = \{(x^i y^k)^* \mid 0 \leq i \leq k\}$

Answers: None

a.

b. $L = \{(x^i y^k)^* \mid 0 \leq i \leq k\}$

c. $L = \{(x^i y^k)^* \mid i \geq 0 \wedge k \geq 0\}$

d. $L = \{(x^i y^k)^* \mid i \geq k\}$

Recall **Question 7** grammar G; the grammar is:

Selected Answer: d.
Not ambiguous because we can transform it to a non-ambiguous grammar.

Answers: None

a.

b.
Ambiguous because S has two possible derivations.

c.
Ambiguous because two parse trees can be obtained for some strings.

d.
Not ambiguous because we can transform it to a non-ambiguous grammar.

Question 10

The context-free grammar that accepts **L = { w | w $\in \Sigma^+$ and w starts and ends with the same symbol }** and $\Sigma = \{a, b\}$ is:

Selected Answer:

$S \rightarrow aAa \mid bAb$

$A \rightarrow aA \mid bA \mid \lambda$

d.

Answers:

a.

$S \rightarrow aSa \mid A \mid a \mid b$

$A \rightarrow bAb \mid a \mid b \mid \lambda$

b.

$S \rightarrow aSa \mid bSb \mid a \mid b$

None

c.

$S \rightarrow aAa \mid bAb$

$A \rightarrow aA \mid bA \mid \lambda$

d.

Response Feedback: