

Quiz 3 (Syntax)

Due Feb 5 at 11:59pm**Points** 100**Questions** 10**Available** Jan 31 at 12am - Feb 5 at 11:59pm**Time Limit** 90 Minutes**Allowed Attempts** 2

This quiz was locked Feb 5 at 11:59pm.

Attempt History

	Attempt	Time	Score
LATEST	<u>Attempt 1</u>	18 minutes	100 out of 100

⚠️ Answers will be shown after your last attempt

Score for this attempt: **100** out of 100

Submitted Feb 4 at 9:55pm

This attempt took 18 minutes.

Question 1

10 / 10 pts

In a grammar a production rule is recursive if left-hand side appears in its right-hand side.

☒ True

☐ False

Question 2

10 / 10 pts

BNF is a metalanguage for programming languages.

☒ True☐ False**Question 3****10 / 10 pts**

The language $L(G)$ where $G = (\{S, A\}, \{0,1\}, \{(S, 1A), (S, 0S), (A, 11)\}, S)$ is a finite language

☐ True☒ False**Question 4****10 / 10 pts**

We can always construct the syntax tree for a sentence from a derivation for the sentence.

☒ True☐ False**Question 5****10 / 10 pts**

Every terminal or nonterminal symbol in a syntax tree can only have a nonterminal symbol as a parent.

☒ True

☐ False

Question 6

10 / 10 pts

The following is an example concrete syntax written in Haskell.

While (Not (And T T)) (While T Skip)

☐ True

☒ False

Question 7

10 / 10 pts

Consider the language L defined by the following grammar with productions.

$S \rightarrow CD$

$C \rightarrow 0C \mid 0$

$D \rightarrow 1D \mid 1$

Which of the following statements are true for all sentences of L ?

☐ Each sentence contains the same number of 0s as 1s.

☒ Each sentence contains one or more 0s.

☒ Each sentence contains at least two digits.

☒ Each sentence contains one or more 1s.

☒ All 0s precede all 1s.

☐ Each sentence contains at least as many 0s as 1s.

Question 8**10 / 10 pts**

Consider the following grammar for describing meeting times that can be given by either time values or intervals. The rules for the nonterminal *time* are not important here; assume that the Haskell type `Time` represents specific time values.

mtg* ::= **at** *time* | **from** *time* **to** *time

Which of the following data type definitions for `Mtg` are a correct representation of the abstract syntax for the *mtg* grammar?

☐ `data Mtg = Time | From Time Time`

☒ `data Mtg = At Time | From Time Time`

☒ `data Mtg = From Time Time | At Time`

☐ `data Mtg = From Time Time | At Time Time`

Question 9**10 / 10 pts**

Consider the language `L` defined by the following grammar with productions

S* -> *AB

A* -> **a** | *Ab

B* -> **b** | *Ba

Which of the following statements are true for all sentences of `L`?

☒ Each sentence contains one or more `a`'s.

☐ All `a`'s precede all `b`'s.

- ☒ Each sentence contains at least two letters.
- ☒ Each sentence contains one or more b's.
- ☐ Each sentence contains exactly as many a's as b's.

Question 10**10 / 10 pts**

Given the following BNF grammar for a simple assignment statement;

$\langle \text{assign} \rangle \rightarrow \langle \text{id} \rangle = \langle \text{expr} \rangle$

$\langle \text{id} \rangle \rightarrow A \mid B \mid C \mid D$

$\langle \text{expr} \rangle \rightarrow \langle \text{id} \rangle + \langle \text{expr} \rangle \mid \langle \text{id} \rangle * \langle \text{expr} \rangle \mid (\langle \text{expr} \rangle) \mid \langle \text{id} \rangle$

Which of the following sentences can be derived from $\langle \text{assign} \rangle$?

- ☒ $A = A + B + C$
- ☐ $B = (B * C) + B$
- ☐ $B = AB + BC$
- ☐ $A + B$
- ☒ $A = A$
- ☐ $A = A(B + C)$

Quiz Score: 100 out of 100