

Quiz: Regular Language / Regular Grammar

- Due Apr 13 at 11:59pm
- Points 55
- Questions 4
- Available Apr 7 at 12am - Apr 20 at 11:59pm
- Time Limit None
- Allowed Attempts 2

Instructions

This quiz was locked Apr 20 at 11:59pm.

❗ Correct answers are no longer available.

Score for this attempt: 55 out of 55

Submitted Apr 13 at 6:42pm

This attempt took 18 minutes.



Question 1

10 / 10 pts

Among the following grammars, which one(s) would be considered as "Right Linear Grammar"?

- ☐ ($\{a,b,S\}$, $\{0,1\}$, S , $\{S \rightarrow S|0a\}$)
- ☒ ($\{A,B,S\}$, $\{a,b\}$, S , $\{S \rightarrow a|bS, A \rightarrow b|aB\}$)
- ☒ ($\{a,b,c,S\}$, $\{0,1\}$, S , $\{S \rightarrow 1S|0a, a \rightarrow 1|0b|1c\}$)
- ☐ ($\{S,A,B\}$, $\{a,b\}$, S , $\{S \rightarrow S|aB, A \rightarrow AB|aA\}$)



Question 2

10 / 10 pts

The following 4-tuple regular grammar is given:

$G = (\{S,A,B\}, \{a,b\}, S, \{S \rightarrow AB, A \rightarrow aA|a, B \rightarrow bB|b\})$

Assume that L is the regular language generated by this grammar. Which string(s) will not belong to L ?

- ☐ aaaabb

- ☐ abbbbbbb
- ☒ aaaabbbbba
- ☒ ababababab



Question 3

20 / 20 pts

Which statement(s) would be **correct** about different types of languages, automata, and grammars?

- ☒ Recursive Enumerable Language is the language that includes all strings that can be generated by using a Turing Machine as automaton.
- ☒ Regular Language is the language that includes all strings that can be generated by the Regular Grammar.
- ☐ Context Free Grammar is a Type-1 grammar in the Chomsky categorization of grammars.
- ☒ Pushdown Automaton is more powerful than the Finite State Machine.
- ☒ Regular Grammar is a Type-3 grammar in the Chomsky categorization of grammars.
- ☐ Context-Free Language is a higher level language than the Context-Sensitive Language.

The following automata become more powerful from left to right:

- ☒ Finite Automaton / Pushdown Automaton / Linear Bounded Automaton / Turing Machine



Question 4

15 / 15 pts

Assume that we want to use the **Pumping Lemma** to prove the language L is not a regular language.

Here are the steps we follow:

1. We assume that L is a regular language with a pumping length value of P .

2. We define a string in the language L , called S such that $|S|$

3. We consider all different cases that string S can be divided into three segments:
 $S = x.y.z$

for all these cases, the following conditions can not be satisfied at the same time:

$$|y| > 0 ; |x.y| \leq P ; x.y^i.z \in L \text{ for all } i = 0, 1, 2, 3, \dots$$

$i = 0, 1, 2, 3, \dots$

therefore L cannot be a regular language.

Answer 1:

$\geq P$

Answer 2:

$\leq P$

Answer 3:

L

Quiz Score: 55 out of 55