NOM POUPA

Prénom Adrien

Promo M1 2018

Date 12/04/17

POUPA Adrien
M1 - 2016

MATIÈRE Introduction to linguistic

This contains the subject (2 pags)

POUPA
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Introduction to Linguistic
Patryk Kiepas

Exam
12 April 2017

7. (3 points) **Describe the language** $L(G)$ generated by grammar G. Only a set of production rules P is given. S is a *start rule*.

$$S \rightarrow aS \mid bS \mid aA$$
$$A \rightarrow aB \mid bB$$
$$B \rightarrow \epsilon$$

Put your solution here:

This grammar validats words that can loop through a and b from 0 to some number, then a "a", then a final "a" or "b".

$L = \{a, b\}^* a \{a, b\}$ 3

Sample words: aa, ab, aaa, bb, ba, bab, etc...

8. (4 points) Given a description of a language L create grammar G that generates the language $L(G)$. **List a set of production rules** P. Make rule S a *start rule*.

$L = \{a, ab, abc, abca, abcab, abcabc, abcabca, abcabcab, abcabcabc, \ldots\}$

Put your solution here:

$S \rightarrow aB \mid a$

$B \rightarrow bC \mid b$

$C \rightarrow cS \mid c$ 4

These rules make a word start by "a", then either stop there, or append a "b", or append a "b" and stop there, or append a "c" and stop there, or append a "c" and start from the begining meaning appending another "a" and so on.

9. (4 points) **Assign grammar class** to each grammar example:

1.	$S \to SAB \mid AB$ $A \to Aa \mid a$ $B \to Bb \mid b$	○ Regular grammar ○ Context-sensitive grammar ○ Unrestricted grammar ● Context-free grammar
2.	$S \to Sa \mid Sb \mid \epsilon$	● Regular grammar ○ Context-sensitive grammar ○ Unrestricted grammar ○ Context-free grammar
3.	$S \to LBRP$ $B \to BB$ $BR \to RCC$ $LRC \to aLR$ $aLRP \to a$	○ Regular grammar ○ Context-sensitive grammar ● Unrestricted grammar ○ Context-free grammar
4.	$S \to aSBa \mid aba$ $aB \to Ba$ $bB \to bb$	○ Regular grammar ● Context-sensitive grammar ○ Unrestricted grammar ○ Context-free grammar

Question	Points	Score
1	3	3
2	1	1
3	1	0
4	1	1
5	1	1
6	2	2
7	3	3
8	4	4
9	4	4
Total:	20	19

19

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Introduction to Linguistic **Exam**
Patryk Kiepas **12 April 2017**

Answer the questions in the spaces provided. **Question with choices have only one correct answer.** Exam will take **1 hour and 45 minutes.**

Name and surname [CAPS LOCK]: POPPA ADRIEN

1. (3 points) **Give three examples** of alphabets:
   1. $\Sigma = \{a, b\}$ +
   2. $\Sigma = \{0, 1\}$ +
   3. $\Sigma = \{a, b, 0, 1\}$ +

   3

2. (1 point) **What is the length** of the word that consists of three empty words $|\epsilon\epsilon\epsilon| = ?$
   - (●) 0 +
   - ( ) 1
   - ( ) 3

   1

3. (1 point) Given an alphabet $\Sigma = \{x, k\}$ **what is the closure Σ^* over this alphabet** (*Kleene closure/star*)?
   - ( ) $\Sigma^* = \{\epsilon\}$
   - (●) $\Sigma^* = \{\epsilon, x, k\}$ —
   - ( ) $\Sigma^* = \{\epsilon, x, k, xk, kx, xx, kk\}$
   - ( ) $\Sigma^* = \{\epsilon, x, k, xk, kx, xx, kk, xkx, xkk, kxk, kxx, xxk, xxx, kkk, kkx, xkxk, xkxx, \ldots\}$

   0

4. (1 point) **Which language L_i cannot be build** over a binary alphabet $\Sigma = \{0, 1\}$?
   - ( ) $L_1 = \{\epsilon\}$
   - ( ) $L_2 = \{0, 00, 000, 0000, 00000, 000000, 0000000, 00000000, 000000000, \ldots\} = \{0^n | n \geq 1\}$
   - (●) $L_3 = \{01, 012, 10, 102, 01012, 10102, 0101012, 1010102, 010101012, 101010102 \ldots\}$ +
   - ( ) $L_4 = \{\epsilon, 0, 1, 01, 10, 11, 00, 010, 011, 100, 101, 110, 111, 000, 001, 0100, 0101, 0110, 0111, \ldots\}$

   1

5. (1 point) What is the **set of terminals V_T** for grammar G defined with production rules $P = \{S \to aS, S \to b\}$?
   - ( ) $V_T = \{\epsilon\}$
   - ( ) $V_T = \{S\}$
   - ( ) $V_T = \{S, a, b\}$
   - (●) $V_T = \{a, b\}$ +

   1

6. (2 points) **Arrange grammars in Chomsky's hierarchy** (1-4) from the the most restrictive (1) to the least restrictive (4):

   + 1 Regular grammar
   + 3 Context-sensitive grammar
   + 4 Unrestricted grammar (recursively enumerable)
   + 2 Context-free grammar

   1