

First Assessment (October 2010)

<i>LAST NAME(s)</i> (Capital letters)			
<i>FIRST NAME</i> (Capital letters)			
NIA		DNI	

INSTRUCTIONS FOR THE EXAM

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- Read these instructions carefully before starting the exam.
 - Do not forget to write your name, NIA and DNI in every answer sheet.
 - Pay attention to what it is asked in each question and/or problem, given that it is not the same: to explain, to list, to describe, to define, etc., always, sometimes, at least.
 - **The duration of the exam (Test + problems) is 45 minutes.**
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Problem 1 (3.5 points)

1.1 Given the following grammar $G = (\{a,b\}, \{S,A,B\}, S, P)$ with P:

$$S ::= Aba$$

$$A ::= a$$

$$Ab ::= AAbA \mid ABb \mid AbB$$

$$B ::= A \mid AB$$

Prove that it is an ambiguous grammar.

1.2 Given the following grammar with axiom H:

$$H ::= aH \mid FG$$

$$F ::= bF \mid bcb$$

$$G ::= Gb \mid c$$

- Indicate the type of grammar in the Chomsky Hierarchy. Explain in detail.
- Detail the language that it generates.

1.3. Indicate a grammar to generate palindromes over the alphabet $\{0, 1\}$. Describe which is the type of the grammar in the Chomsky Hierarchy.

Problem 2 (4 points)

Calculate a well-formed grammar equivalent to the following one, explaining in detail whether the different problems are present or not and the respective solution.

$$G = (\{0, 1, 2\}, \{S, A, B, C, D\}, S, P)$$

$$P = \{(S:=AABC), (A:=\lambda \mid 1A0), (B:=1B \mid 1), (C:=1C1 \mid 0C0 \mid \lambda), (D:=C)\}$$