

Formal Languages and Automata Theory

Second Assessment – November 2010

(Duration: 45 minutes)

LAST NAME(s) (Capital letters)			
FIRST NAME (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. An identifier in C language can be expressed as a letter whether followed by any number of letters and/or numbers or not.
 - a) Write a regular expression to denote any valid identifier for this programming language.
 - b) Use subset construction to generate a NFA for the previous regular expression. Show the complete process and explain in detail.
 - c) Obtain and represent an equivalent DFA applying the corresponding algorithm (NFA \rightarrow DFA) and explaining the process in detail.
 - d) Obtain an equivalent minimal DFA by calculating the equivalence relationships and quotient sets. Explain the process in detail.
 - e) Obtain a regular grammar from the DFA by applying the corresponding algorithm (DFA \rightarrow G3 grammar).
 - f) Write the characteristic equations of the obtained minimal DFA, solve the system of equations and verify that the obtained regular expression generates the same language that the one defined in section a).