



**Universidad de Puerto Rico
Recinto Universitario de Mayagüez
Departamento de Ingeniería Eléctrica y Computadoras**

**ICOM 4036 – Programming Languages
Otoño 2004**

**Ejercicios de práctica
Examen Parcial I**

1. Write finite state diagrams to recognize the following languages:
 - a. Sequence of 0's and 1's containing the pattern "010111". Careful with overlapped patterns
 - b. Identifiers that begin with letter or underscore followed by letters, digits or underscore, and ending with a dollar (\$) sign.
 - c. Integer constants that are divisible by 5
2. Write a BNF for C++ variable declarations
3. Write a BNF for C++ statements. You may assume that a non-terminal <expression> has already been defined.
4. Write a BNF for C++ classes using the BNF's from (2) and (3)
5. Write recursive descent parsing functions in the style of Sebesta (see lecture notes) for each of the BNF non-terminals defined in (2), (3) and (4).
6. Design a state diagram to recognize all numeric literals in ANSI C
7. Consider the following grammar:

stmts	→	<stmt> ; <stmts>
		<stmt>
block	→	begin <stmts> end
stmt	→	<if_stmt> <block> ...
if_stmt	→	if (<expr>) then <stmt> else <stmt>
		if (<expr>) then <stmt>
expr	→	<expr> + id
		id

- Prove that the grammar is ambiguous.
- Provide a new unambiguous grammar that generates the same language and whose parse trees correspond with the semantics of nested if-then-else in Pascal

8. PLP Exercise 2.3

9. PLP Exercise 2.4

10. PLP Exercise 2.6

11. PLP Exercise 2.11

12. PLP Exercise 2.12

13. PLP Exercise 2.17

14. PLP Exercise 2.22