

ICOM 4036 – Programming Languages

Problem Set 1

Lexical and Syntactic Analysis

Due on Tuesday March 9 Midnight

Objectives

- Gain experience with the specification of the lexical structure of a programming language
- Gain experience with the specification of the syntactic structure of a programming language
- Understand the concepts surrounding the processes involved in the syntactic analysis of programs

Questions

1. Design a state diagram to recognize all numeric literals in ANSI C
2. 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

- (a) Prove that the grammar is ambiguous.
 - (b) 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
3. Sebesta problem set question 3.13
 4. Sebesta problem set question 3.14

Submitting your responses

You should submit a gzipped word file titled “4036_ps1.gz” with your typewritten answers using the submit program.

Remember from the prontuario that your assignments will be graded according to the following late penalty policy:

Days Late	Percent Deduction
1 day late	25%
2 days late	50%
3 days late	100%

Assignments will be graded for both correctness and quality according to the following weights:

Criteria	Weight (%)
Correctness	60%
Design	20%
Efficiency	10%
Style & Documentation	10%