Laurea Magistrale in INFORMATICA
Principi di Linguaggi di Programmazione
Compiler Techniques

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Regular Exam V - July 18th 2014

(Available Time: 2 hours. Mandatory: In each exercise get at least, one half of the assigned points)

Exercise 1 (pts 10). Let E1 = ((b | a) c*)* and E2 = (a | b | c)*.

a) Using dotted automata, provide a proof of the equivalence of E1 and E2;
b) Apply to E1, the method for transforming DFSA into right-linear grammars.
c) Show the LL(1) parsing table of the grammar You obtain in (b).

Exercise 2 (pts 10). Let L be the following language:

$L = \{a^{n1}\ c\ \ldots\ a^{nk}\ c\ b^{m} d^{n-m} \mid k \geq 1, n = n1+\ldots+nk, (\forall i: 1 \leq i \leq k)\ ni > 0\}$

(a) Provide a LR grammar G for L;
(b) Provide the collection Coll(1) of G
(c) Looking at the collection, answer:
[1] is G an LR(1) grammar?
[2] is G a LALR(1) grammar?
[3] is G a SLR(1) grammar.

Exercise 3 (pts 10). Extend the language "Semplice" with the multiple assignment defined below

Cmd ::= MUpd
MUpd ::= Ide IdeList := Exp ExpList
IdeList ::= , Ide Idelist | ε
Exp ::= , Exp Explist | ε

Multiple assignement requires that the number of the identifiers on the left hand of := is the same of the number of expression on the right hand. Moreover, it behaves like any arbitrary sequence of assignments "$ide_i := exp_i$" where $1 \leq i \leq n$, ide_i (resp. exp_i) is the i-th identifier (resp. expression) of the list on the left (resp. right) hand of :=.

1) Provide a translation scheme of the productions above, with attributes that:
   a) check whether or not the requirement on the size of the lists is satisfied;
   b) produce, by side-effects, the 3AC code of the multiple;
2) Apply the translation in 1.b) to the multiple assignment:
   x,y := 10,x+y
   and show the generated 3AC code.