German University in Cairo
Department of Computer Science
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CSEN1002 Compilers Lab, Spring Term 2022
Task 9: ANTLR Parsing I

Due: Week starting 29.05.2022

1 Objective

For this task you will use ANTLR (`www.antlr.org`) to implement an SDD for the following problem. ANTLR documentation is available here:

`https://github.com/antlr/antlr4/blob/master/doc/index.md`

2 Requirements

- You are required to use ANTLR to implement the SDD appearing below for a CFG that generates the language $\mathtt{a}^*\mathtt{c}^*\mathtt{b}^*$.

S	$\longrightarrow$	ACB	$S.check = equals(A.n, B.n) * equals(A.n, C.n)$
A	$\longrightarrow$	$\mathtt{a}A_1$	$A.n = A_1.n + 1$
A	$\longrightarrow$	ε	$A.n = 0$
B	$\longrightarrow$	$\mathtt{b}B_1$	$B.n = B_1.n + 1$
B	$\longrightarrow$	ε	$B.n = 0$
C	$\longrightarrow$	$\mathtt{c}C_1$	$C.n = C_1.n + 1$
C	$\longrightarrow$	ε	$C.n = 0$

- The start variable S has an attribute *check* whose value is 1 if the generated string is of the form $\mathtt{a}^n\mathtt{c}^n\mathtt{b}^n$, and is 0 otherwise.
- The only operations allowed on attributes are assignments, additions, multiplications, and equality checks; an equality check is an expression of the form $equals(x, y)$ whose value is 1 if x is equal to y and is 0 otherwise.
- Important Details:
  - Your implementation should be done within the template file which is uploaded to the CMS.
  - You are not allowed to change the already provided grammar, parser rule, or attribute names or types.
  - You are allowed to write as many helper lexer/parser rules within the same grammar file (if needed).
  - Public test cases have been provided on the CMS for you to test your implementation.
  - Please ensure that the public test cases run correctly without modification before coming to the lab to maintain a smooth evaluation process.

- A java file is provided in order to easily test your grammar with custom strings in addition to the public test cases.
- Private test cases will be uploaded before your session and will have the same structure as the public test cases.

3 Evaluation

- Your SDD will be tested using ten inputs.
- You get one point for each correct output; hence, a maximum of ten points.

4 Online Submission

- You should submit your code at the following link.

`https://forms.gle/NyoeZ8jad5JjvZWL9`

- Submit one file "`Task9.g4`" containing executable code.
- Online submission is due on Thursday, June 2, by 23:59.