Project 2 Report

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Abstract: The project demonstrates implementation of context flow grammar and push down automata. In this project, context flow grammar (CFG), the conversion of CFG to push down automata (PDA) should be implemented and processed with given inputs. The project should also evaluate the performance of two equivalent grammers Gb and Gcnf that are in general and CNF, respectively. It should be done by counting the total number of derivation step required to decide a string, and whether Gb with stpc, and stpb bounds are able to match the answer of Gcnf.

Experimentation Results:

Table 1: Empirical evaluation for 'L1Gb, L1cnf' benchmark file

G_{type}	eval 1_1		eval 1_2		eval 1_3	
	$S \Rightarrow w_1$	# deriv	$S \Rightarrow w_2$	# deriv	$S \Rightarrow w_3$	# deriv
G_c	No	timeout	No	timeout	No	timeout
G_b	No	timeout	No	timeout	No	timeout
G_{cnf}	No	timeout	No	timeout	no	timeout

Table 2: Empirical evaluation for 'L2Gb, L2cnf' benchmark file

G_{type}	eval 2_1		eval 2_2		eval 2_3	
	$S \Rightarrow w_1$	# deriv	$S \Rightarrow w_2$	# deriv	$S \Rightarrow w_3$	# deriv
G_c	yes	84	no	-1	-1	no
G_b	yes	84	no	-1	-1	no
G_{cnf}	no	3	no	3	no	3

Table 3: Empirical evaluation for 'L3Gb, L3cnf' benchmark file

G_{type}	eval 3_1		eval 3_2		eval 3_3	
	$S \Rightarrow w_1$	# deriv	$S \Rightarrow w_2$	# deriv	$S \Rightarrow w_3$	# deriv
G_c	No	44	no	44	no	64
G_b	No	44	no	44	no	64
G_{cnf}	yes	46	yes	47	yes	71

Discussion: For Language 1, the PDA looped on input strings as the rule choices never derivd a string, which is why it shows timeout on the number of derivation steps. For Language 3, all the inputs were able to be derived with the 2n-1 steps given as bound.