

Question 1

Consider the following grammar:

$$\begin{aligned} S &\rightarrow A a \\ A &\rightarrow d a b \mid B b \\ B &\rightarrow c A \mid S c \end{aligned}$$

- Explain why this grammar is not LL(1)
- Write an LL(1) grammar that accepts the same language and build for it a parse tree to the input "ccdabba"

Question 2

Consider the following grammar G:

$$\begin{aligned} S &\rightarrow A \\ A &\rightarrow b \mid c D \\ D &\rightarrow a \mid A a \mid A; D \end{aligned}$$

- Is G in LR(0) ? If No, convert this grammar to LR(0)
- Develop an LR(0) parser for the grammar and apply your parser to the inputs "cba;ba" and "ccabba"

Question 3

Consider the following grammar G:

$$\begin{aligned} S &\rightarrow B \\ B &\rightarrow B \& B \\ B &\rightarrow B \mid B \\ B &\rightarrow B \wedge B \\ B &\rightarrow \sim B \\ B &\rightarrow t \\ B &\rightarrow f \end{aligned}$$

- Try to construct an LR(0) parser for G. Can you make it? explain what is the problem
- Write a non ambiguous grammar that accepts the same language and define the operator's precedence and associativity using the table below. Note that priority 1 is the highest, and priority 4 is the lowest. Try to construct an LR(0) parser for your new grammar and show what is the problem.

Priority	Operator	Associativity
1	\sim	left
2	$\&$	left
3	\wedge	left
4	\mid	left

- Bonus: Try to build parse trees to the inputs " $t\&f\mid f\wedge$ " and " $t\mid t\&f\wedge t$ " using your new grammar

GOOD LUCK