

1. Work in groups of 2–4 people. List the members of your group below. Underline your name.
2. Consider the following context-free grammar.

$$\begin{aligned} S &\rightarrow S S S F \mid i \mid n \\ F &\rightarrow + \mid - \mid * \mid / \mid ** \end{aligned}$$

- (a) For each symbol used above, indicate whether it belongs to the *language* (defined by the grammar) or the *metalanguage* or the *meta-metalanguage*.
- (b) For each of the following *sentences*, state clearly whether the sentence is *valid* (belongs to the language of the grammar). If it does then provide a leftmost derivation for it; else explain (as precisely as possible) why it does not. Ignore all white space.
 - (1) `i n i + i n * i /`
 - (2) `i i i n n n * * * * *`

3. For each sentence (if any) of Question 2 that is not valid, make as small a change as possible to yield a valid sentence. Then provide a parse tree for each.

4. Repeat Question 3 but provide abstract syntax trees (ASTs) instead of parse trees.