

Challenge Activity 8 – Context Free Grammars (CFGs)

1. Consider the following section of a CFG of a programming language based on the C programming language:

$$\begin{aligned} S \rightarrow & \text{if (E) S} \\ & | \text{if (E) S else S} \\ & | \text{O} \end{aligned}$$

Where E and O represent grammar variables associated with expressions and other statements of the language, respectively.

- (a) Considering only the productions of the S variable, could you say that this CFG is ambiguous? Justify your answer.
- (b) The semantic of C-type if-else statements associates (when not using brackets to enforce another association) the else branch to the previous nearest if. Do the presented productions enforce by default that association? Justify your answer. If not, change this section of the grammar in order to ensure that association.