

1994 Paper 4 Question 2

Programming Language Compilation

Carefully describe how to construct the precedence matrix for a given grammar, illustrating your answer by investigating whether the following is a precedence grammar.

$$\begin{aligned} S &\rightarrow a P Q b \mid c Q P d \\ P &\rightarrow X \\ Q &\rightarrow Y \\ X &\rightarrow p \mid X x Y \\ Y &\rightarrow q \mid y Y z \end{aligned}$$

[10 marks]

Explain why replacing the productions

$$S \rightarrow a P Q b \mid c Q P d$$

by

$$S \rightarrow a X Y b \mid c Y X d$$

would introduce conflicts in the precedence matrix.

[2 marks]

Give a detailed description of a parsing algorithm that uses a precedence matrix.

[8 marks]