Term Rewriting Systems
Exercise Sheet 6
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Exercise 25
Let \( u, x, y, \) and \( z \) be variables. Use the unification algorithm recalled in the lecture to solve the following two unification problems:

a) \( S_1 := \{ f(h(x), g(x, u)) =? f(z, g(f(y, y), z)) \} \)

b) \( S_2 := \{ h(x, g(x, y), y) =? h(x, g(a, y), y), z =? h(x, g(x, b), b) \} \)

Exercise 26
From the unification algorithm recalled in the lecture, design a direct decision procedure for the matching problem.

Hint: ‘Direct’ means that no constants are introduced in the right term. Instead, the rules are to be modified such that the new algorithm returns ‘the input terms do not match’ or a matcher for the input terms as soon as possible.

Exercise 27
Prove the undecidability of the uniform halting problem by a reduction of the halting problem.