2006 Paper 6 Question 10

Foundations of Functional Programming

(*a*) What does the combinator expression `S S S S S S` reduce to? Explain your working carefully. [4 marks]

(*b*) What would you get if you had a sequence of n `S` combinators (part (*a*) is the case $n = 6$)? [5 marks]

(*c*) If you start with a sequence of `K` combinators of general length n, as in the expression `(K K K K K K)` that arises when $n = 6$, what will the expression reduce to? [3 marks]

(*d*) Now what about sequences that start `S K S K S K` in cases where n instances of `S` alternate as shown with n of `K`? You should certainly include in your answer a tabulation of results for some small values of n. [8 marks]