Computer Science & Engineering 505
Concepts of Programming Languages
Assignment 2
Oct 5, 1994
Due: October 12, 1993

1. Write a polymorphic abstract type sorted_list in Miranda, using the abstype facility. Its signature should include empty, isempty, member, insert, remove, and sorted_map functions. Notes: member should take advantage of the list being sorted; sorted_map is like the ordinary map but works on sorted lists, and should return a sorted list. Test your data type for several element types, including numbers and strings.

2. (a) Using the basic algorithm described by Turner in his paper "A New Implementation Technique for Applicative Languages" (i.e. using only the **S**, **K** and **I** combinators), give the variable-free form of the function

   square x = x*x

   (b) Show the result of applying this expression to 5.

   (c) Give the optimized form for square (using the additional **B** and **C** combinators).

   (d) Show the result of applying the optimized expression to 5.