Foundations of Computer Science

Give the declaration of an ML datatype that could be used in the representation of a lazy list of integers, and illustrate its use by defining a function ints that when given an argument n yields a lazy list of integers from n to infinity.  

The decimal representation of a real number in the range 0 to 1 is to be represented as an infinite sequence of the decimal digits following the decimal point (0.\,d_1\,d_2\,...). Define a function mknumb which when applied to the digit function dig will construct a lazy list of these digits where the i\textsuperscript{th} digit (d_i) is given by dig i.  

Suppose we have an infinite sequence of such numbers \([r_1, r_2, \ldots]\), in which the digits of the decimal expansion of \(r_i\) are given by the digit function \(f_i\), and that the collection of digit functions is represented by the lazy list \([f_1, f_2, \ldots]\). Define suitable datatypes for the list of numbers and the list of digit functions.  

Define a function newnumb which when given the lazy list of digit functions will yield a lazy list of digits that have the property that its i\textsuperscript{th} digit differs from the i\textsuperscript{th} digit of \(r_i\).