CSC C78F 2000
Assignment 4, alternate question

due: Wednesday, November 22, 2000

Consider the abstract data type DEPR that consists of a set S of positive integers upon which the following two operations can be performed:

DELETE(S, i)**:** Delete the integer i from the set S. If $i \notin S$, then do nothing.

PREDECESSOR(S, i)**:** Return the predecessor of integer i in S, i.e. $\max\{j \in S | j < i\}$. If i has no predecessor in S, i.e. if $i \leq \min S$, then return 0.

Initially, S is a set of n consecutive integers. Describe a data structure with $O(\alpha(m, n))$ amortized cost per operation, where α is the inverse of the Ackermann function and m is the number of operations that are performed. Justify the correctness and complexity of your data structure.

How do you initialize your data structure and how much time does it take?