Foundations of Computer Science

This question has been translated from Standard ML to OCaml

The variant type pri defined below is to be used for the representation of priority queues which are finite or infinite ordered sets of integers.

```ocaml
type pri = E
  | N of int * (unit -> pri)
```

Define an OCaml function `intfromto i j : int -> int -> pri` which will return a representation of the ordered set of integers

```ocaml
{ i, i + 1, ... , j }
```

Define the function `first p : pri -> int` that will return the first (and hence smallest) integer in the given queue `p`, and `rest p : pri -> pri` that will return (if possible) a representation of the given queue `p` with its smallest element removed.

Your implementation should be such that the expression

```ocaml
first (rest (intsfromto 20 1000000))
```

should evaluate efficiently.

Define an OCaml function `ins i p : int -> pri -> pri` which will return a priority queue with the integer `i` inserted in the proper position of the given queue `p`.

[10 marks]