The structure of a binary tree containing integers at some of its leaves is given by the ML datatype T defined as follows:

\[
\text{datatype } T = X \mid N \text{ of } \text{int} \mid D \text{ of } T*T;
\]

Define a function \texttt{filter} of type \((\text{int } \to \text{bool}) \to (T \to T)\) with the property that the call \texttt{filter p t} will yield a simplified copy of \(t\) by repeated application of tree rewrite rules:

\[
D(X,a) \to a \quad D(a,X) \to a
\]
on the tree obtained from \(t\) by replacing all leaf nodes of the form \(N \ k\) for which \(p \ k\) yields \text{true} by \(x\). Thus, for example:

\[
\text{filter (fn n => n=0)}
\]
should yield a function that converts \(D(D(N0,N0), D(D(N2,N0), N3))\) to \(D(N2,N3)\).