A tree can be implemented by listing its items in breadth order.

(a) Implement a binary tree by a list of its items such that the root is at index 0 and the left and right subtrees of an item at index \( n \) are rooted at indexes \( 2n+1 \) and \( 2n+2 \).

§ surprisingly hard due to many fiddly details

(b) Prove your implementation.

(c) Generalize this implementation to trees in which each item can have at most \( k \) branches for arbitrary (but constant) \( k \).