1.1. Problem (8)  
Efficient broadcasts

Let $p$ be a power of two. Assume that a node has to broadcast a message to its $p - 1$ colleagues. Is it a good idea to organize the broadcast by a binary tree or are more general tree shapes better?

You may assume that a node can send its data to exactly one other node in a single time step.

1.2. Problem (8)  
Prefix problems

Show how to solve the prefix problem on the complete binary tree $T_k$.

Hint: observe that a nephew link is inserted for a left child only.

1.3. Problem (8)  
The Dyck language

We recursively define the language of a well-formed brackets:

- () is well formed,
- if $K_1$ and $K_2$ are well-formed, then so is $(K_1)$ and $K_1K_2$.

Describe a fast parallel algorithm to decide whether a given expression of brackets is well-formed.