DISTRIBUTED ALGORITHM

Assignment 02

Group Members:
Xugang ZHOU
Fangzhou YANG
Yuwen CHEN

Tutor:
Daniel GRAFF

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Distributed Algorithm

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1   Echo

The basic idea of improvement of the Echo-Algorithm by sending taboo nodes is to avoid the visit of nodes which are known to be visited by other exploers.

- **a. Ring with n nodes**

  In this structure, the number of edge and the number of nodes are both n, so the needed number of messages for a normal Echo-Algorithm is 2n. For Echo-Algorithm with taboo nodes, it only needs n messages, because the message goes only forwards.

- **b. Binary X-tree of height h**

  In this structure, the number of nodes $n = 2^{h+1} - 1$, the number of edges $e = 2n - h - 2 = 2^{h+2} - h - 4$, so the needed number of messages for a normal Echo-Algorithm is $2 * n = 2^{h+2}$.

  For Echo-Algorithm with taboo nodes, because of the taboo nodes, the messages will not be delivered between sons of a same parent, therefore the number of needed messages is $2 * (n - (2^h - 1)) = 2^{h+1}$