Weekplan: Distributed Algorithms II

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References and Reading

[1] Linial's Lower Bound Made Easy

[2] Sinkless Orientation Made Simple

[3] Jukka Suomela: Distributed algorithms (latest version).

We recommend reading [1] and [2] in detail.

Exercises

1 List-colouring. Consider a generalisation of k-colouring. Now, each vertex has its own personal pallette of k colours, but not necessarily the same k colours as its neighbour.

A graph is k-choosible if any for set of k-sized pallettes, there is a proper colouring of the graph assigning to each vertex a colour from its own pallette.

The algorithm for finding such a pallette-respecting colouring is called a k-list colouring algorithm.

1.1 Can you 3-list colour a path? Give an efficient distributed algorithm. Analyse how few rounds are needed.

1.2 Can you $f(\Delta)$-list colour a graph of maximum degree Δ? For which function $f(\Delta)$? Give an efficient distributed algorithm. Analyse the number of rounds needed. Can you make the number of rounds not depend on Δ?

2 Exercises from [3]. Solve exercise 6.1, 6.3, 6.4, 6.5, 6.6
(If time permits, 6.7*.)

3 Exercises from [3]. Solve exercise 10.1 (a) and (b), and exercise 10.5.
(If time permits, see 10.8*.)