



BA/SA/Group/Lab:

Dynamic Directories

It is summer time and people need ice-cream, every now and then. Unfortunately, there is a remote village that has only a single ice-cream vendor and he takes his little cart around the village to make people happy. To reduce his manual effort, we do not want him to go around the village where the residents do not need ice-cream at that moment. Also, we do not want the residents to search the whole village for the vendor when they need ice-cream. Ideally, the person who wants an ice-cream should be able to request a nearby neighbor, who is waiting for the vendor as well, to “forward” the vendor when he arrives.

At the heart of the above problem is a fundamental problem of building a distributed directory which can be used to share a resource within a network of nodes. Simple and elegant solutions have been proposed for this problem when the network is a tree. However, this is not so true when the network is not a tree. For example, imagine that the village is circular. The vendor will have a terrible time if we restrict him to use a tree as there might be repeated ice-cream requests just across the missing edge.

The goal of the thesis would be to develop simple and efficient algorithms to solve the above problem for general networks. To quantify the efficiency of the algorithm, we compare it against the hypothetical case when the ice-cream vendor is aware of the locations of future requests. In other words, we want to design an online algorithm that competes well with an optimal offline algorithm that knows the future. We already have some ideas to start with but your ideas are always welcome.



Figure 1: Ice-cream!

Requirements: Interest in graph theory, online algorithms and using your favorite programming language to simulate and test hypothesis.

Interested? Please contact us for more details!

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