ETH
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Distributed Computing

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# Ad Hoc And Sensor Networks
# Sample Solution to Exercise 4

Assigned: October 18, 2010
Due: October 25, 2010

## 1 Dozer

There is no one single correct answer to this question but many possible arguments may be valid. The following reasons are the most relevant aspects which made us build Dozer the way it was introduced in the lecture.

a) Synchronizing beacons of independent schedules results in multiple undesirable effects. Dozer is a strictly local algorithm. If a node changes its parent (and thus its position in the data gathering tree) this has no influence on its role as a parent. Hence sub trees rooted at this node do not have to change their schedules in any way. If beacons were synchronized with their parent beacons, this would no longer be the case.

a) Dozer has no included collision avoidance mechanism. Instead relatively low data rates and random distribution of traffic result in low collision probabilities. If the beacons were synchronized the collision probability of beacons from different sub-trees would grow significantly. Hence an additional mechanism for collision avoidance would become necessary (also see next question).

b) The most simple solution is *not* to tweak the existing protocol for fast broadcasts but to extend the system by an additional broadcasting mechanism. Without going into details one may assume that beacon messages contain an additional field indicating the time of the next broadcast. At this time all nodes in the network wake-up and a participate in an arbitrary broadcast protocol. Obviously this global synchronization of the network is less precise than the strictly single-hop synchronization of Dozer. Hence, also the necessary activity time for a broadcast is much higher than the one for a common data/beacon transmission. The frequency at which broadcasts occur and the maximal allowable delay for one broadcast have an impact on parameters such as the network wakes-up frequency.