Hemuppgift datakom 3 wireless sensor networks

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10 points, 5 needed
Deadline: Jan. 13, kl 16

1 Question 1, 3 points

What is the *main* difference between RFID technology and the sensor networks
discussed in the seminar? Hint: think about a product in a shop equipped with a
RFID tag or with a sensor node attached to it. What fundamentally different way
of communication is possible?

2 Sensor network, 7 points

The figure shows a network in which each node peridically sends data to the base
station (node 1) in a multi-hop fashion. A simplified example is shown where only
nodes in the top row send data. No data aggregation takes place. So the node to
the right (node 4) sends one packet. Node 3 must receive one packet and sends 2
packets: its own and node 4's packet. Node 2 must send 3 packets and receive 2.

Assume now, that all nodes except the base station have a limited but the same
amount of energy and that idle listening does not consume energy, so only trans-
mitting and receiving packets costs energy. Equal for transmitting and receiving.

Questions:

- Describe the best routing scheme assuming nodes can only send to the neigh-
  bours on the same row or column, not diagonal.
  Hint: this is not one of the energy-efficient routing schemes discussed in the
  lecture, but rather a static (pre-computed) one.

- Which nodes run out of energy first?

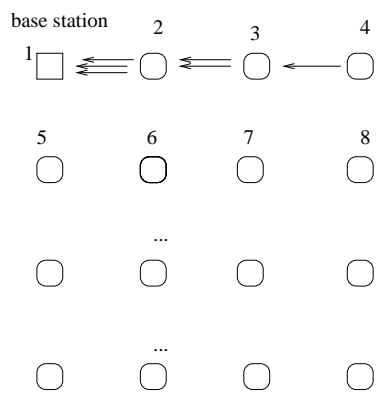- Describe some ways to extend the lifetime of the sensor network?

Figure 1: Network