

Exercises of lecture
Wireless Sensor Networks
Winter 2006/2007
Sheet 6

SECTION 1:

Preamble Sampling, TRAMA

1. Based on the diagram that represents the worst case scenario on the next page, the following data is given for each sensor node in a wireless sensor network to collect the temperature and moisture level of a forest:

Average number of data collection event: 10 events per minute

Number of message(s) per event, m : 1 message per event

Preamble interval = Listening interval + Sleeping interval

Listening interval = 0.05 s

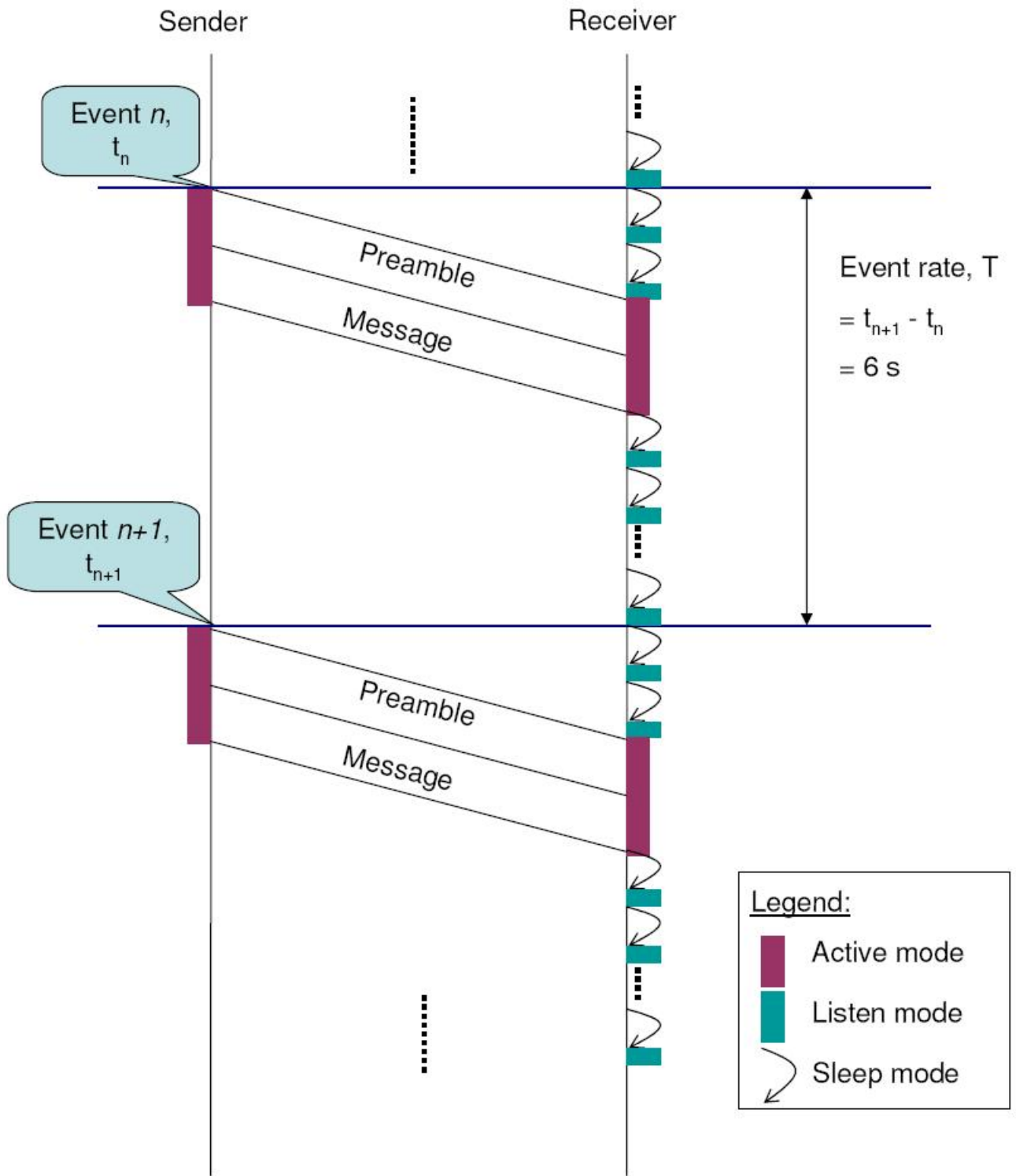
Power needed for Listening mode, $P_{Listen} = 0.8$ W

Power needed for Receiving mode, $P_{Receiving} = 0.9$ W

Power needed for Transmitting mode, $P_{Transmitting} = 2$ W

Preamble interval and message interval are always the same, which is equal d .

- (a) Find the optimum value for the preamble signal, d for this particular application? [Hint: Refer to slide 61 of 64 on Lecture 8 at <http://download.informatik.uni-freiburg.de/lectures/WirelessSensorNetworks/2006-2007WS/LectureRecordings/Flash/WSN-08/WSN-08.html>]
- (b) Similarly, find out the optimum value for the preamble signal if the message interval is always the double of that of the preamble interval.
- (c) With the preamble, the transmission and reception length are increased. Will it have impact on collision?



2. TRAMA is a MAC protocol which is based on TDMA. In TRAMA each node knows schedule and priority of its two hops neighbors within a given time slot. Hence in a given time slot, a node with highest priority among nodes with data, is given chance to transmit. A PhD student claims to improve design where a node now knows schedule of more than two hop neighbors then will this new protocol will further improves the performance of TRAMA? Explain.