ECE6615: Sensor Networks
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MIDTERM EXAM: MARCH 13, 2013

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* PUT A CODEWORD NEXT TO YOUR NAME!!!
* THIS IS AN OPEN BOOK EXAM (EVERYTHING ALLOWED EXCEPT LAPTOPS AND CELL PHONES)
* DURATION 75 MINUTES
* ANSWER THE QUESTIONS RIGHT TO THE POINT;
* AVOID LONG EXPLANATIONS; COUPLE SENTENCES WILL BE ENOUGH AS LONG AS THEY ARE CORRECT!!

QUESTION 1. (20 points; 5 points each question)

a) One of the ways to save energy for communication is to deploy the transmitters and receivers close to each other? What are the two problems of this deployment?

b) Dynamic Voltage Scaling can help us to save energy? What is the downside of it?

c) Why can't we use solar cells for sensors and solve the power problem for good?

d) What is the major drawback of sensor networks that they did not create a billion dollars business so far?

QUESTION 2. (20 points; 5 points each question)

a) Where was the RMST basic idea taken from? In other words, for which networks was this idea used before?

b) What are the shortcomings of RMST?

c) In what type of sensor networks, ESRT cannot be used?

d) Is ESRT an energy efficient protocol? Why?

QUESTION 3: (30 points; 5 points each question)

a) What is the advantage of SPIN algorithm compared to Flooding? What is the gain of using SPIN?

b) What is the routing metric for all routing algorithms we handled in the class?

c) Would you use Directed Diffusion algorithm for dynamic (i.e., frequent changes of interests)? Why?

d) What type of MAC protocol can be used with the LEACH routing algorithm?

e) Are the clusters of LEACH fixed during the lifetime of WSNs?

f) What is the major criticism of Geographical Routing algorithms?

QUESTION 4.   (30 points; 5 points each question)

a) Can SMAC and BMAC solve the Hidden Terminal Problem?

b) What does CCA (Clear Channel Assessment) achieve for BMAC? What is the contribution of CCA?

c) What does Low Power Listening (LPL) contribute to the BMAC? What is the gain?

d) What is the problem of CCMAC? In what type of networks can CCMAC be used?

e) How does Z-MAC take care of the possible waste of time slots of the owners who do not have packets to transmit?

f) Why would not use ARQ protocol for error control in WSNs???