Lesson Title: Tag Architecture

Rationale
Why is this lesson important? Why does the student need this lesson? How does this lesson fit in the larger module?

RFID tags are essential components of the RFID system. Therefore, students need to know the major circuit components of a tag.

Objective(s)
What will the student know, be able to do, and value at the end of this lesson? This is smaller amounts of information than the module objectives.

The student will be able to describe the tag architecture.

Exploration
Explicit concepts related to the Module goal are explored. It is at this point that the student will be provided basic information about the topic and the chance to explore some basic concepts about the topic. This is where the instructor imparts information.

- Classify RFID tags
- Display the top-level diagram of the RFID tag circuits
- Describe each component
  - Antenna
  - Rectifier
  - Charge pump
  - Voltage regulator
  - Reset circuit
  - Demodulator
  - Envelope detector
  - Comparator
  - Ring oscillator
  - Modulator
- Introduce memory organization
Reflection
Several questions are posed to the student to answer and then often discuss as a class. This is an attempt to determine whether the student "gets" the basic concepts delivered above. If they do get it, move on to engagement. If they do not get it, go back to exploration above. It could be as simple as asking a few probing questions or as complex as asking the student to write a paper.

- How do you classify RFID tags and what are the major differences among different tag classes?
- What are the major circuit components on an EPCglobal Class-1 Gen-2 RFID tag?
- How many memory banks are on an EPCglobal Class-1 Gen-2 RFID tag and what are they?

Engagement
Concepts learned in the Exploration are further developed by conducting experiments, designing and building solutions, and solving problems. This is an attempt to cause the student to apply the new knowledge. By applying the new knowledge, the student is much more likely to retain this information. This engagement could be accomplished through a debate, an experiment, a problem solving activity, or anything else that would cause the student to demonstrate understanding and competence.

- The knowledge of memory organization will be applied and tested during lab assignments.

Expansion
Provide opportunities for students to expand the concepts to more general or global situations including connection to the Module goal. Expand back to the big ideas of the module and prepare for the next lesson.

- What kind of memory accessing protocol do you think is appropriate for RFID?

Lesson Assessment
Assess student understanding of the lesson content. This does not have to be a full-blown examination. It could be a graded homework assignment, a quiz, a performance examination, a graded problem solving activity, or something similar.

- Quizzes
- Lab assignments

Equipment
- PC running Windows
- Readers from TagSense or Intel
Software
- The developed Visual Basic user interface for the readers

References
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