Lesson Title: EPCglobal Gen2 Tag Finite State Machine

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Rationale

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

The tag finite state machine defines how readers and tags communicate with each other. Based on the knowledge about tag circuit components and memory organization, this is the core material for the students to understand the traffic between readers and tags, as well as the reader/tag behaviors under all circumstances.

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 three basic operations between readers and tags, how Gen2 accesses individual tags, and the purpose of sessions in Gen2.

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.

- The three basic operations between readers and tags
- Tag sessions
- Finite state machine
  - Ready state
  - Arbitrate state
  - Reply state
  - Acknowledged state
  - Open state
  - Secured state
  - Killed state
- Random number generator and slot counter
- Manage tag populations
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.

- What are the three basic operations between readers and tags?
- How many sessions can a tag participate during an inventory round?
- Since the power-on status of some flags are unknown by the reader, how can a reader inventory all tags in the field?
- How many states are in the FSM and what are they?
- In general, how do you access an individual tag while many tags present in the field?

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 managing tag populations will be tested in homework assignments and exams
- The knowledge of communication protocols between single reader and single tag 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.

- Can the on-tag random number generator generate “real” random numbers? If not, can you think of a way to do that?

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
- Homework assignments
- Exams
- 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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