Lesson Title: Contactless Smart Card Standards

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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?

Smart cards for identification and finance will become pervasive. They not only store digital information but also have cryptographic algorithms. Contactless smartcards use RFID so that they can be queried over the wireless media. The student needs this lesson to understand smart cards.

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 recall the frequency used by proximity and vicinity smart cards, describe the difference between proximity and vicinity smart cards, and describe the importance of FIPS 201.

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.

- Contactless Smart Card
  - Components
  - Applications
- Contactless Smart Card Standards
  - International Standards Organization (ISO)/International Electrotechnical Commission (IEC) Standards
  - Federal Information Processing Standard 201 – FIPS 201
  - FIPS 140
  - Common Criteria
  - Global System for Mobile Communication (GSM) Standards
  - Europay, MasterCard, and Visa (EMV 2000)
  - ...
- ISO/IEC 7618
- ISO/IEC 14443
- ISO/IEC 15693
- FIPS 201

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 is the standard of proximity smart cards?
• Which data rate is faster, ISO/IEC 14443 or 15693?

**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.

• Homework assignment

**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 are the security advantages of ISO/IEC 14443 over 15693?

**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.

• Homework assignment

**Equipment**

• None

**Software**

• None

**References**

• Smart Card Basics
  • http://www.smartcardbasics.com/standards.html
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