Module 1: RFID Background

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Goal/Assessment

Goal
Where are we going?  What is expected?  What will the student be able to do, know, and value at the end?

The student will be introduced to RFID, including its history.  The student will know some history, the requirements, how RFID enables the Internet of Things (ThingNet), applications, the RFID Reference Model, types of tags, security issues, social implications, and privacy concerns.

Assessment
How do we measure?  How will the student be assessed in the lessons and at the end of the module?  Use general terms.  Present this to the student at the beginning of the module.

A student should:

- Be able to list the requirements of a low-cost tag, describe the requirements of a low-cost tag, identify the major parts of a passive tag, and recall the major institutions involved with EPCglobal, Inc.
- Be able to describe how RFID enables supply chain visibility, describe how RFID enables identity systems, and describe pervasive computing and the Internet of Things (ThingNet).
- Be able to list different categories of RFID applications.
- Be able to list and describe each of the layers of the RFID Reference Model.
- Be able to describe the differences between active, passive, and semipassive tags.
- Be able to describe the motivations of RFID manufacturers, businesses that provide and use contactless payment, retailers, and consumers.
- Be able to describe attacks on RFID, describe why threats to RF devices are harder to mitigate, and generate some plausible mitigation techniques to prevent a given threat.
- Be able to describe both the good and bad implications of a transparent society enabled by RFID embedded in all objects, the main privacy threat, and the top privacy threats.
- Be able to recall the five principles of privacy, describe Alan F. Westin’s privacy classifications of individuals, and describe privacy threats by RFID.

Hook
Pique the student’s interest using a case study, interesting story, experiment, or disaster.

Case study: Discuss the original application of RFID in robotic vision.
Lessons
Divide the module into logical lessons (4-5 days). Create lessons, activities, experiments, homework and/or quizzes based on these grain size lessons.

Lesson: History of RFID
Lesson: ThingNet
Lesson: Introduction to RFID Applications
Lesson: RFID Reference Model
Lesson: Types of RFID Tags
Lesson: RFID Stakeholders
Lesson: Hacking RFID and other RF devices
Lesson: Social Implications of RFID
Lesson: Privacy Overview

Culminating Activity
Tie it all together returning to the big idea. Go full circle. Create a culminating experience that ties lessons back to the module theme. Create module-level rubric and each topic is one of the lessons below.

Quizzes.

Assessment
Assess the results using tools such as paper/pencil, programming, simulation, demonstration, experiments, and projects. Paper and pencil homework assesses what you know. Programming, simulations, demonstrations, and projects assess what you can do.

Assessment:
Use rubric based on lessons. Each lesson is a row in the rubric.
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