

Field Trip # 37

Developed by:

Subject:

Short description:

Educational Level:

Field trip type:

Educational

Outcomes:

Content:

Notes to instructor:

Digital Logic with the Program Encryption Toolkit

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Ethical Hacking

This is an NSF-sponsored hands-on learning activity where students with some knowledge of computers and programming will learn about basic digital logic and circuits and how security impacts their design.

11th – 12th Grade

Workshop

Students will be able to:

- Understand basic types of logic gates like AND, OR, XOR
- Interpret or create a truth table for a logic gate
- Understand the logic equation of a logic gate using canonical sum of products and product of sums
- Create basic components from logic gates
- Create polymorphic variants of a logic circuit
- Understand how to analyze circuits to see if they are equivalent
- Understand the security issues associated with digital logic and circuit designs

The lesson uses a custom research software called the Program Encryption Toolkit (PET) to help students visualize and create digital logic circuits and components. PET is also used to illustrate basic digital logic principles and security techniques such as obfuscation.