



Cyber Security Initiative for Nevada Teachers

Curriculum Integration Plan for Introduction to Computer Science

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Target Course

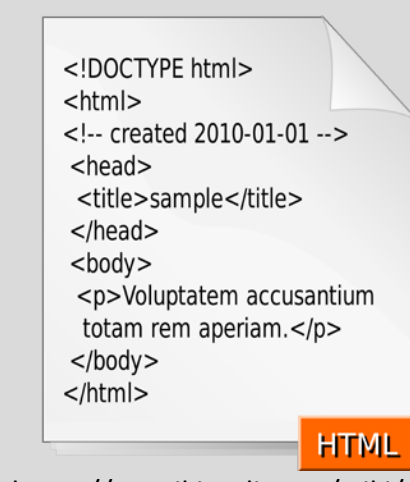
Freshman have a choice among three types of courses to fulfill the graduation requirement for computer literacy:



Digital Literacy
primary focus on educational technology



Intro to Computer Science
primary focus on how computers work and communicate



Intro to Web Design
primary focus on web layout and html

Target 2016-17: Introduction to Computer Science

Implementation

- A. 40 weeks/2 semesters
- B. 2 sections (periods 1, 7)
- C. 5 lesson extensions
- D. throughout unit 1 as extended lessons

Course Overview

This course is aimed at students with little or no computer infrastructural knowledge. Throughout the semester students will work with collaborative, hands-on activities to understand computer architecture, language, networking, and security using curriculum from Code.org's CS Principles and five lesson plan extensions created during the Cyber Security Initiative for Nevada Teachers summer program.



Lesson Overview

Computer Architecture Lesson

(follow up extension to Unit 1, Lesson 1: Personal Innovations)

Learning Objectives

Students will be able to identify the major hardware and software components inside a typical computer and explain their function in relationship to the computer's functional process. Students will research a topic with a partner to learn what the component's main function is, where it is located in relationship to other components, and how it fits into the computer's overall functional process. Students will be able to distinguish between two primary types of memory and explain how the computer uses memory to process information and store information long-term.



Materials

- ◆ "Inside Your Computer" Video by Bettina Blair
- ◆ "How Transistors Work" Video By Gokul J. Krishnan
- ◆ Student Research Topics (Vocabulary)
- ◆ Inside the Computer Live Demo

Network and Internet Infrastructure Lesson

(follow up extension to Unit 1, Lesson 8: The Internet Is for Everyone)

Learning Objectives

Students will be able to identify components of a local area network within an organization and determine how to most economically expand systems and redistribute configurations to avoid bottlenecks and keep down the total cost of ownership. Students will understand how communication is enabled on different levels of networking and the hierarchy involved in the Internet at large.

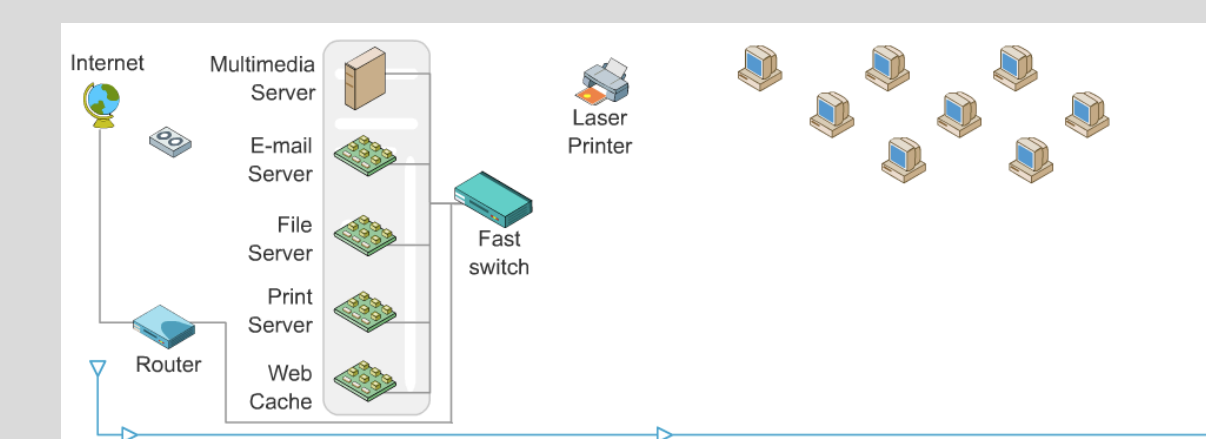


Figure 1

Materials

- ◆ Networking and the Net Presentation
- ◆ Figure 1: Teach-ICT.com Network Simulation

Cyber Security Threats v. Attacks Lesson

(follow up extension to Unit 1, Lesson 9: The Need for Addressing)

Learning Objectives

Students will be able to explain the principles of security by examining encryption, cryptography, and authentication techniques. Students will be able to discuss the social and economic implications associated with hacking. Students will be able to describe security and privacy issues that relate to computer networks.

Materials

- ◆ Figure 2: Threats, Attacks, and Firewalls Presentation
- ◆ Figure 3: Kali Linux Running on Virtual Machine
- ◆ Figure 4: Port Scanning and Metasploit Live Demos

Figure 3

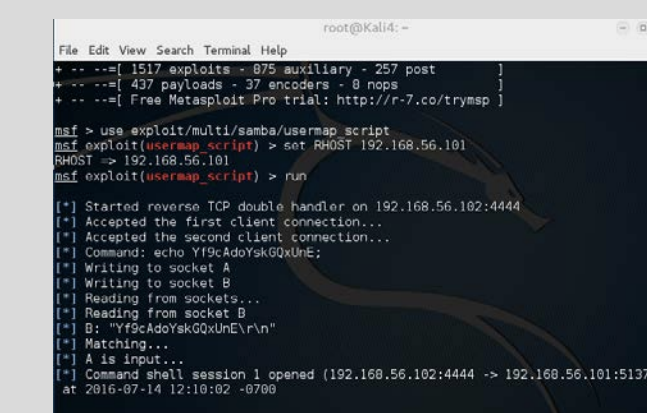


Figure 2

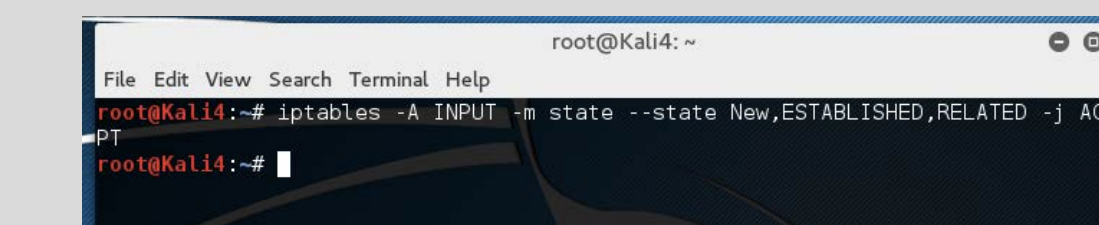
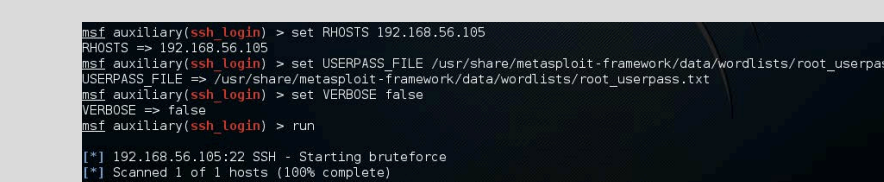


Figure 4



Lesson Overview (cont.)

Wireless and Security Part 1 Lesson

(follow up extension to Unit 1, Lesson 10: Routers and Redundancy)

Learning Objectives

Students will be able to explain the importance of good practices in personal information security, using passwords, encryption, and secure transactions. Students will explore principles of system design in security. Students will be able to describe ethical issues that relate to computers and networks.

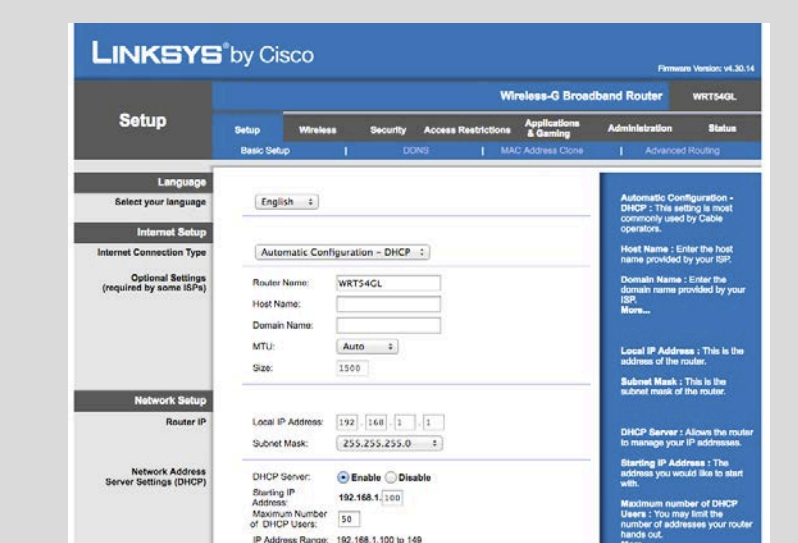


Figure 5

Materials

- ◆ How Wireless Works Presentation
- ◆ Figure 5: How to Configure a Router Live Demo
- ◆ Figure 6: Cain & Abel Software Presentation

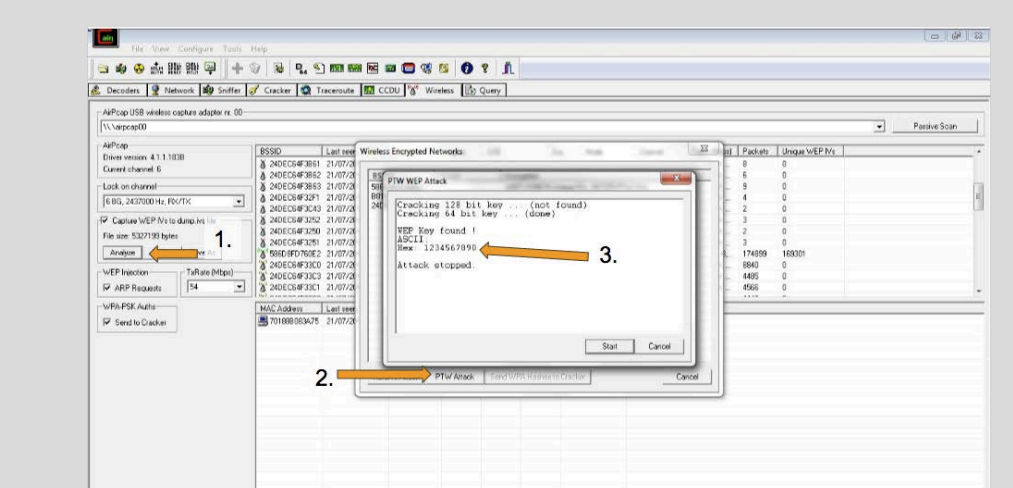


Figure 6

Wireless and Security Part 2 Lesson

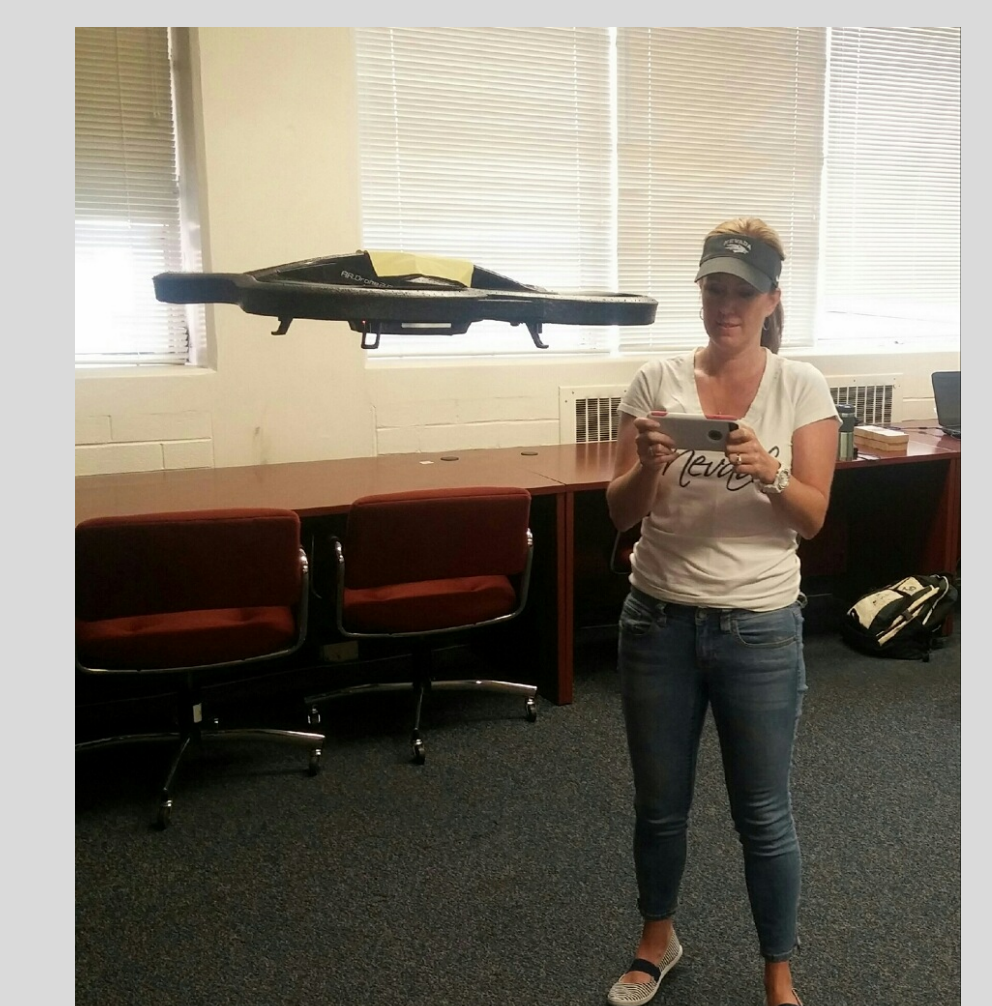
(follow up extension to Unit 1, Lesson 11: Packets and a Reliable Internet)

Learning Objectives

Students will be able to describe ethical issues that relate to computers and networks. Students will explore principles of system design in security. Students will be able to analyze the positive and negative impacts of computing on human culture.

Materials

- ◆ "Meet the Dazzling Flying Machines of the Future" Video by Raffaello D'Andrea
- ◆ AUV 101 Presentation
- ◆ Hack the Drone Live Demo



Evaluation

Two assessments of learning outcomes will be given each semester. The pre-test will be administered in the first week of class, and the post-test using the same questions will be given at the culmination of unit 1. The questions will be 25 summative multiple choice questions concerning 5 topics from each lesson extension.

"This work is supported by the National Science Foundation under Grant #1542465."