First Principles: Process Isolation, Domain Separation

1. Time: 1-4
2. Virtualization and Building a lab
    a. Time
    b. Lecture: Basic concepts of virtualization
        i. Explanation of CPU hardware
        ii. Basic concept of a hypervisor
            1. Mapping a hard drive to a file
            2. Mapping virtual machine RAM to physical memory
            3. Translating virtual CPU instructions to physical CPU instructions
        iii. Small-level virtualization:
            1. AV sandboxes
    c. Activity: Boot up a local Windows 7 VM and access the Internet
    d. Activity: Boot up a local Windows XP VM and access the Internet
    e. Activity: Install Linux on a virtual machine and check network connectivity. Install a web server application.
    f. Activity: Install Linux on a virtual machine and check network connectivity. Install a database server.
    g. Overflow: Boot other VMs on and look at what kind of tools they have.
3. Virtual Network Types
    a. Time
    b. Lecture: Home networking and virtual networking
        i. Basic home networking concepts
            1. Client
            2. Server
            3. Router
            4. Switch
            5. Network address translation
        ii. Basic home networking tools
            1. ip/ifconfig
            2. tracert/traceroute
            3. netcat
            4. Whois
            5. nslookup
            6. netstat
    c. Activities
        i. Use the VM in the morning to:
            1. Perform a traceroute to Google IP (8.8.8.8)
            2. Perform a traceroute www.google.com
            3. Perform a whois on each IP between RIT and Google
            4. Use netcat to communicate with the other members of your team.
            5. Use netcat to manually make an HTTP request
        ii. Overflow:
            1. Map the traceroute to other websites