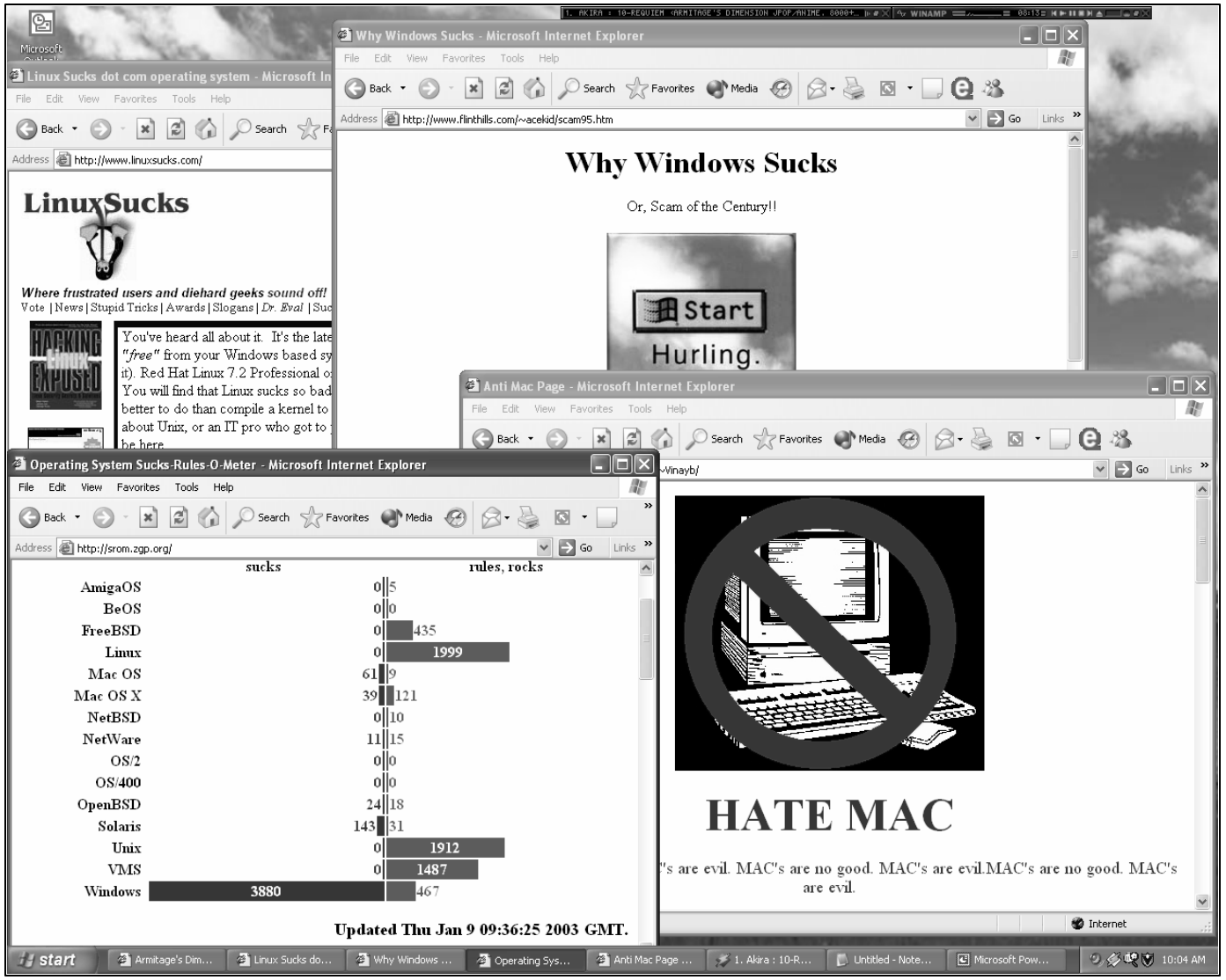

CSE 451 – Operating Systems Section, Autumn 2003

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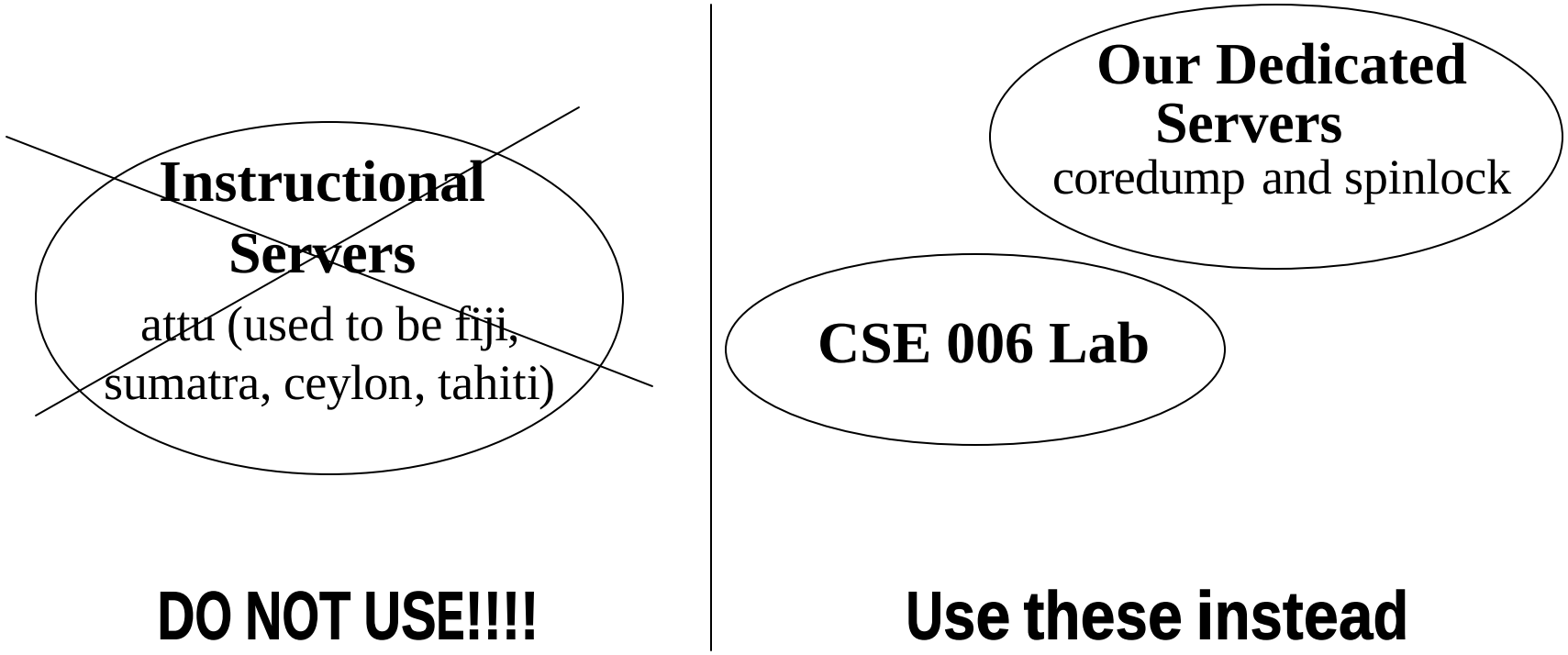
Projects

- 4 Projects
- Work individually for the first project, groups of 3 after that
- You need to have basic Unix and C skills
  - I'll go over a little today and point you to more resources
- Don't wait until the last minute!
  - Projects require a substantial amount work and you'll be much happier if you start early
- Lots of helpful info on the course web page
  - http://www.cs.washington.edu/451

Project 1

- Introduces you the Unix and C skills you'll need for the rest of the class
- Teaches you how to build and run Linux in VMWare
- Two parts
  - Write a simple shell
  - Write a syscall
- First steps:
  1. Read the project
  2. Work through the lab info page at http://www.cs.washington.edu/education/courses/cse451/CurrentQtr/labinfo.htm
  3. Start the project

Computing Resources

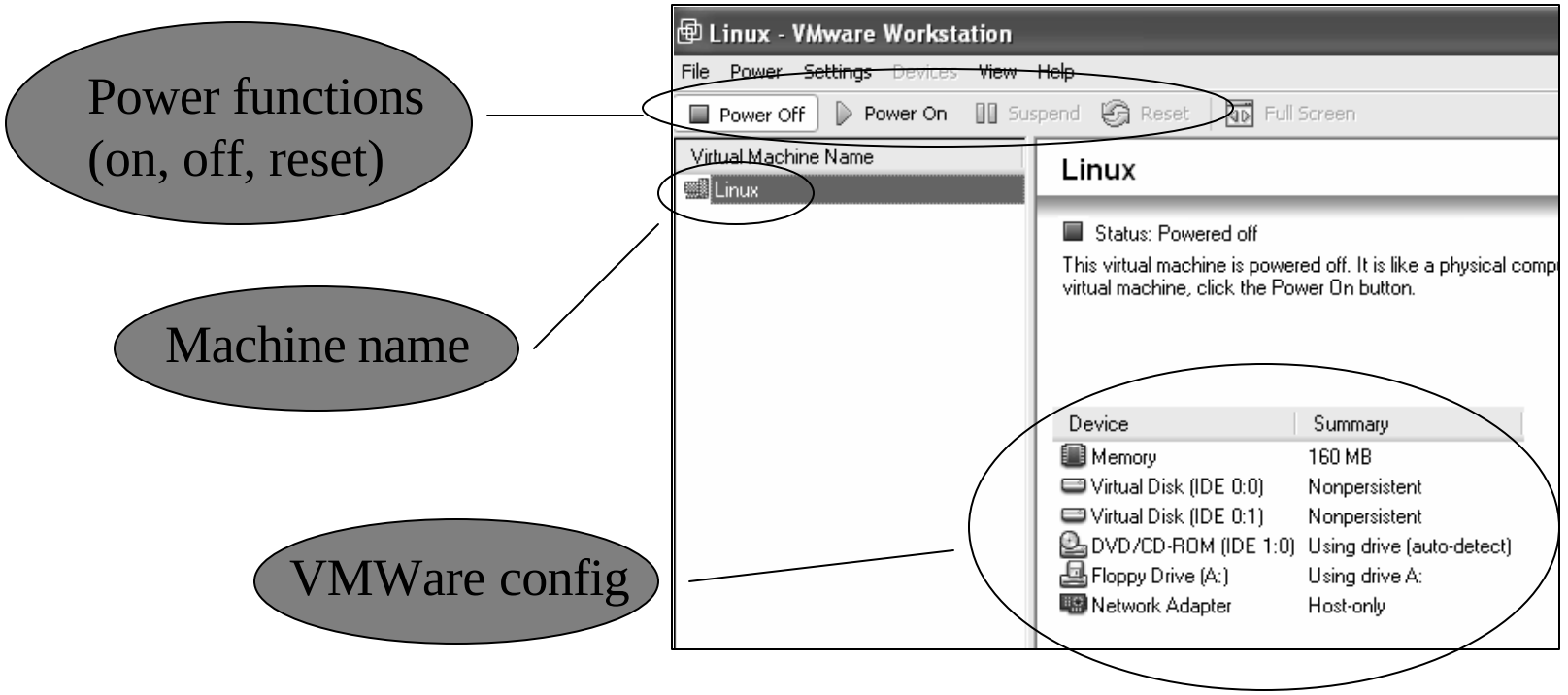


- Develop your code on *coredump* or *spinlock*.
- Test your code in VMWare.
- WARNING: Do not run your code on the instructional servers (attu). You can easily fork bomb a server, which can bring down the server. Use only spinlock, coredump, and VMWare.

VMWare

- VMWare is a software simulation of an x86 computer.
  - The OS thinks it is running on a real machine
- It allows you to run an OS in a sandbox.
  - Easy to reset to known good state

VMWare Basics



- **All disks are non-persistent.** This means that using the Power Off function will lose any changes you made to the file system inside VMWare.
  - A soft reboot will preserve data. Type “shutdown –r now” or “reboot” from the shell instead of hitting the reset button.
- **Network Adapter is Host Only.** This means that only the host computer can talk to the VMWare network card. You must transfer files (like your kernel) to the host machine first.

VMWare Tips

- There is only one user: "*root*"
- The password to root on the vmware machines is "*rootpassword*"
- Use ftp to get files into VMWare
  - Move files onto your local machine
  - Open Internet Explorer to access VMWare through the URL, ftp://root:rootpassword@192.168.93.2
  - If you decide to use another ftp method, remember to check **binary** mode. Otherwise you'll get garbage instead of your file.

Unix Help

- ACM Unix tutorial
  - Wed Oct 8, 5-7pm, CSE 022
- Unix tutorials online at the ACM website
  - http://www.cs.washington.edu/orgs/acm/tutorials/

Intro to C

- What is C?
  - C is a procedural language (not an object oriented language)
- Major Syntactic Differences in C
  - No classes
    - Structs are **not** the same as classes in C++ or Java
  - Variables must be declared at the top of a block (after an opening brace) before any other kind of statement
  - No new/delete operators. Use malloc and free functions (see man pages – *man malloc*).
  - void* is used often in C data structures
  - No boolean type
    - 0 is false, anything else is true

Basic C type mechanisms

Structs

- Structs are meant for grouping structured data.
- They are not classes. Structs do not have inheritance and methods like classes do (though you can simulate inheritance and methods fairly well. Look at glib).
- You use structs for 2 reasons.
  - Ordering memory
    - Because structs guarantee a memory layout, they are useful for communicating with hardware
  - Grouping related items
    - This is the more common usage. You can use this to create really dumb “objects”.

Basic C type mechanisms

Typedefs

- Typedefs are a way of creating aliases for a type. So if you type:

  typedef unsigned char byte;

  From this point on, a “byte” is the same as char.

- You use typedefs for 3 reasons.
  - Making a shorthand (often done with structs and function pointers).
  - Adding an extra level of abstractions to the type. (say you’re waffling between using a short int or a long int).
  - Designating a logical difference. A byte is the same as an unsigned char, but when you see “byte” you think of 8 bits where when you see “char” you think of ‘a’ or something similar.