ECE 598 – Advanced Operating Systems
Lecture 1

Vince Weaver

`http://www.eece.maine.edu/~vweaver`

`vincent.weaver@maine.edu`

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Announcements

- Go over Syllabus

Hardware for the Class Assignments

- Raspberry Pi Model B (or Raspberry Pi Model B+)

- Micro-USB cable (To provide power)

- 4GB SD memory card (or larger) – preloaded with Linux if possible

- USB/Serial adapter – something similar to `http://www.adafruit.com/products/954`; I have some I can loan out

If you are starting from scratch, getting a kit like `http://www.adafruit.com/products/1014` might be convenient (but expensive) getting the parts individually might be cheaper.

I also have a limited number of Raspberry Pi boards I can loan out if necessary.

Optional Hardware (not necessary for class but might make development easier)

- Case to hold the Pi

- GPIO breakout cable

- ethernet cable

- HDMI cable

- USB keyboard

Why Use an Operating System?

- Provides Layers of Abstraction

  - Abstract hardware: hide hardware differences. same hardware interface for classes of hardware (things like video cameras, disks, keyboards, etc) despite differing implementation details
  - Abstract software: with VM get linear address space, same system calls on all systems
  - Abstraction comes at a cost. Higher overhead, unknown timing

- Multi-tasking / Multi-user

- Security, permissions (Linus dial out onto /dev/hda)

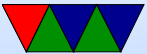- Common code in kernel and libraries, no need to re-invent

Common Operating Systems

- UNIX-like – UNIX (Solaris, IRIX, AIX, ULTRIX, XENIX), Linux, FreeBSD, OpenBSD, NetBSD, OSX/ioS, MINIX

- VMS

- WindowsNT based (NT/2000/XP/Vista/8/etc)

- CP/M, DOS based (DOS, Windows 3.1, Windows 95/98/ME)

- Embedded OSes (QNX, Vxworks)

- Mainframe OSes (IBM z/OS)

- Other – MacOS, BeOS, AmigaOS, Haiku

In this class will primarily discuss Linux

- Free

- Source code available

- I know it well; have contributed many patches

What's included with an OS

- kernel / drivers – Linux definition

- also system libraries – Solaris definition

- low-level utils / software / GUI – Windows definition
  Web Browser included? (lawsuit)

- Linux usually makes distinction between the OS Kernel
  and distribution. OSX/Windows usually doesn't.

Linux Distributions

- RedHat/Fedora/Suse/Ubuntu/Debian

What Does Linux Provide

- Boot/initialization

- Hardware drivers

- Network (TCP/IP and others)

- Interrupts, DMA

- Multi-tasking/Job scheduling

- Virtual Memory

- Filesystems

- Security