

Unix Background

Brief Unix History

- ◆ In 1969, Ken Thompson at AT&T Bell Labs began developing Unix.
 - First done in assembly language.
 - Ran on DEC PDP-7 with 8K words of memory.
- ◆ In 1974, Unix was rewritten in C.
 - By writing C compilers, Unix can be ported to other computers.
- ◆ BSD UNIX
 - BSD: Berkeley Software Distribution
 - UCB put the Internet Protocols (IP) into UNIX
 - 4.4BSD (Berkeley): 1994

Brief Unix History

- ◆ System V
 - AT&T System V (1984)
 - SVR4: System V Release 4 (1988, current version)
- ◆ POSIX (IEEE Computer Society):
 - Portable Operating System Interface for Computer Environments (1988)
 - Most Unix systems try to conform with POSIX to a certain extent
- ◆ SunOS was BSD-based and Solaris is SVR4-based (cs department used to have many Sun stations).
 - Most of the things you will learn in this course work in different Unix/Linux systems with small differences

The Unix Philosophy

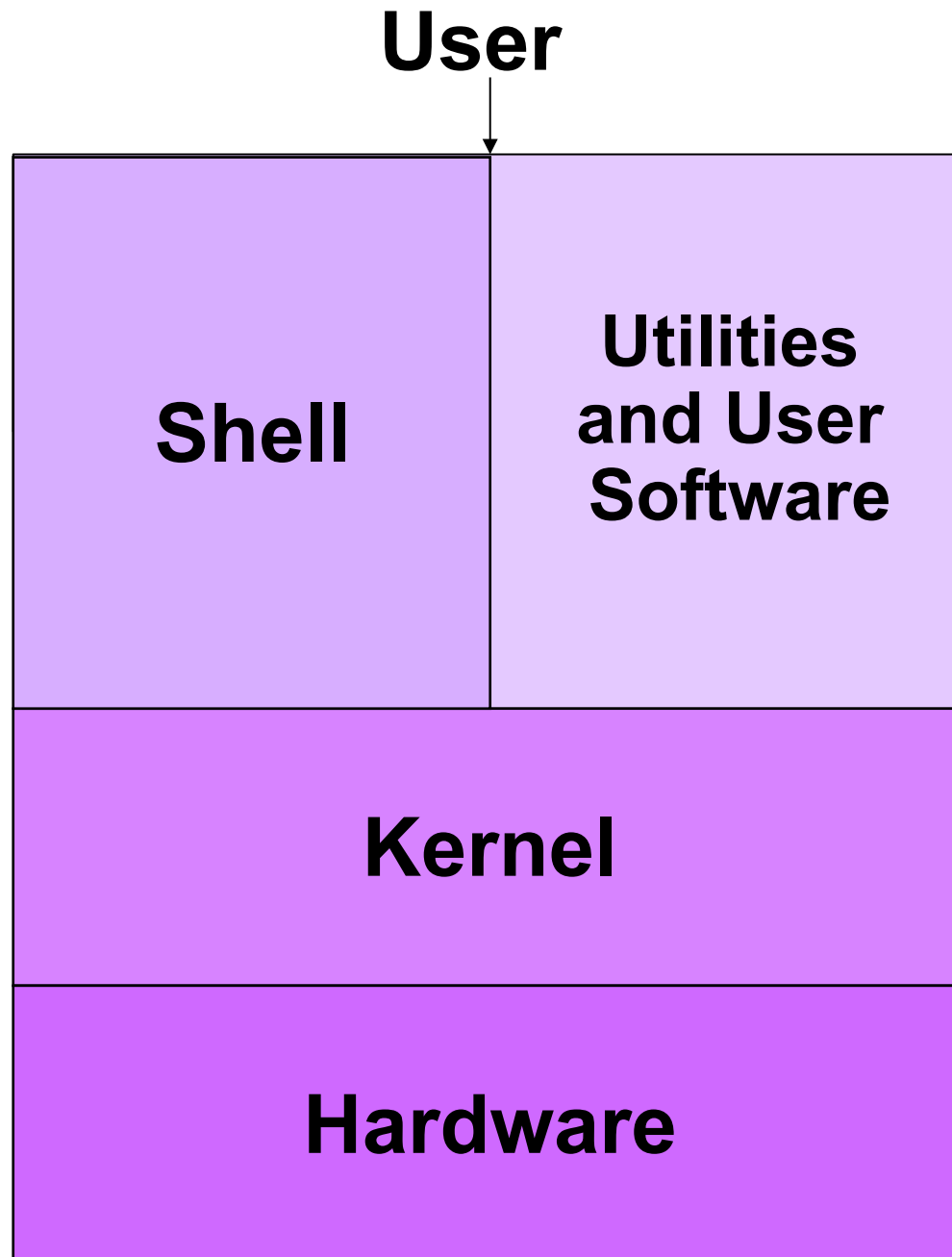
- ◆ Unix was not meant to be a user-friendly operating system
 - Instead, meant to be “user-helpful” and **very** powerful
- ◆ The Unix operating system protects users from other users but not necessarily from themselves
- ◆ It provides the necessary tools then gets out of your way

The Unix Philosophy

◆ The Unix Tools

- Keep each tool simple
- Have each tool do one thing, and do that one thing really well
- Keep tools terse and not too talkative
- More complex tasks can be accomplished by combining tools together in scripts or pipelines
- Originally, input and output to workstations were slow and tedious, and this approach made things faster and more efficient.

Structure of a Unix System



Parts of a Unix Operating System

◆ Kernel

- Manages the processes and resources
- Controls and hides the hardware

◆ Shell

- An interface between users and the kernel
- A command line interpreter (CLI)

◆ Utilities are standard tools/applications

- They are used so often that they become a part of Unix
- “ls” and “vi” are Unix utilities, for example

A Word on Linux (GNU/Linux)

- ◆ In 1991, Linus Torvalds wrote the Linux kernel
 - When he was an undergraduate in University of Helsinki.
 - Wanted a version of UNIX that he could run on the old computer he owned...
- ◆ Numerous programmers have worked on it
 - It's a popular Unix-like operating system now
 - ❖ Started with hobbyists and at universities
 - ❖ Growing popularity in corporations and elsewhere
 - Occupies a large percentage of PC server market
- ◆ Achieved its goal of POSIX compliance

A Word on Linux

- ◆ Now available for many architectures
 - x86, PowerPC, SPARC, SGI Indy, HP PA-RISC, DEC Alpha, IA64 ...
- ◆ Growing software base
 - Office suites, desktops, server software, games, ...
- ◆ Has become a popular Unix in the microcomputer world
 - Much more popular than Free/Open/NetBSD, Solaris x86, ...
- ◆ Still a "free" operating system
 - Mostly under GNU General Public License (GPL or "Copyleft")
 - Many companies create and sell distributions (Redhat, SUSE, and many others)
 - Check it out at: <http://www.linux.org>
- ◆ Big servers are using Linux now
- ◆ The only OS used on top 500 supercomputers since Nov. 2017

Apple's macOS

- ◆ macOS, previously OS X and Mac OS X, is a series of Unix-based graphical interface operating system developed, marketed, and sold by Apple Inc.
- ◆ It is designed to run exclusively on Mac computers, having been pre-loaded on all Macs since 2002.
- ◆ It was also the first (2007 Mac OS X Leopard) BSD-based OS to receive UNIX 03 certification.
- ◆ Has become popular in desktop and laptop computer world.
- ◆ iOS is also based on Unix.

Google's Android

- ◆ Android is a mobile operating system based on Linux kernel and currently developed by Google.
- ◆ Designed primarily for touchscreen mobile devices such as smartphones and tablet computers.
- ◆ It uses touch inputs that loosely correspond to real-world action like swiping, tapping, and pinching to manipulate on-screen objects, and a virtual keyboard.
- ◆ Android is the most widely used mobile OS as of 2013, and the largest installed base for any operating system since May 2017.
- ◆ Android source code is released by Google under open source licenses.