Unix Shell

Technical Tuesdays

Bala

Technical Tuesdays

Objectives

Introduction but **not a tutorial**

Tell people what is already there and **what is possible**

Give some **examples** for inspiration

Provide a **minimum viable environment** for
further learning and exploration

Technical Tuesdays

Introduction
15 Oct

*nix Shell
22 Oct

R Scripting
29 Oct

Python
12 Nov

JavaScript
19 Nov

Databases
26 Nov

Version Control
03 Dec

Mapping
10 Dec

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Overview

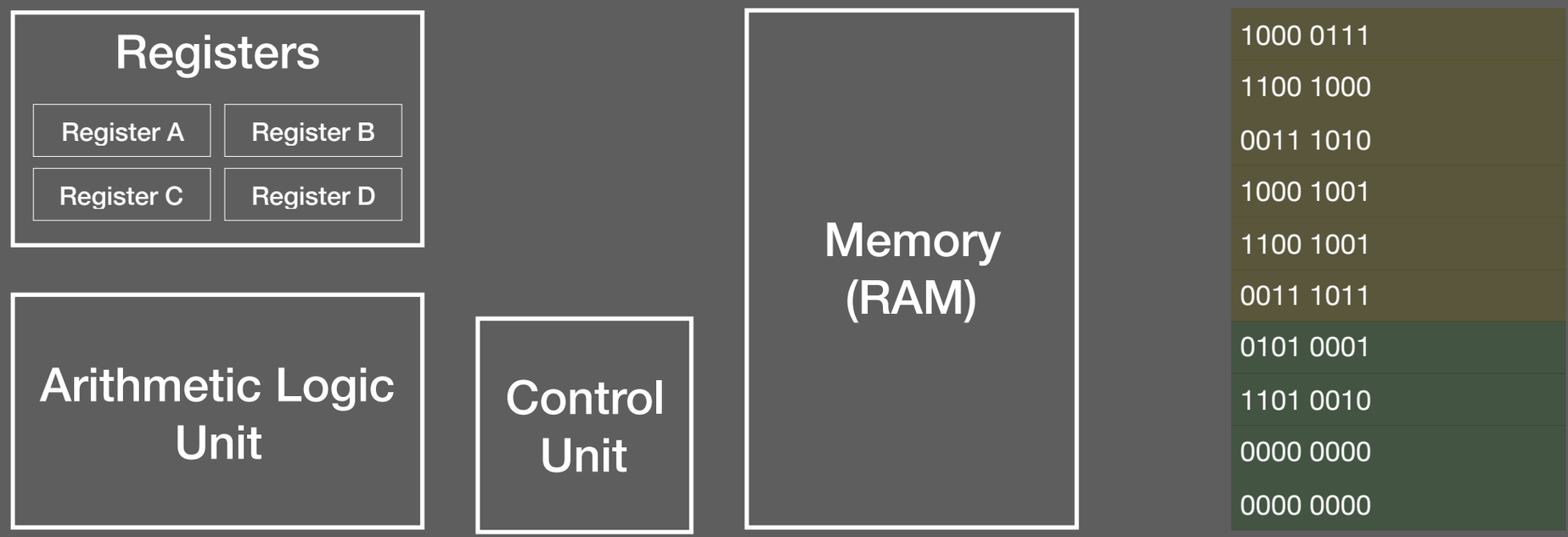
Context - Where does all of this come from?

Utility - For what these things are used?

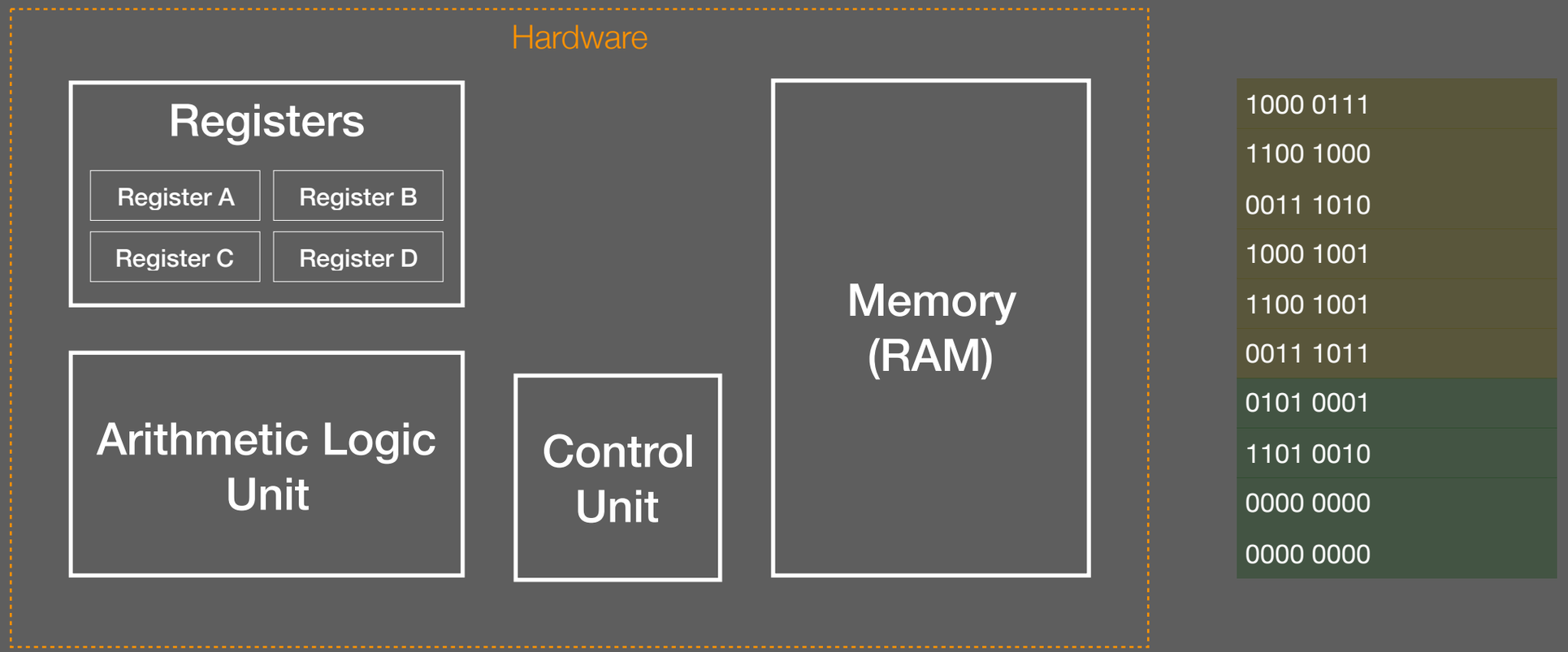
Relevance - How can I use these for my purposes

Resources - Where can I learn more?

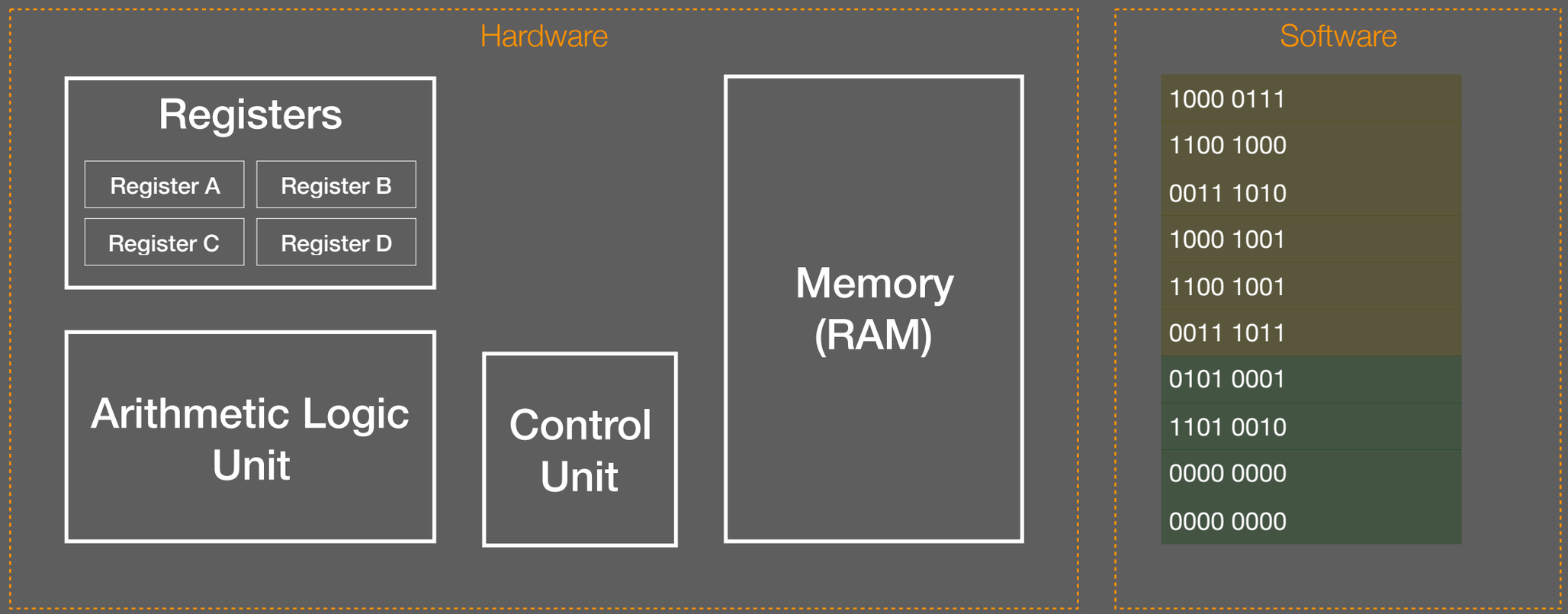
Recap


Registers
Register A
Register B
Register C
Register D
Arithmetic Logic Unit
Control Unit
Memory (RAM)
1000 0111
1100 1000
0011 1010
1000 1001
1100 1001
0011 1011
0101 0001
1101 0010
0000 0000
0000 0000

Recap


Hardware
Registers
Register A
Register B
Register C
Register D
Arithmetic Logic Unit
Control Unit
Memory (RAM)
1000 0111
1100 1000
0011 1010
1000 1001
1100 1001
0011 1011
0101 0001
1101 0010
0000 0000
0000 0000

Recap


Hardware
Registers
Register A
Register B
Register C
Register D
Arithmetic Logic Unit
Control Unit
Memory (RAM)
Software
1000 0111
1100 1000
0011 1010
1000 1001
1100 1001
0011 1011
0101 0001
1101 0010
0000 0000
0000 0000

Recap

Operating System

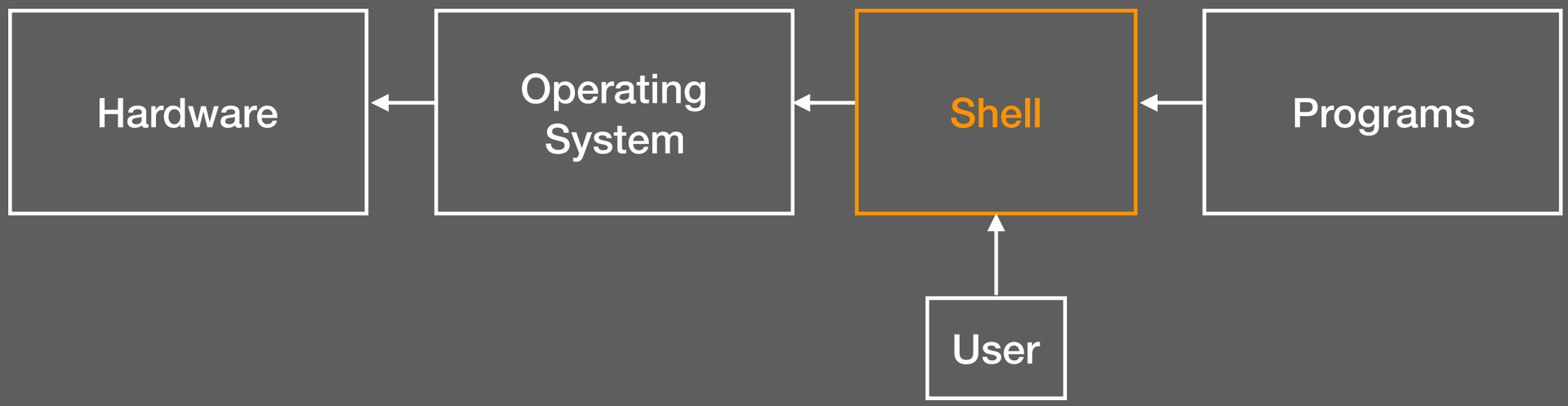
Operating systems abstract away the hardware for programs.

The **way** they abstract is the key!

What is a shell

Shell is the program which the user uses to communicate to the operating system.

What is a shell



Shell is the program which the user uses to communicate to the operating system.

How do they Abstract?

Central mainframe

↓

Command line
(unix)

Typical Workspace

↓

Graphical User Interface
(apple, windows)

GUI vs Command line

GUI vs Command line

Capturing complex instruction with language is much easier than with skeuomorphism.

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GUI vs Command line

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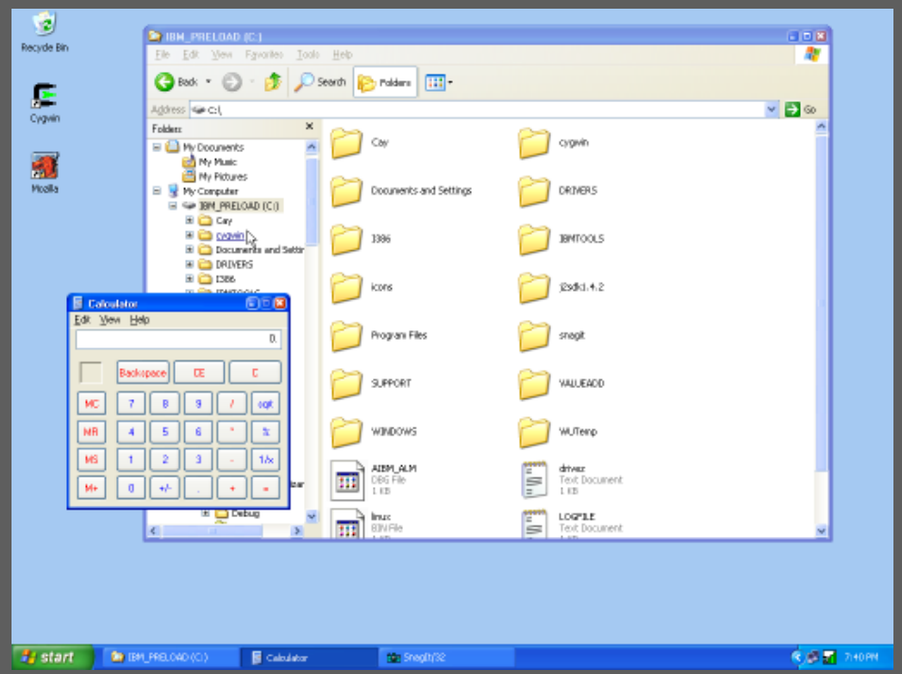
Bandwidth is much smaller between user and shell.

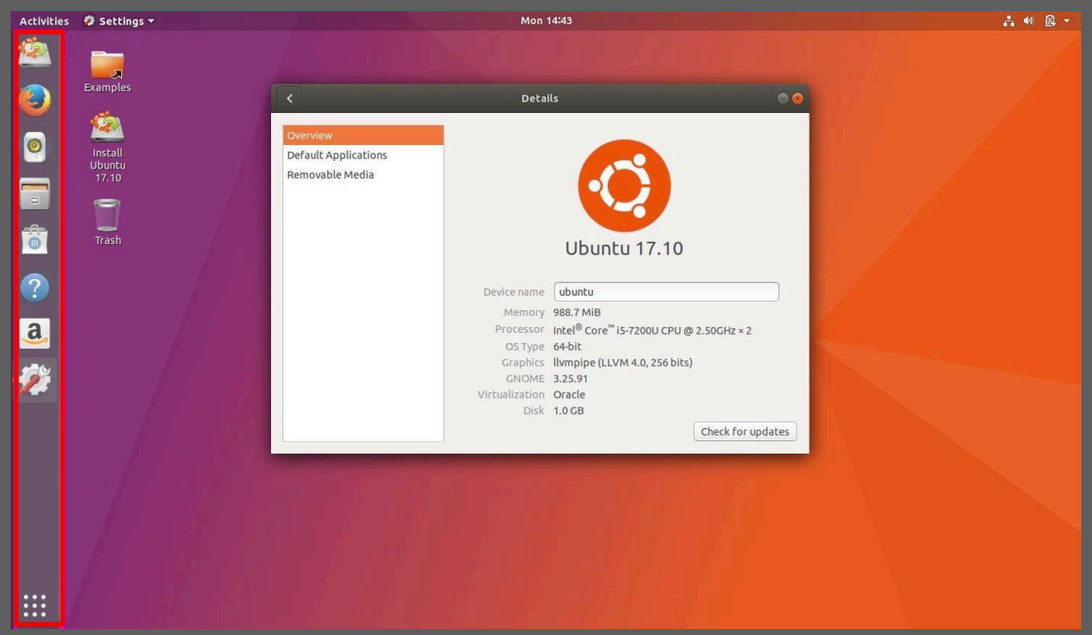
Repeating stuff is easy.

Much harder learning curve.

GUI Shells


Recycle Bin
Cygwin
Mozilla
IBM_PRELOAD (C:)
Calculator
start


Finder File Edit View Go Window Help
Wed 12:08 AM
About This Mac
Mac OS X
Version 10.0.3 (Build 4P13)
Memory: 576 MB
Processor: PowerPC G3
™ & © Apple Computer, Inc. 1983-2001
Vega
Grayce
Mac OS X Install CD
Algol
Desktop (Mac OS 9)


Activities
Settings
Mon 14:43
Examples
Install Ubuntu 17.10
Trash
Details
Overview
Default Applications
Removable Media
Ubuntu 17.10
Device name
ubuntu
Memory 988.7 MiB
Processor Intel® Core™ i5-7200U CPU @ 2.50GHz × 2
OS Type 64-bit
Graphics llvmpipe (LLVM 4.0, 256 bits)
GNOME 3.25.91
Virtualization Oracle
Disk 1.0 GB
Check for updates

History of Unix Shell

sh
(aka Bourne shell) The original Shell written for the unix operating systems

csh
Developed to be used with a language that is similar to C. tcsh, zsh etc.

ksh
Developed by David Korn, this strives to closely emulate Bourne shell and be compatible with POSIX standards pdksh, mksh etc.

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Developed by Brian Fox for the GNU project, strives to be free and open source replacement for Bourne shell. Linux

fish, sash
Specialised shells developed while prioritising specific needs

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Specialised shells developed while prioritising specific needs

Though there is a lot of history and evolution all of them remained backward compatible and POSIX compliant

bash is synonymous with a command line shell for unix and unix-like (linux) systems.

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Major functions of Shell

Managing Input and Output

Managing Filesystem

Executing Programs

Basic concepts

How to talk to the shell

file system, reading and writing from file system

Installing and Executing Programs

Passing data through programs

Doing things multiple times

Automating things

Demo!

Remote access

ssh - **s**ecure **sh**ell

Purpose	Geography servers
Gateway Servers	archibald.geog.ucl.ac.uk roundabout.geog.ucl.ac.uk squarepeg.geog.ucl.ac.uk triangleting.geog.ucl.ac.uk
General Purpose	ankara.geog.ucl.ac.uk bangkok.geog.ucl.ac.uk caracas.geog.ucl.ac.uk dakar.geog.ucl.ac.uk edinburgh.geog.ucl.ac.uk freetown.geog.ucl.ac.uk gaborone.geog.ucl.ac.uk hanoi.geog.ucl.ac.uk islamabad.geog.ucl.ac.uk khartoum.geog.ucl.ac.uk lima.geog.ucl.ac.uk muscat.geog.ucl.ac.uk nassau.geog.ucl.ac.uk ottawa.geog.ucl.ac.uk pyongyang.geog.ucl.ac.uk quito.geog.ucl.ac.uk rabat.geog.ucl.ac.uk seoul.geog.ucl.ac.uk tirana.geog.ucl.ac.uk ulanbator.geog.ucl.ac.uk valletta.geog.ucl.ac.uk washington.geog.ucl.ac.uk

https://www.geog.ucl.ac.uk/resources/computer-support/linux-remote-access

Purpose	CDRC servers
Database	cdrc-db.geog.ucl.ac.uk
High Memory (1TB of RAM)	cdrc-highmem.geog.ucl.ac.uk cdrc-footfall.geog.ucl.ac.uk
Storage	cdrc-archive.geog.ucl.ac.uk
Computing	cdrc-node01.geog.ucl.ac.uk cdrc-node02.geog.ucl.ac.uk cdrc-node03.geog.ucl.ac.uk cdrc-node04.geog.ucl.ac.uk cdrc-node05.geog.ucl.ac.uk cdrc-node06.geog.ucl.ac.uk cdrc-node07.geog.ucl.ac.uk cdrc-node08.geog.ucl.ac.uk

Purpose	UCL Server
General HPC	Legion
Parallel Proc.	Grace
Storage	Myriad

https://www.ucl.ac.uk/research-it-services/services/research-computing-platforms

Questions