Bash Fundamentals

Course Structure

Assumed Knowledge

Advice

Practice

Scripting - the next level

What are shell scripts?

To elaborate...

Practice

Situating Shells among Languages

What are shell scripts good for?

Ok, so what is automation good for?

Two Styles

Two Styles (continued)

Delegation Style - Wall Metaphor

Delegation Style - Conductor Metaphor

Will I need scripting skills?

Probably yes

"Hidden" Shell Scripts

When/How not to use Shells?

When/How not to use Shells? (continued)

To sum up

Just a Few More Points

Learning Objectives

Some terminology

Which Shell?

Course Approach

Part I - Below the Surface

WARNING: Lots of Theory Ahead

What the Shell does for Us

Rush

Command Result ———- ———-

What the Shell Does behind the Scenes

For Programming

Shell Operation: The Gist

Step 2: Tokenizing

Tokenizing in Bash

Tokenizing - Demo

Tokenizing - Examples

Literal Characters

Quoting

Quoting - Showing Arguments

Quoting - Examples

Quoting - `''` vs `""`

Practice

Step 3: Parsing Commands

Parsing by the Shell

Examples of Lists

Compound Commands

Practice

Step 4: Expansions

Brace Expansion

Brace Expansion - Examples

Tilde Expansion

Tilde expression Expansion ———— ———

Parameter Expansion

Command Substitution

Arithmetic Expansion

Process Substitution

Word Splitting

Why split on words?

Solutions (sort of)

IFS - Internal Field Separator

IFS - Internal Field Separator (continued)

Filename Expansion (“globbing”)

Wildcard meaning ——— ——-

Quote Removal

Expansions can be Mixed

Practice

Step 5: Redirection

Here Documents: <<

Here Strings: <<<

Step 6: Command Execution

Recap

A Brief Point About Pure and Delegation Styles

Interpretation

FASTA to TSV converter script project

The Trouble with Fasta

Why ?

The project

WARNING

Practice

Input

Standard Input (`stdin`)

Practice

Arguments and Positional Parameters

`read`

Practice

Control Structures

Loops

`for` loop - 1st form

`for` loop - Example 1

`for` loop - Example 2

`for` loop - 2nd form

Example: `for` loop, 2nd form

`while` loop

`until` loop

The `continue` keyword

Practice

Iterating over lines in a file

Parameters

Setting

Getting

Unset and Null

Defaults for Null and Unset

Variants

Constants

Type

String Operations I

String Operations II

Arrays

Indexed Arrays

Accessing All Array Elements

Iterating over an Array

Example of Array Usage

Arrays and Word Splitting

Array Caveats

Associative Arrays

Associative Array Caveats

Practice

Conditionals

`if`

A shortcut

Test Commands

Why can 0 signal both success and failure?

Commands as Tests

Conditional Expressions

File Properties

---

operator true if ——-- ———

String Conditionals

Operator True if ——— ——-

Pattern Matching

Matching Regular Expressions

Practice

Numeric Conditionals

Operator Meaning (numerically) ———— ——————

Expansion Happens

Logical Operations

Arithmetic Tests

Shell Arithmetic

Shell Arithmetic - Examples

No floating-point?

Appendix I: Sample Formats

General Feature Format (GFF)

Variant Call Format (VCF)

‘‘‘

subtitle: Day 3 - Project, part II

Output

`printf` - formatted printing

`printf` - some more examples

Practice

A small problem

A small problem (continued)

Functions - Motivating Example

Functions

Definition

Call

Local Variables

“Returning values” from functions

Practice

More control structures with `case` and `break`

Looping over Arguments

Looping over Arguments (continued)
