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Bash Workshop

Aline Abler

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Shells

Bash is a not a programming language.

- It is a shell
- It is an interface between you and your computer
- It allows you to access the operating system's services (i.e. run programs)
- It is not designed as a programming language, but can be used as such

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Shells

Bash is not the only shell there is.

- sh, ksh, zsh, fish, dash...
- Most commands work in any shell, but some don't
- Usually this doesn't matter too much

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Shells

Bash scripts are not programming

▶ Glue existing programs together to create new ones
▶ It's possible to write entire programs, but please don't

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How to bash

Look, a bash script

```bash
#!/bin/bash

echo 'Hello World'

echo Bash is awesome

# Now some fun stuff:
sudo zypper update
notify-send 'Update complete'
feh --bg-fill 'pictures/fancy_wallpaper.jpg'
youtube-dl -o 'Video.%(ext)s' 'https://www.youtube.com/watch?v=lAIGb1lfpBw'
```

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How to bash

What bash can do

- ▶ Automate anything you can do from a console
- ▶ Let several separate programs work together

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Commands

All about commands

Everything is a command

Kinds of commands

▶ Functions
are a sequence of bash commands that have been given a name

▶ Builtins
are small utilities that are part of bash

▶ Programs
are external programs that are installed on your system

▶ Aliases
are specific keywords that are replaced by an entire string (interactive mode only)

▶ Keywords
are like builtins, but with special parsing rules

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Commands

Why is this so important?

- if and while are builtins
- [[is a keyword

Strings

All about strings

Everything is a string

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Strings

Strings and word splitting

- ▶ A string is a sequence of characters that is treated as a unit
- ▶ Commands are strings, too
- ▶ Strings are split at every space, tab, or newline

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Meaning of strings

```
echo Hello World
```

- ▶ echo, Hello and World are single strings
- ▶ The first string becomes the command, all following become arguments

```
echo 'Hello World'
```

- ▶ Here, Hello World is just one string

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All about return values

Return values

- ▶ What you run

```
echo 'Hello World'
```

- ▶ What you see

```
Hello World
```

- ▶ What bash sees

```
0
```

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All about return values

Why?

- Every command returns a number, its return value
- 0 means success
  Everything else means there was an error
- Some commands also print to stdout

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All about return values

Why is that important?

- **&&**, **||**, **if** and **while** all act based on the return value of something
- They disregard that command's actual output

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Expansion

Bash doesn't only run commands

- ▶ Tilde expansion
  `~/files` becomes `/home/alinea/files`
- ▶ Variable expansion
  `$BROWSER` becomes `Firefox`
- ▶ Arithmetic expansion
  `$(( 1 + 4 ))` becomes `5`
- ▶ Command substitution
  `$( pwd )` becomes `/home/alinea/scripts`
- ▶ Pathname expansion (or globbing)
  `files/qui*` becomes `files/quicknotes files/quiz`

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Expansion

Bash doesn't only run commands

- Expansion happens before any command is run
- It also happens before word splitting

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Expansion

The issue with word splitting

```
var='Unimportant File.odt'
rm $var
```

becomes

```
rm Unimportant File.odt
```

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Expansion

Repeat after me:

If there's a dollar, you probably need quotes!

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The whole point of bash

Why is bash awesome?

- ▶ Bash can easily invoke any programs and connect them
- ▶ Bash is like glue

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How to write a bash script

How to write a bash script

- I want a script that searches youtube and downloads the first video it finds

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How to write a bash script

Splitting it up

▶ Search youtube
▶ Download video

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How to write a bash script

Splitting it up even further

- Search youtube
  - Download youtube results website
  - Search website text
  - Find first youtube video link
- Download video

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Step 1. . .

Google for a program that already does what you need

▶ `youtube-dl` can download a video from youtube

```
youtube-dl -o 'Video.%(ext)s' 'https://www.youtube.com/watch?v=lAIGb1lfpBw'
```

▶ Now I only need to use bash to glue everything together

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What happens now?

Hands on!

- ▶ Self study using a guide
- ▶ Try some of our exercises

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What happens now?

Course material

- ▸ These slides, exercise sheet and bash guide:
  http://thealternative.ch/index.php?view=knowhow

- ▸ Theme by **Christian Horea, CC BY**