

LinuxDays

Unleash the Power of Linux

Purpose of this course

- ▶ Get overview of common Linux tasks
- ▶ Learn what Linux is very good at!

... and you get to love your system!



Basics

Stuff you can already do

Automatic updating and shutdown

```
$ sudo su
root's password:
$ zypper ref && zypper -n up && poweroff
```

- ▶ `sudo su`: Become root
- ▶ `zypper ref`: Update repository
- ▶ `zypper -n up`: Install upgrades
- ▶ `-n` stands for `no confirmation`
- ▶ `A && B`: Execute B if A completed successfully

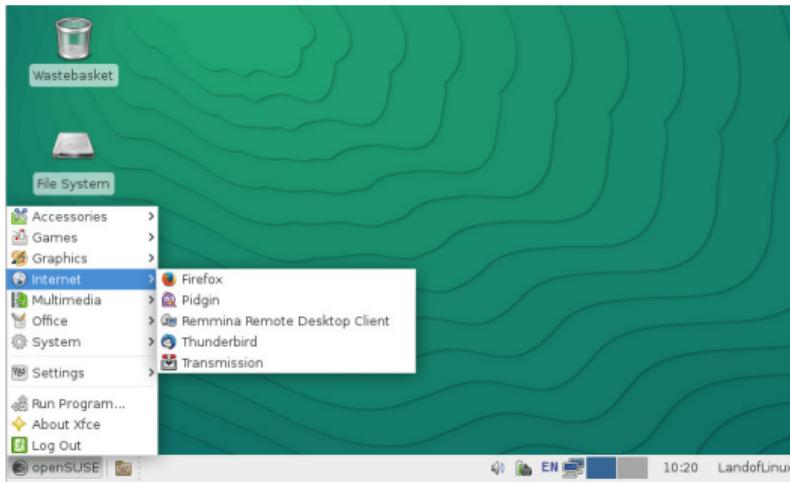
Replace anything!

The package manager is your friend

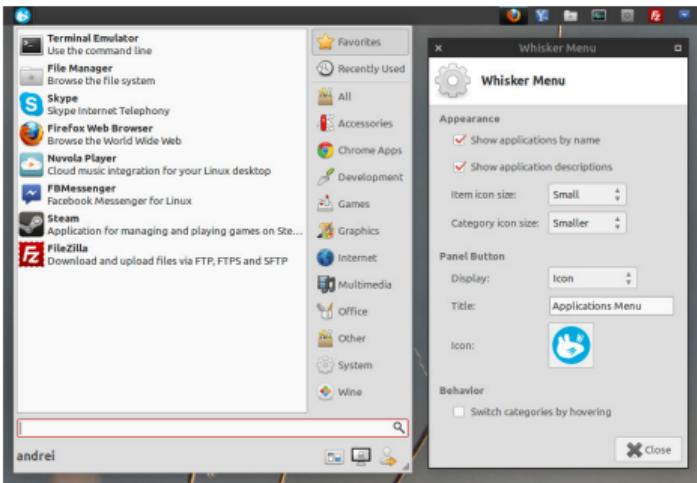
Start menus

- ▶ xfce, kupfer, whisker, rofi

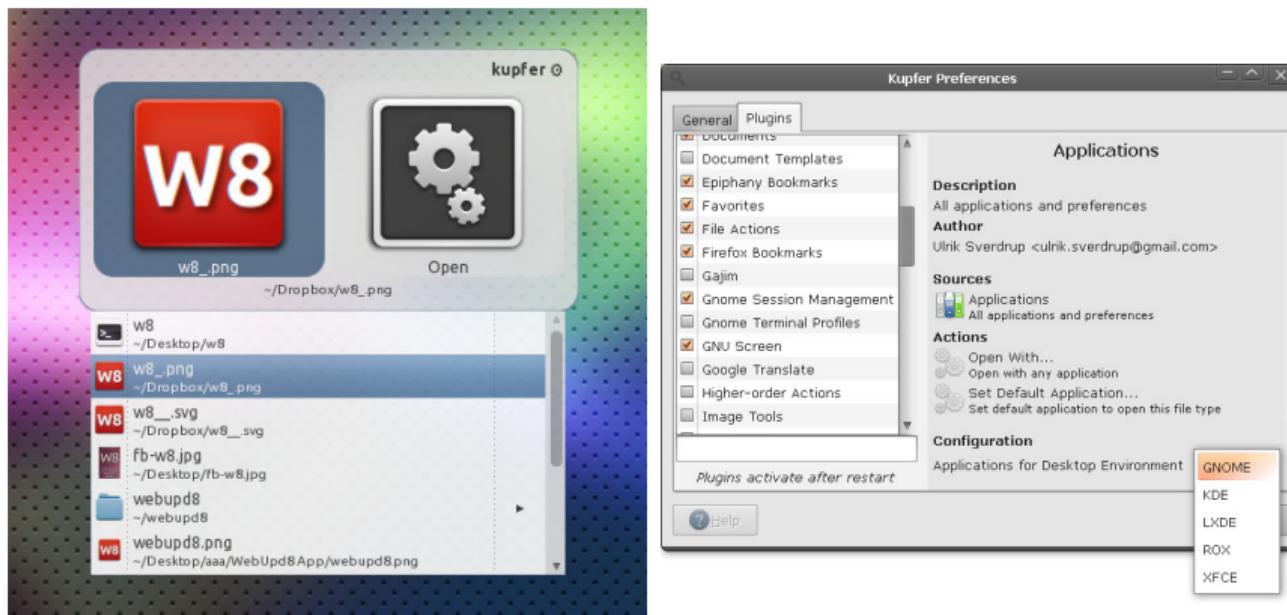
Start menus: XFCE default



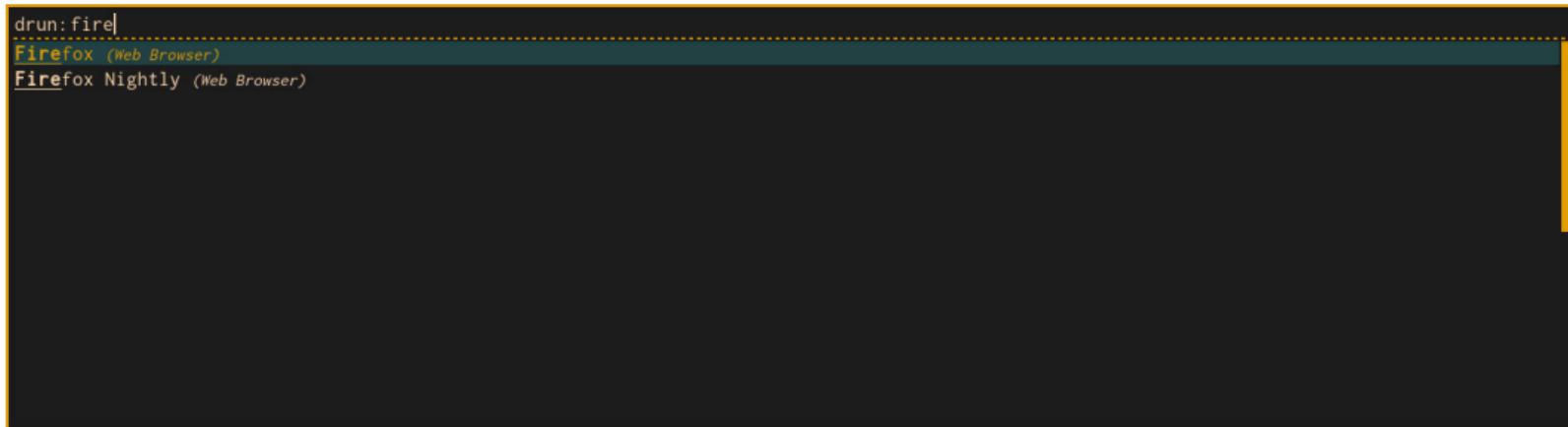
Start menus: Whiskermenu



Start menus: Kupfer



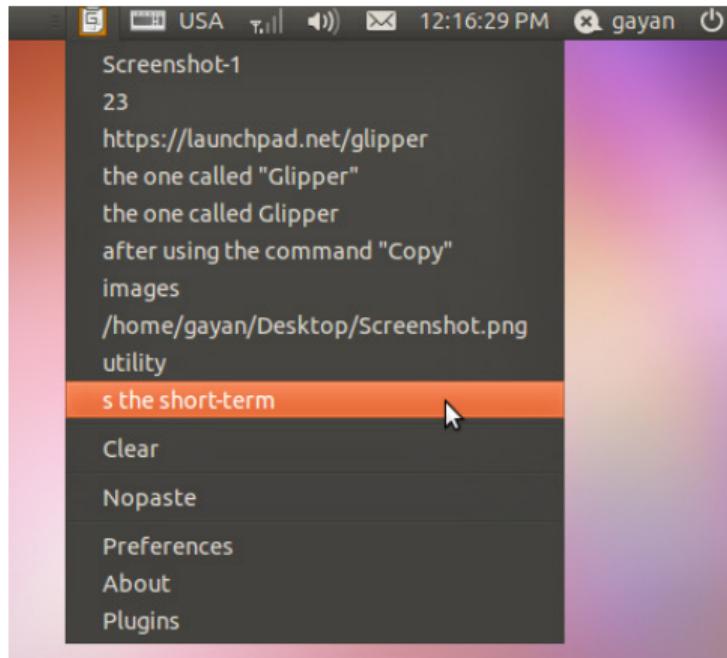
Start menus: Rofi



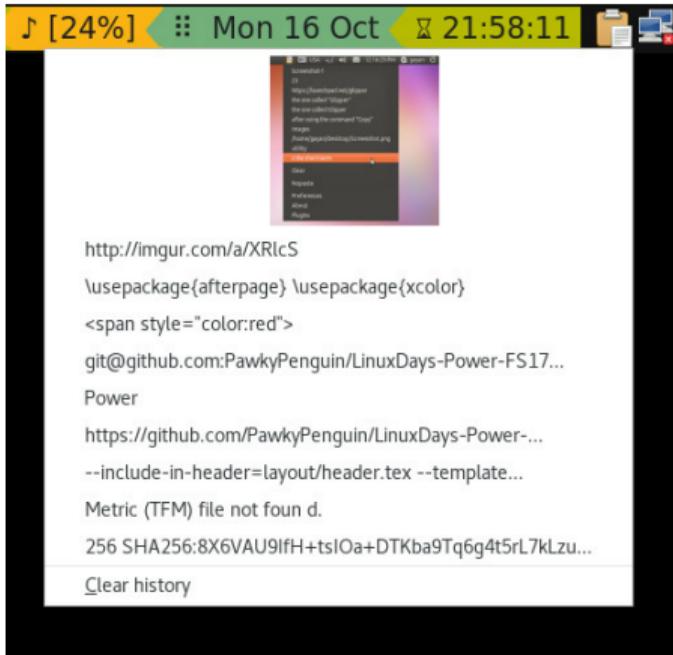
Clipboards

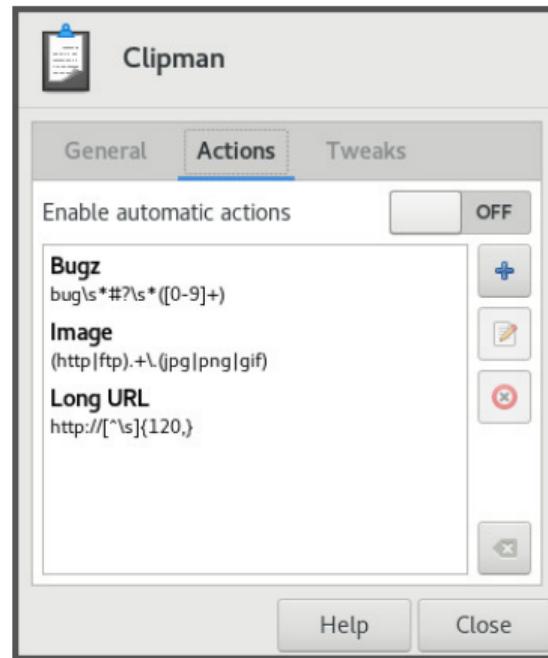
- ▶ glipper, copyq, xfce4-clipman

Glipper



Xfce4-Clipman



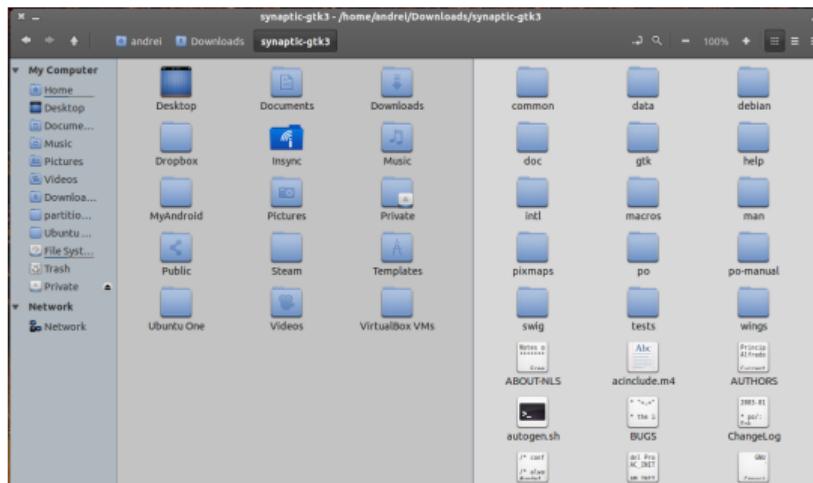


File Managers

- ▶ nemo, spacefm, ranger

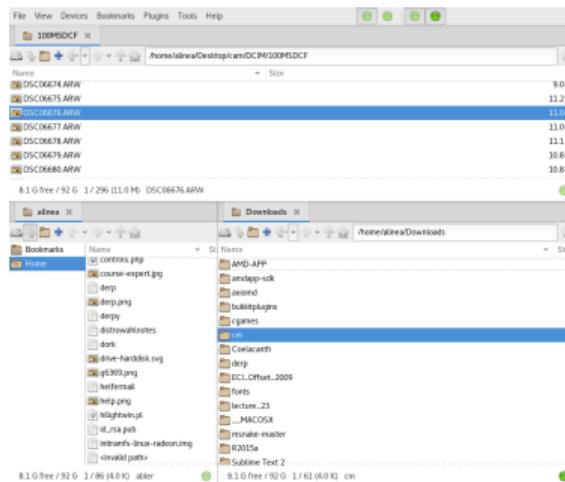
File Managers: Nemo

- ▶ Typical graphical file manager



File Managers: SpaceFM

- ▶ Graphical manager with a lot of features



File Managers: Ranger

- ▶ Completely cmdline based
- ▶ Even supports pictures

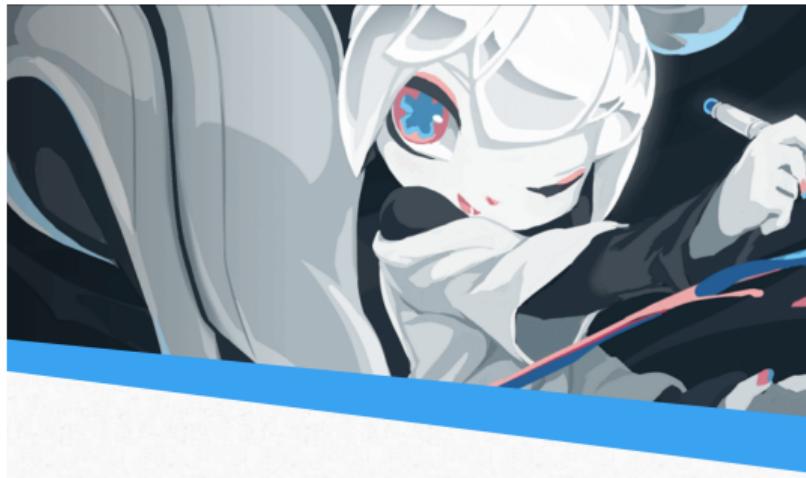


Drawing

- ▶ GIMP
- ▶ Krita
- ▶ Inkspace (for vector graphics)

Krita

- ▶ Digital painting and animation
- ▶ FOSS



Advanced

Doable after some reading

Shells

- ▶ bash, fish, zsh
- ▶ Tmux

Shells: Bash

- ▶ Standard shell on many distributions
- ▶ Configure using `.bashrc`

```
If I manage my bank account like I manage my phone battery, I'd be rich.  
[^(^.)-(alinea@Triangle)-(0)-(20:01 Fri Feb 26)-(~)]  
└> fortune | cowsay  
Term, holidays, term, holidays, till we \  
leave school, and then work, work, work  
till we die.  
\\ -- C.S. Lewis  
_____  
 \ ^__^  
  (oo)\----  
   (__)\       -||--W  
    ||----w ||  
[^(^.)-(alinea@Triangle)-(0)-(20:13 Fri Feb 26)-(~)]  
└> lol  
bash: lol: command not found  
[(0_0)-(alinea@Triangle)-(0)-(20:13 Fri Feb 26)-(~)]  
└> █
```

Shells: Fish

- ▶ Friendly interactive shell
- ▶ Configure in webbrowser
- ▶ Autocompletion shows while typing

The screenshot shows a web browser window with the URL `localhost:8000`. On the left, there's a configuration interface for the `fish` shell. It has tabs for `colors`, `prompt`, `functions`, `variables`, and `history`. The `prompt` tab is selected, showing a dropdown menu with "Current" and several themes: "Informative Git Prompt", "Screen Savvy", "Terlar", "Nim", "Classic", and "Classic + Status". The "Current" theme is highlighted. Below the dropdown, the code for the `fish_prompt` function is displayed:

```
function fish_prompt --description "Write out the prompt"
    # Just calculate theme once, to save a few cycles when
    # displaying the prompt
    if not set -q __fish_prompt_hostname
        set -q __fish_prompt_hostname $(hostname|cut -d . -f 1)
    end

    if not set -q __fish_prompt_normal
        set -q __fish_prompt_normal $(set_color normal)
    end
```

On the right, there's a terminal window showing a session on a blackbox system. The user runs `help fish_right_prompt` and lists various executables and tools:

```
nate@blackbox ~/lwn> help fish_right_prompt
help: Help is being displayed in xdg-open.
nate@blackbox ~/lwn>
(process:29259): GLib-CRITICAL **: g_slice_set_config: assertion `sys
e == 0' failed

nate@blackbox ~/lwn> pwd
/home/nate/lwn
nate@blackbox ~/lwn> ma
nate@blackbox ~/lwn> mat
match_parens          (Executable link, 3.3kB)
matchpoint             (Run feature detection and extraction)
math
mathspic               (Executable link, 125kB)
mattrib                (Change MSDOS file attribute flags)
nate@blackbox ~/lwn> mar
marble                 (Executable, 436kB)
markdown-calibre       (Markdown tool for calibre)
markdown_py             (A Python implementation of John Gruber's Markdown.)
nate@blackbox ~/lwn> marble
```

Shells: Zsh

- ▶ Nowadays, most advanced shell
- ▶ Plugins and themes with “oh-my-zsh”
- ▶ Incredibly configurable

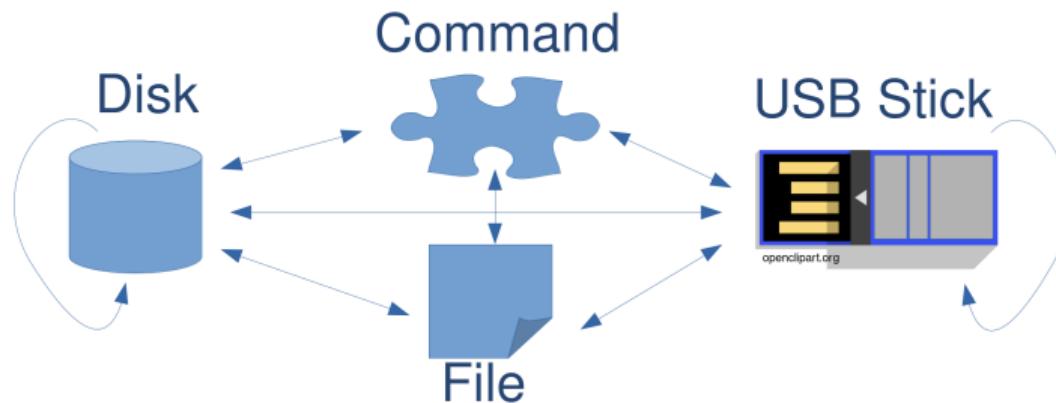
```
~ > sources > packages { master
~ > sources > packages { master tar [REDACTED]
A -- append to an archive
c -- create a new archive
f -- specify archive file or device
t -- list archive contents
u -- update archive
v -- verbose output
x -- extract files from an archive
~ > sources > packages { master git commit -m"Import IDs (aka keys) from XML into Proceedings and InProceedings"
bck-i-search: com_
```

Tmux

- ▶ Tmux is not a shell
 - ▶ ... but a **container** for shells
 - ▶ Provides shell “sessions”

dd

- ▶ Bitwise copy: Create exact copies on low level
- ▶ Can pipe to commands, e.g. `pbzip2`



dd

- ▶ `if=` and `of=` for input and output file
- ▶ `bs=4M` for faster copy

dd

▶ `sudo dd if=openSUSE.iso of=/dev/sdb bs=4M`

Input file is openSUSE image

Output file is /dev/sdb (a USB stick)

pbzip2

- ▶ `pbzip2` is like `zip`, but multicore
- ▶ Can be used with `dd`

dd and pbzip2

- ▶ Copy and compress `/dev/sda1` partition to `archive.img.pbzip`:

```
sudo dd if=/dev/sda1 | pbzip2 > archive.img.pbzip
```

How to backup?

- ▶ With `rsync`
- ▶ Can backup onto an external harddrive, NAS, Internet . . .

What to backup

- ▶ User files: `/home/user`
- ▶ System files: `/etc`, `/opt`, `/boot`, `/var`, `/root`, `/usr`

VPN using openconnect (Demo)

- ▶ Install openconnect: `sudo zypper in NetworkManager-openconnect`
- ▶ Click on icon -> VPN Connections -> Configure VPN
- ▶ Add new connection with openconnect

mpv

- ▶ Mediaplayer
- ▶ Controlled by keyboard
- ▶ Can run in console

youtube-dl

- ▶ Download YouTube videos
- ▶ `youtube-dl -x <URL>` to download audio only
- ▶ `youtube-dl "youtube.com/watch?v=dQw4w9WgXcQ"`

mpv + youtube-dl

- ▶ `mpv <URL>` plays YouTube video!

ffmpeg

- ▶ Easily convert between video formats:

```
ffmpeg -i input.avi out.mp3
```

Merge PDFs

▶ `pdfunite [SOURCES] [DEST]`

For example: `pdfunite intro.pdf appendix.pdf out.pdf`

For example: `pdfunite course*.pdf out.pdf`

Separate PDFs

- ▶ Separate a whole book into pages:

```
pdfseparate book.pdf page%d.pdf
```

- ▶ Extract one page:

```
pdfseparate -f 5 -l 5 book.pdf page.pdf
```

Search PDFs

- ▶ `pdfgrep` for searching through content of PDFs
- ▶ `pdfgrep "NSA"~/Documents/infsec/*.pdf`

Power consumption

- ▶ [powertop](#)
 - ▶ See exact information
 - ▶ Tune parameters
 - ▶ Calibrate battery
- ▶ [cpupower](#)
 - ▶ See what cpu is doing
 - ▶ See frequencies etc.

Recover lost data

- ▶ **photorec**

- ▶ Works on broken filesystems
- ▶ Recovers videos, documents...
- ▶ ~300 file families supported

- ▶ **dd_rescue**

- ▶ Copies data (like dd)
- ▶ Automatically skips unreadable blocks(!)
- ▶ Pulls data from almost dead harddisk

xrandr

- ▶ Control display size etc.
- ▶ Put projector on auto-resolution:

```
▶ xrandr --output VGA-0 --auto
▶ xrandr --output VGA-0 --auto --left-of LVDS
```

feh

- ▶ Set a random wallpaper:

```
feh --bg-fill --randomize ~/Images
```

ssh

- ▶ Encrypted connection to remote machine

```
▶ ssh [USERNAME]@[HOSTNAME]  
▶ ssh nils@192.168.1.1
```

scp

- ▶ Copy files (securely)

rsync (again)

```
▶ rsync -avh Downloads/ nils@192.168.1.1:media
```

Cronjobs

- ▶ Schedule jobs, e.g. daily, weekly...
- ▶ Command: `crontab`

Look at logs

- ▶ Under `/var/log`
- ▶ Or `dmesg` for logs that you can't understand

Break

- ▶ Back in 5 minutes.
- ▶ Get the slides:

<https://github.com/PawkyPenguin/LinuxDays-Power-HS17>

Expert

Concepts needing some experience

Development

- ▶ Very tight integration on commandline
- ▶ Easy access to software
 - ▶ Through package manager
 - ▶ Through github

Easy programming in...

- ▶ Java
- ▶ C, C++
- ▶ Ruby
- ▶ Python
- ▶ Haskell
- ▶ ...

Github

- ▶ Incredibly big repository
- ▶ Community-driven
- ▶ Download software with `git clone <URL>`

Write a webserver

- ▶ Activate HTTP server with `systemctl enable httpd`

Gaming

- ▶ Steam is nearing ~25% Linux support
- ▶ WINE

WINE

- ▶ “Emulator” for Windows
- ▶ Not only for games
- ▶ Works well for most programs
- ▶ WineHQ: Giant database keeping track of what works

The screenshot shows the WineHQ application interface. At the top, there is a search bar with dropdown menus for Rating, Wine version, License, and Keywords, and input fields for Name and a checkbox for Only show downloadable apps. Below the search bar, a section titled "Active filters" shows a dropdown for Category set to Games and a "Update filter" button. A message indicates "Showing entry 5126 to 5150 of 7466". The main area displays a table with columns Application, Entry#, and Description. The table lists several games:

Application ▲	Entry#	Description
Rise of the Argonauts	8977	Rise of the Argonauts is an action RPG set on an epic scale, in the world of Greek myth and legend.
Rise of the Tomb Raider	17485	Rise of the Tomb Raider is an action-adventure platform game. Published by Square Enix, Rise of the Tom
Rise of the Triad (2013)	15374	Apogee Software and Interceptor Entertainment proudly present the
Risen	10408	Risen is a single-player fantasy-themed action role-playing game under development by the German comp
Risen 2 - Dark Waters	14177	Action Adventure from the Developers of the Gothic Series.

WINE

- ▶ Better support for Windows games than Windows itself!¹

¹For older games



Gaming outlook

- ▶ Valve still actively pushing Linux
- ▶ Vulkan (cross-platform API) supported by big game engines
 - ▶ Unreal Engine
 - ▶ CryEngine
 - ▶ Unity

Becoming a power user

(2°w*)Ø=☆*+°.*:°

A **power user** or **experienced user** is a computer **user** who uses advanced features of computer hardware,^{[1][2][3]} operating systems,^[4] programs,^{[5][6]} or web sites^[7] which are not used by the average user.

Start

- ▶ Identify important Bash commands
- ▶ Skim their manuals

Building Knowledge

- ▶ Get broad knowledge
- ▶ Create your own problems
- ▶ Look at examples (open source!)

Building Efficiency

- ▶ Learn a lifetime editor
 - ▶ Vim
 - ▶ Emacs
 - ▶ Atom
- ▶ Takes a month or two
- ▶ ... but huge payoff

- ▶ Identify problem
- ▶ Open Vim
- ▶ Program some zsh

Communities

- ▶ [reddit.com/r/linux](https://www.reddit.com/r/linux)
- ▶ unix.stackexchange.com
- ▶ Various forums
- ▶ And us :)

Summary

- ▶ You've seen various usescases of Linux
- ▶ Hopefully you're willing to use the command line
 - ▶ Hopefully it's still scary

Questions?

Coming up

- ▶ Bash workshop:
 - ▶ October 23 | 17:15-19:00 | ETH HG D 3.2
 - ▶ or: October 25 | 17:15-19:00 | ETH HG D 3.2
- ▶ Spotlight course: Introduction to Vim
 - ▶ October 26 | 17:15-19:00 | ETH HG D 3.2

Questions?

- ▶ Is anything still unclear?
- ▶ **Ask now!**
(or come to front in a minute)

Where to find these Slides

- ▶ Find the slides here:
<https://github.com/PawkyPenguin/LinuxDays-Power-HS17>
- ▶ Slides by Nils Leuzinger, licensed under CC BY-SA 4.0
- ▶ Slide template by Christian Horea, licensed under CC BY-SA 3.0