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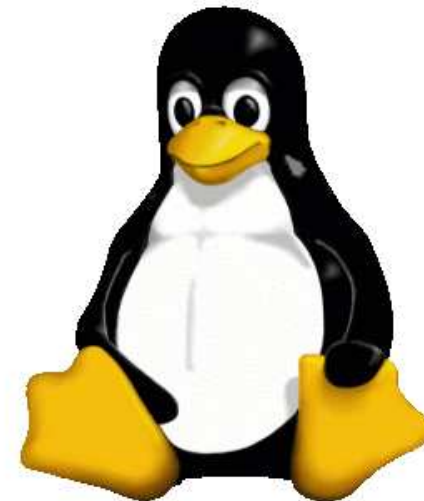
# ***Introduction to GNU/Linux***

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- What is FOSS?
- Advantages of GNU/Linux
- GNU/Linux distributions
- Installing GNU/Linux
- Using GNU/Linux
  - basic system administration tasks
  - word processing
  - data analysis
  - programming
- Pointers, where to get help, etc.



# *What is FOSS?*

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Software that provides users with following freedoms

1. the freedom to run the program, for any purpose (freedom 0);
2. the freedom to study how the program works, and change it to make it do what the user wishes (freedom 1);
3. the freedom to redistribute copies (freedom 2);
4. the freedom to distribute copies of any modified versions to others (freedom 3).

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# Advantages of GNU/Linux

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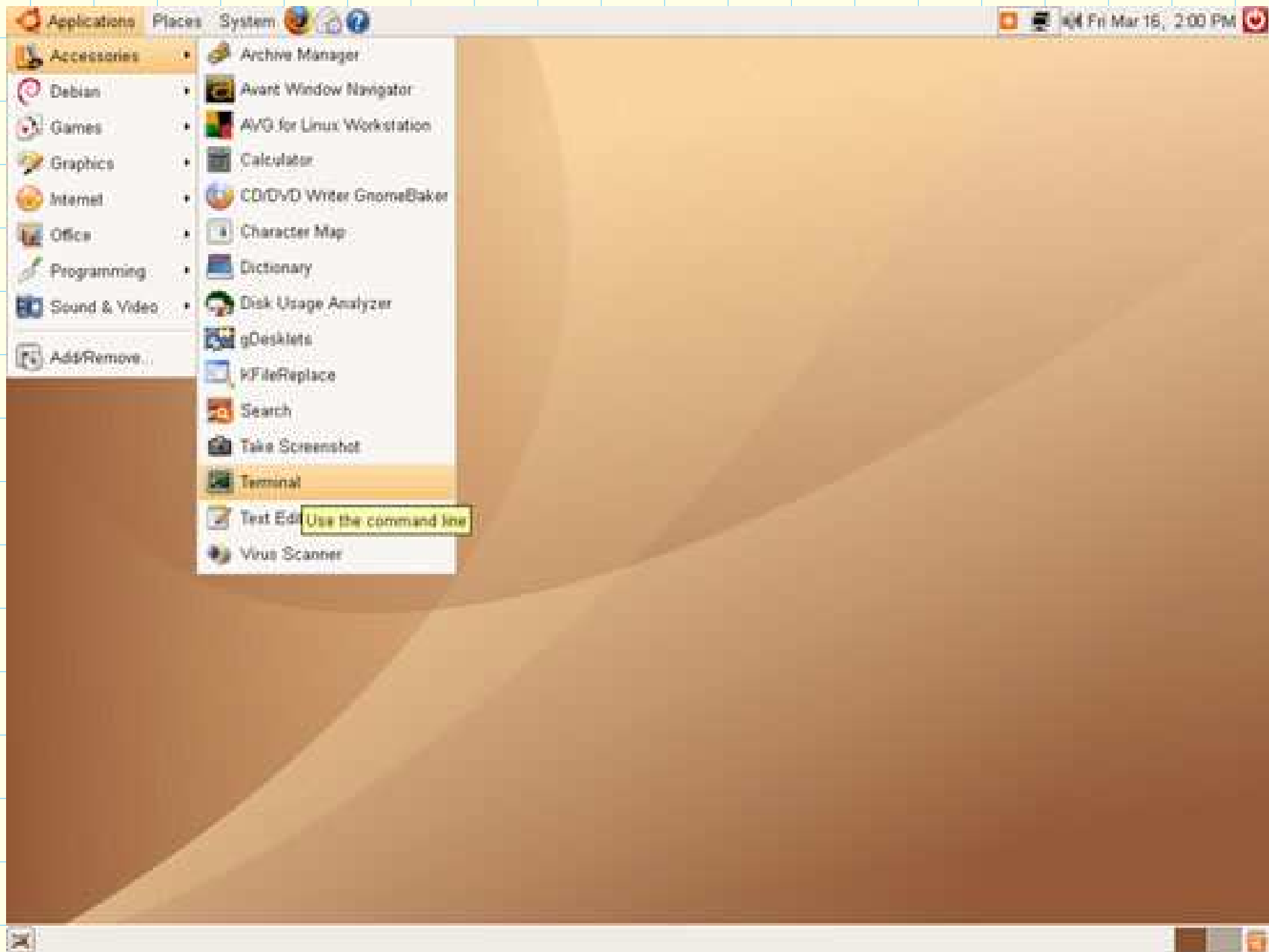
- Economic reasons: cheaper.
- Legal reasons: freedom to share  $\Rightarrow$  no piracy involved.
- Technical reasons: freedom  $\Rightarrow$  quality is often as good / better.

Examples:

- music player
- better desktop manager







# Advantages of GNU/Linux

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- Most useful software comes with the distribution or is readily available
  - updates and improvements are available more quickly
- For most hardware, no drivers are needed
  - users have more control; less “bloat”, runs on lower end hardware
- Enormous and usually very helpful user community + documentation (HOWTOs, etc.)
- More secure — no / very few viruses
- Live CDs / USBs ⇒ you can try it easily and without any risk

<http://www.whylinuxisbetter.net/>

# ***Common misconceptions***

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- GNU/Linux is hard to use.
  - ⇒ some of us are just conditioned to think that way.
- GNU/Linux is unsupported, and therefore unreliable.
  - ⇒ Paid support is often available.
  - ⇒ Community support is freely available.
- We need to use what the real world uses.

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# ***GNU/Linux distributions***

# *What is a distribution?*

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- Kernel + application programmes
- Components from many sources packaged together
- Available conveniently as a single download / DVD / CD set

Distribution = flavour

# *Choice of distribution*

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- Different distributions have different emphasis
- Package management is an important distinguishing feature
- `http://www.distrowatch.com`
- Some of the most popular distributions:
  - Ubuntu `http://www.ubuntu.com/`
  - Fedora `http://fedoraproject.org/`
  - openSUSE `http://www.opensuse.org/`

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# ***Installation and use***

## **Resources**

- <http://www.dedoimedo.com/computers/ubuntu-install.html>
- <http://seogadget.co.uk/the-ubuntu-installation-guide/>
- <http://www.howtoforge.com/the-perfect-desktop-ubuntu-11.04-natty-narwhal-with-ubuntu-classic>

## **Points to remember**

- Partitioning
- Set non-obvious password(s) (and remember it/them!)

# Package management

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- DEB (Ubuntu):

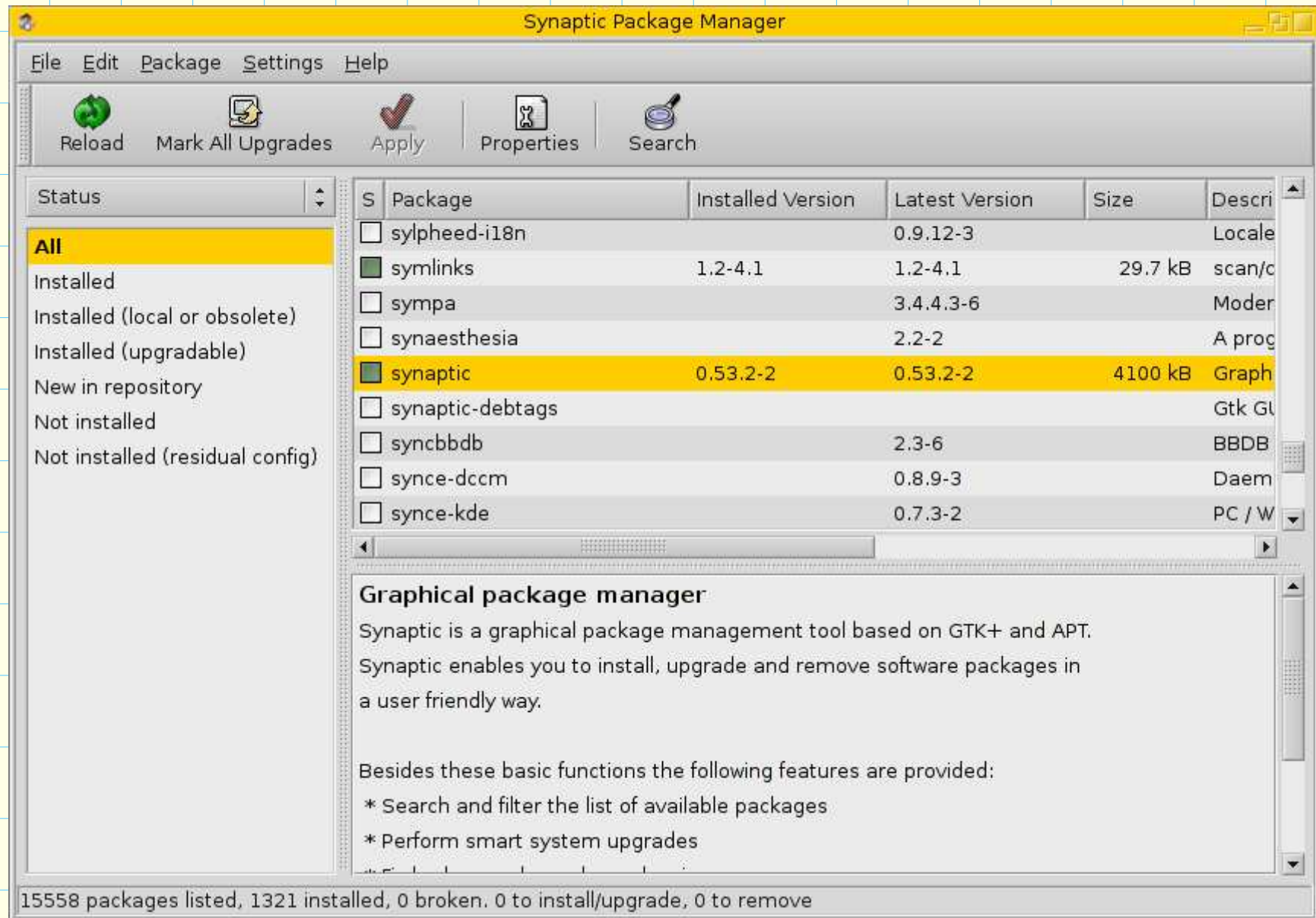
```
apt-get (install | remove) <package name>
```

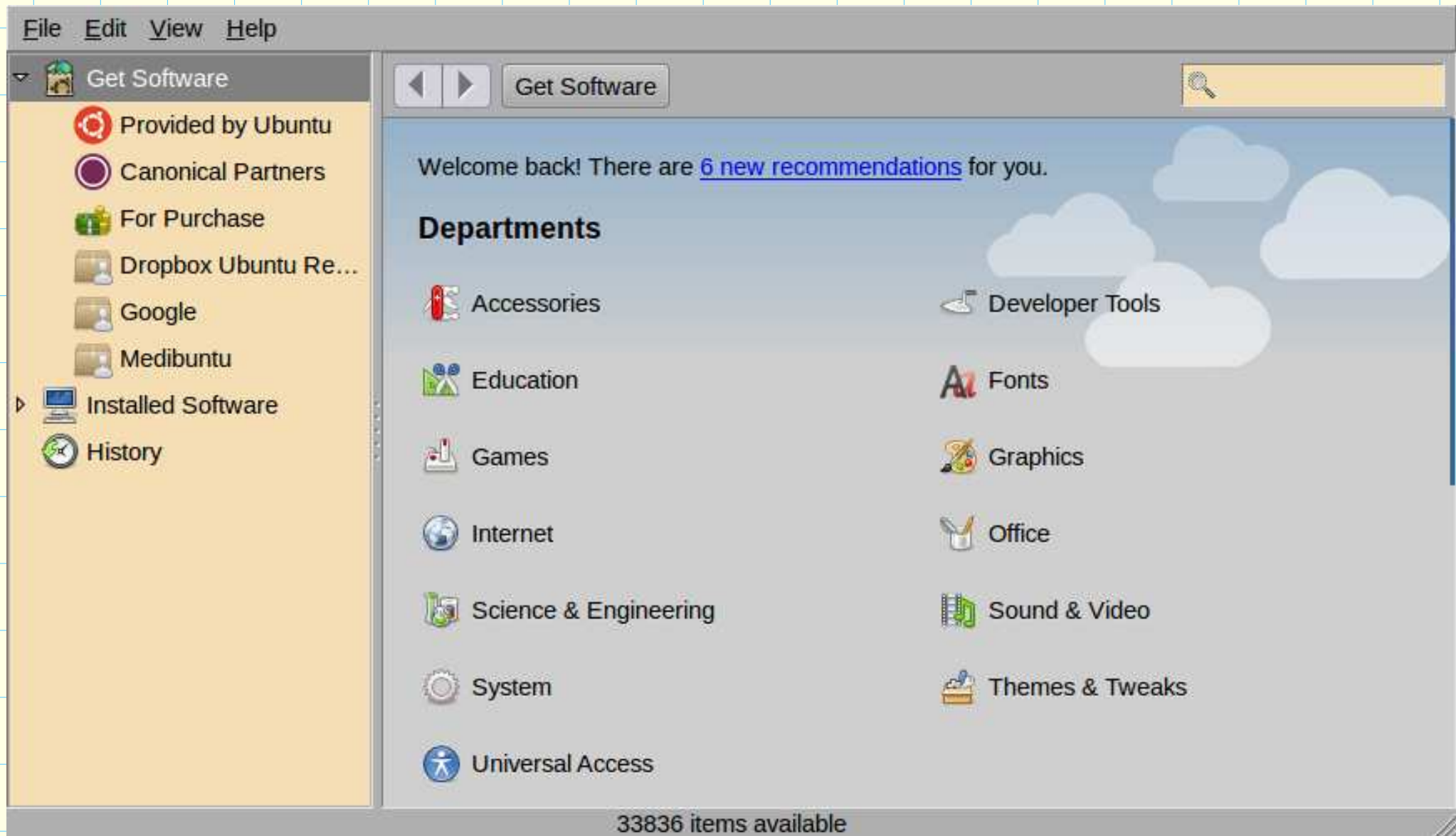
```
synaptic
```

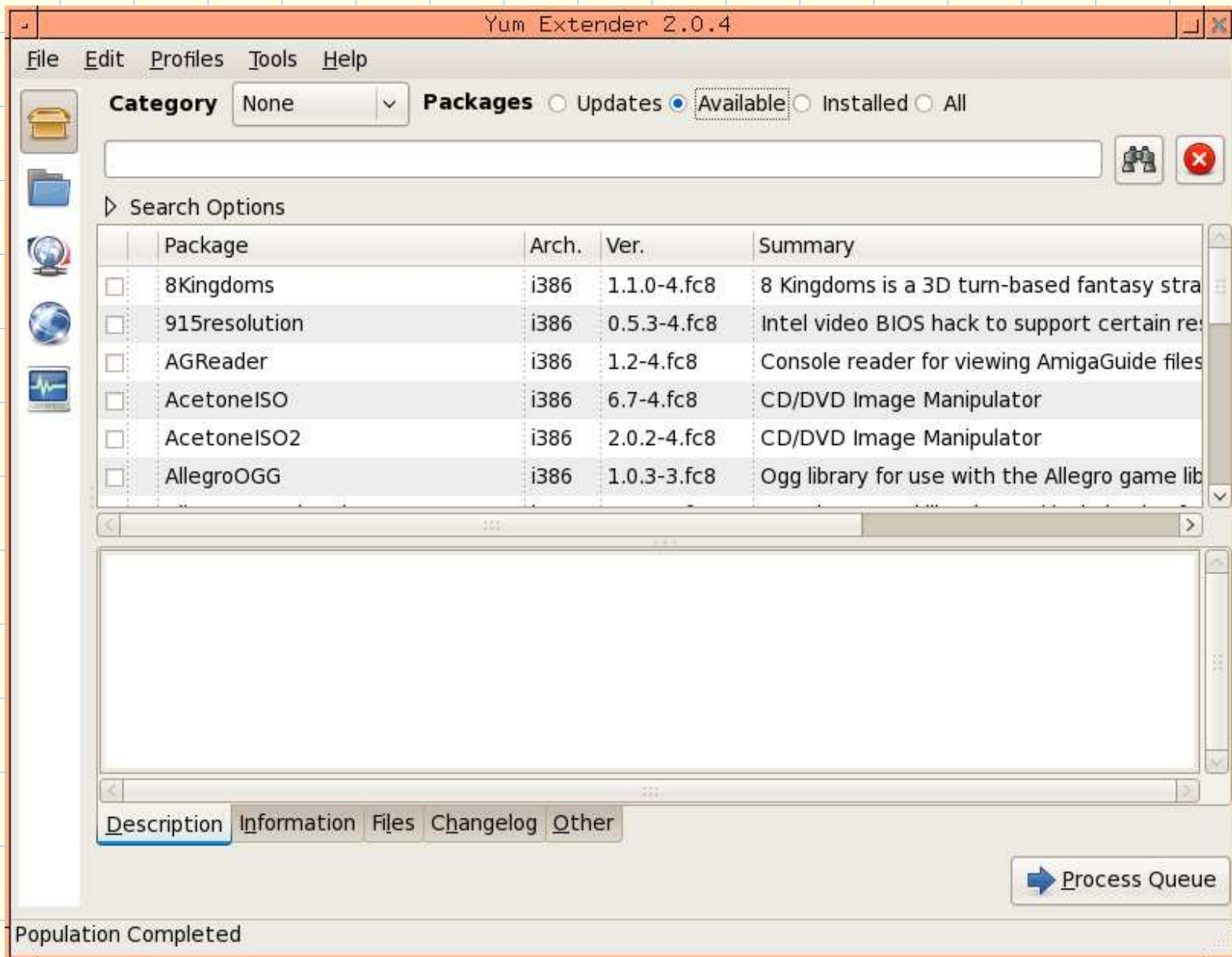
- RPM (Fedora, SuSE):

```
yum (install | remove) <package name>
```

```
yumex
```





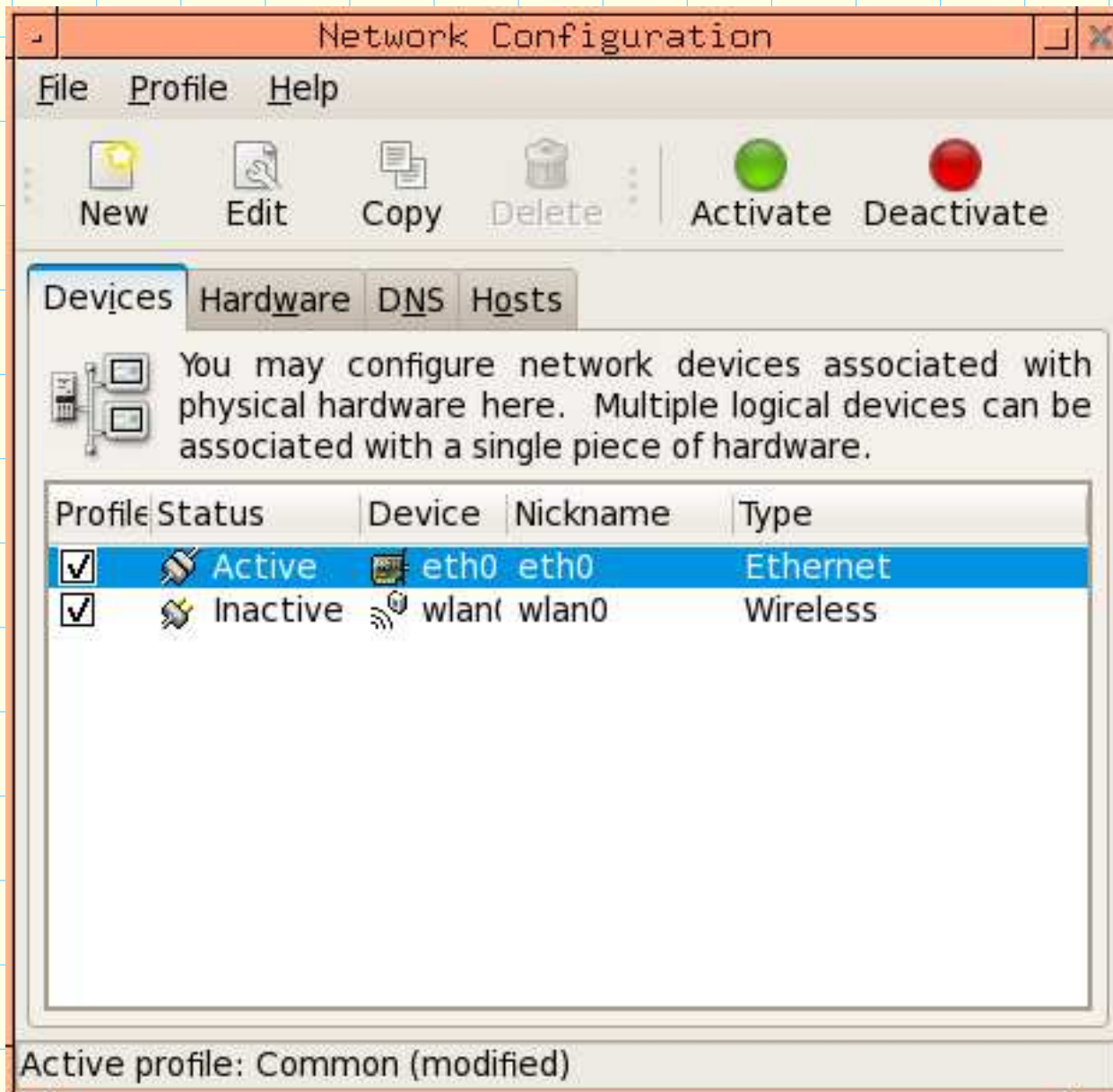


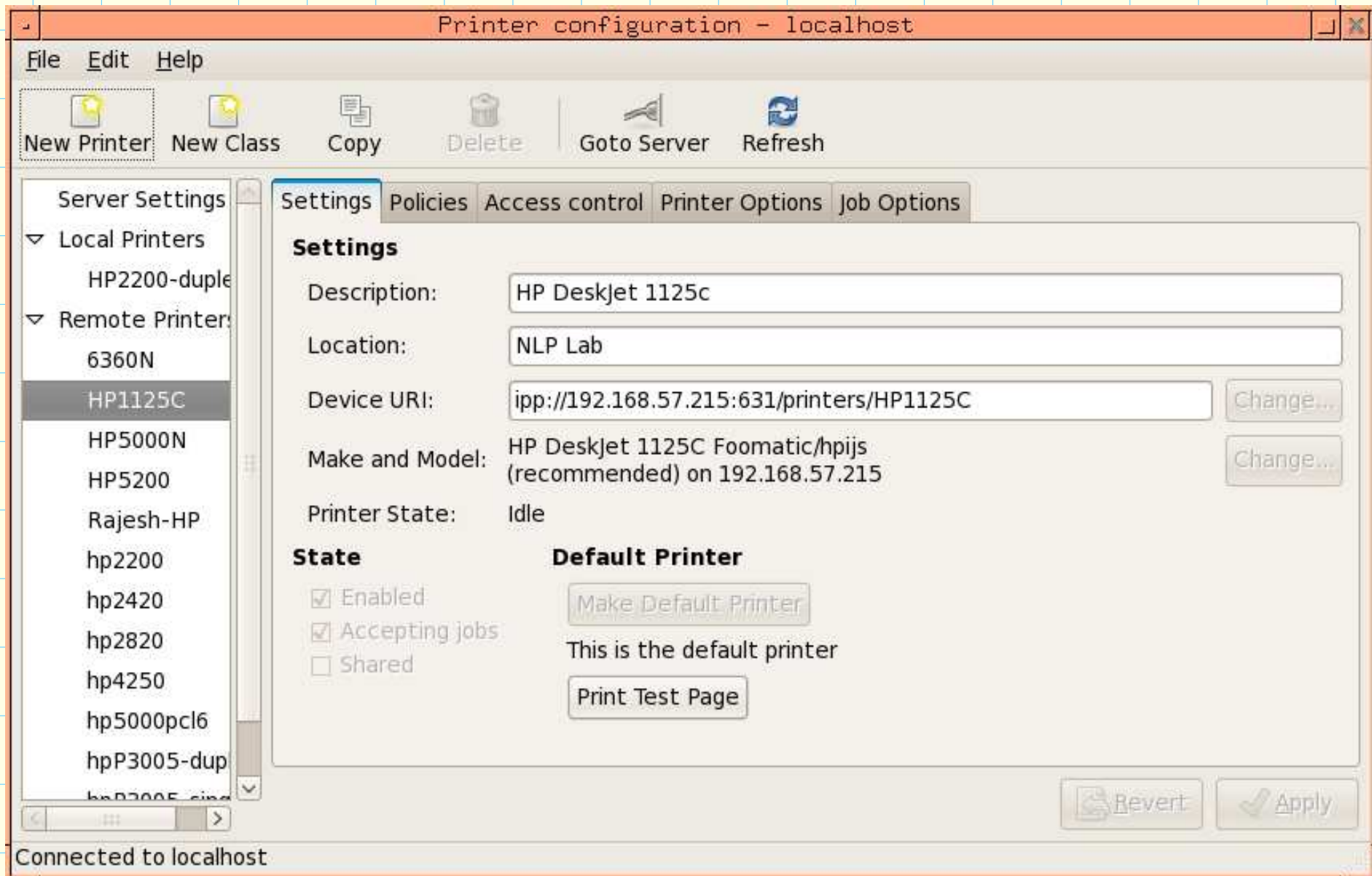
# *System administration*

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## **Commands:**

- Also available through menu (System → Administration)



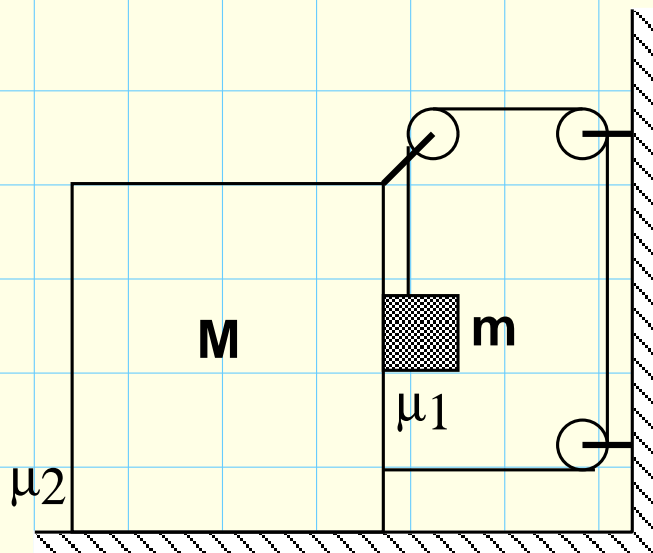
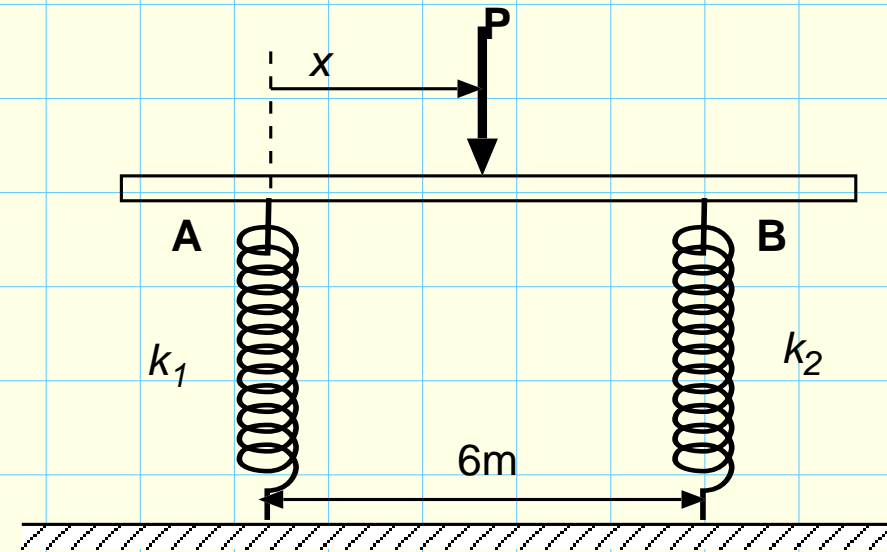
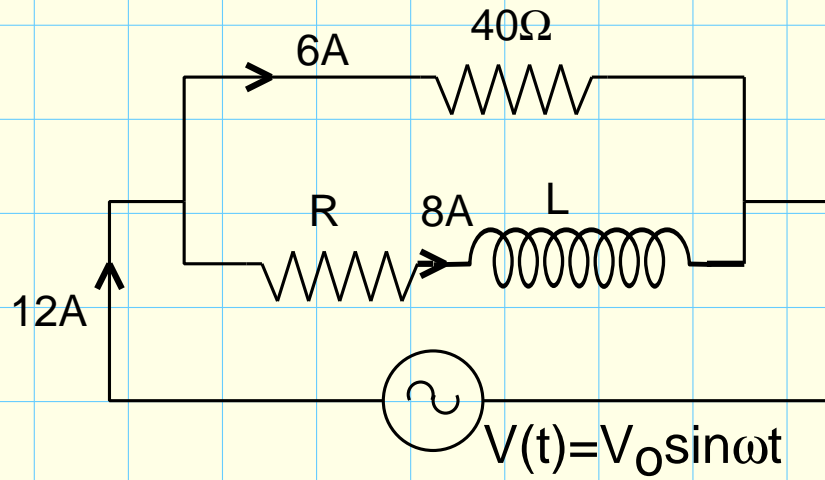


# *Word processing*

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- Openoffice <http://www.openoffice.org>  
writer, calc, impress, base, etc.
- Viewers for postscript, PDF
- Kile for writing Latex documents
- Drawing tools: tgif, dia, inkscape
- Image processing: GIMP, ImageMagick

# Diagrams



## Memory debugging tools: valgrind (<http://valgrind.org/>)

- Usage: `valgrind -leak-check=yes myprog arg1 arg2`

- Output:

```
==19182== Invalid write of size 4
==19182==      at 0x804838F: f (example.c:6)
==19182==      by 0x80483AB: main (example.c:11)
==19182== Address 0x1BA45050 is 0 bytes after a block of size 40 alloc'd
==19182==      at 0x1B8FF5CD: malloc (vg_replace_malloc.c:130)
==19182==      by 0x8048385: f (example.c:5)
==19182==      by 0x80483AB: main (example.c:11)
```

## **The command line**

- Commands can be entered at a “shell prompt” in a terminal

- Some common commands

`cd`    `pwd`    `mkdir`    `rmdir`

`ls`    `cp`    `mv`    `rm`

`cmp`    `diff`    `less`    `su`

- For help on commands, use `man`

- Data analysis using the command line:

`sort`, `join`, `comm`, `awk`, `sed`, `grep`

- If you are using new hardware, use an up-to-date version
- Live CDs (Ubuntu / Knoppix) are very useful
  - familiarization
  - rescue disk
- Take backups at least once a month
- **Mailing lists and Google are very helpful**

# Sources and references

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- Linux in a nutshell - O'Reilly

- Linux in 24 hours / Linux unleashed

<http://www.linuxebooks.com/ebooks.html>

- The Linux Installation HOWTO

<http://tldp.org/HOWTO/Installation-HOWTO/>

- Linux Installation and Getting Started

<http://tldp.org/LDP/gs/gs.html>

- The Linux System Administrator's Guide

<http://tldp.org/LDP/sag/sag.pdf>

- Installation

<http://cacs.usc.edu/CSWUG07/Linux%20Install%20-%20rseymour.pdf>

- Package management

<http://www.debian.org/doc/manuals/apt-howto/>

## *More pointers*

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- [www.linuxquestions.org](http://www.linuxquestions.org)
- [www.howtoforge.org](http://www.howtoforge.org)
- [www.linuxmanuals.net](http://www.linuxmanuals.net)

Our own: [www.ilug-cal.info](http://www.ilug-cal.info) — *please register!*