How to Build a Linux Kernel

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Worcester, MA, USA
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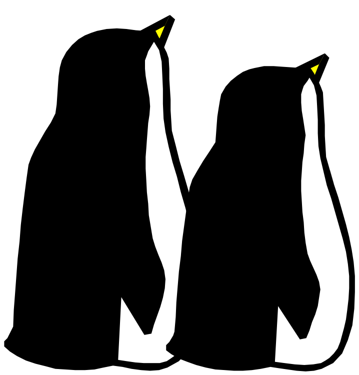
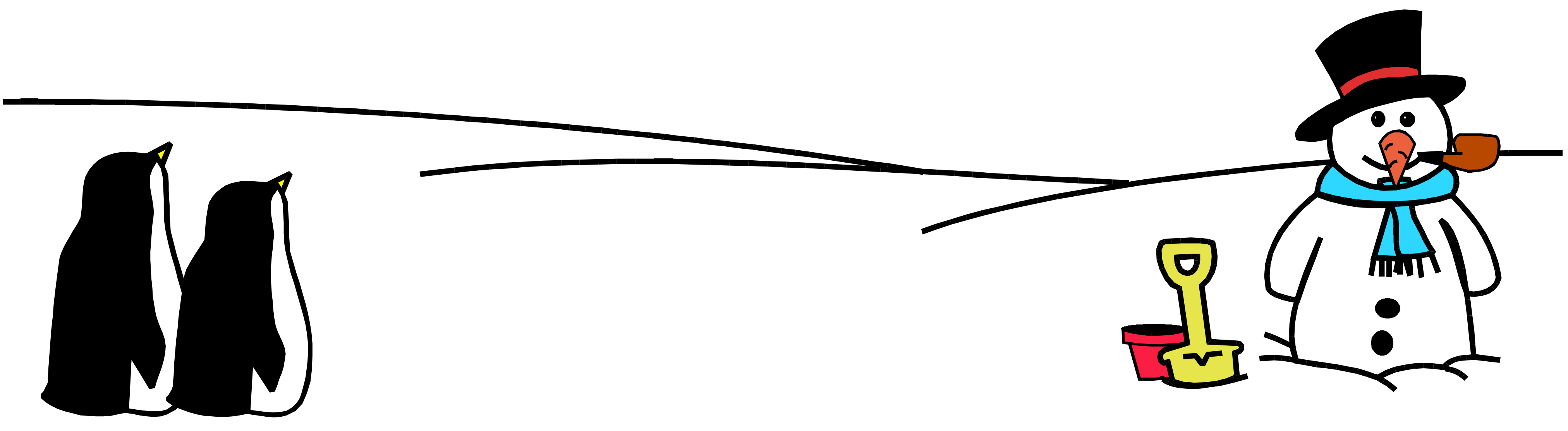


This presentation was created with
StarOffice 5.0 Personal Edition
on an Intel based system running Linux 2.0.36.

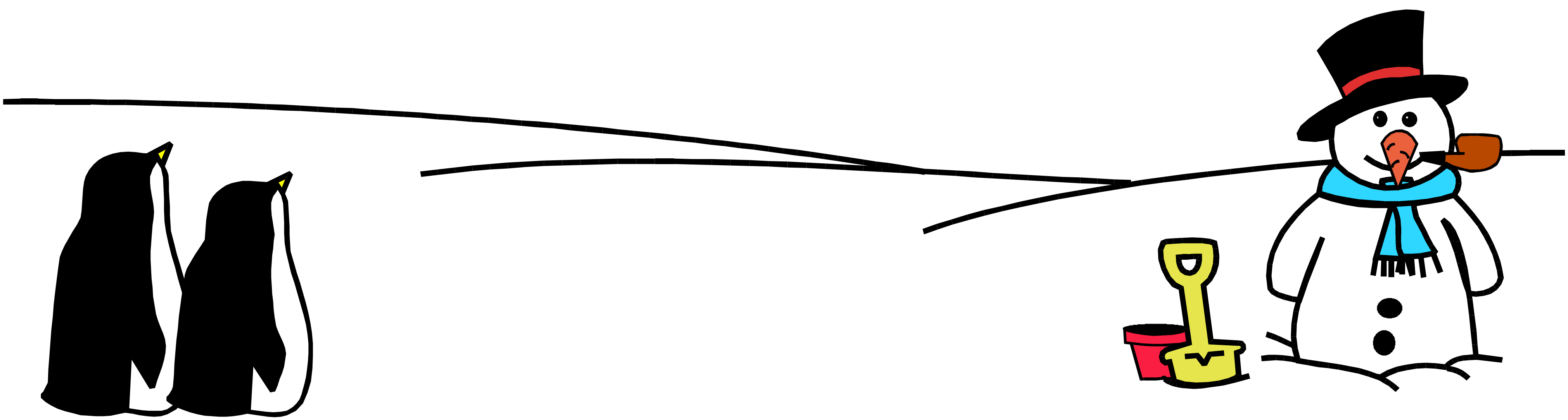
What is a "kernel"?

- The kernel provides the interface to all system resources, such as disks, memory, etc..



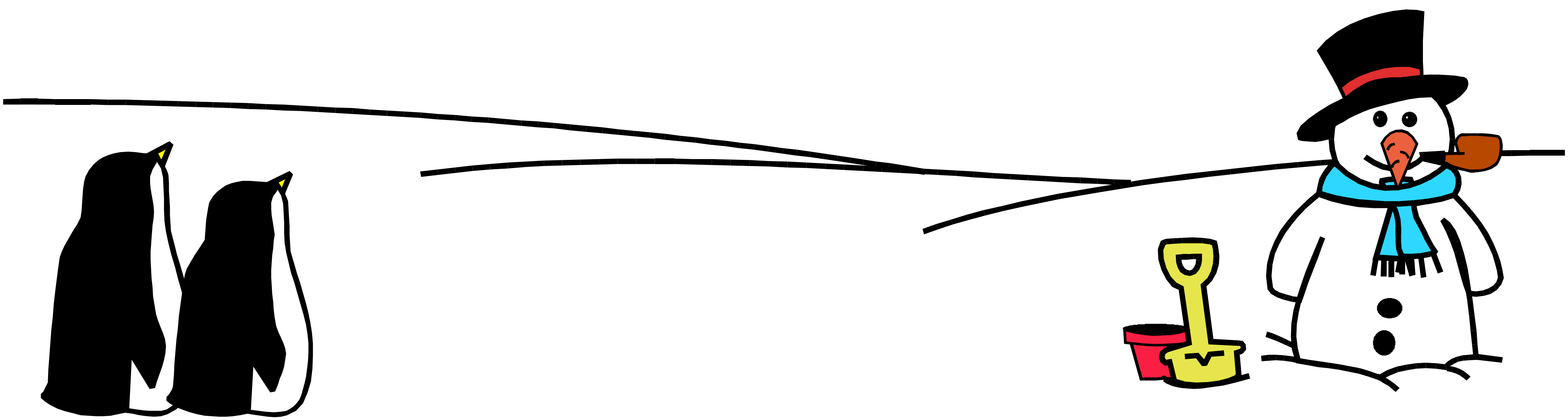
Why do I want to build a new one?

- *Perhaps you have added new hardware that is not supported by an older kernel*
- *There is new functionality that you desire*
- *A bug exists that is fixed in a more recent kernel version*



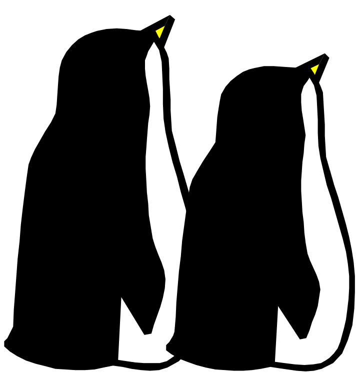
Where do I find the kernel sources?

- *On a CDROM*
- *On the Internet:*
  - *http://www.kernel.org*
  - *http://sunsite.unc.edu/pub/Linux/welcome.html*



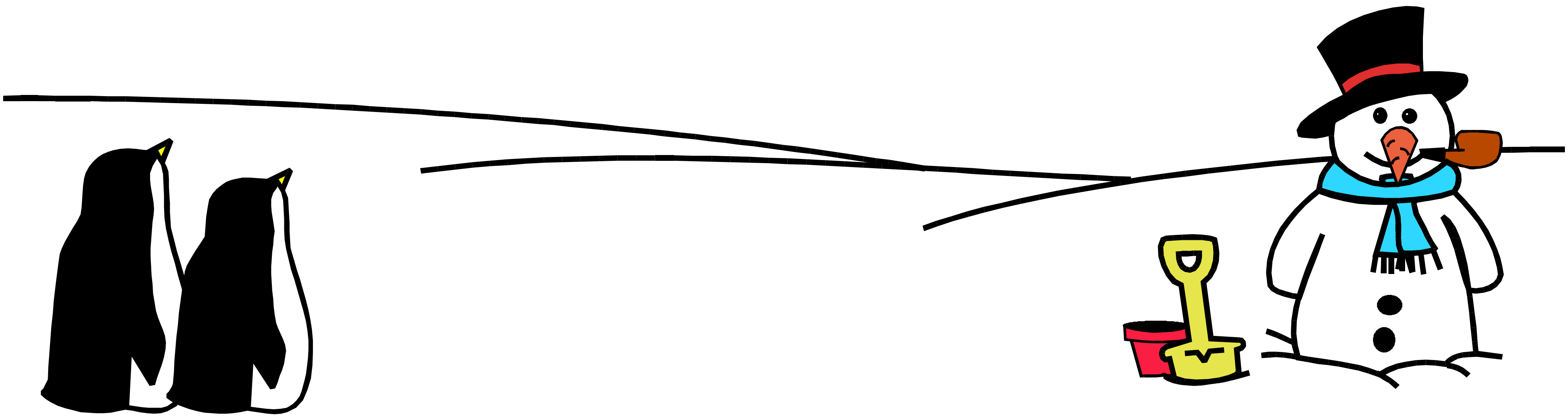
RedHat kernel sources

- Install the RPM files for the following:
  - kernel – contains previously built modules
  - kernel–headers – .h files
  - kernel–source – all other kernel source files
  - Conditionally: kernelcfg, kernel–pcmcia, kernel–ibcs



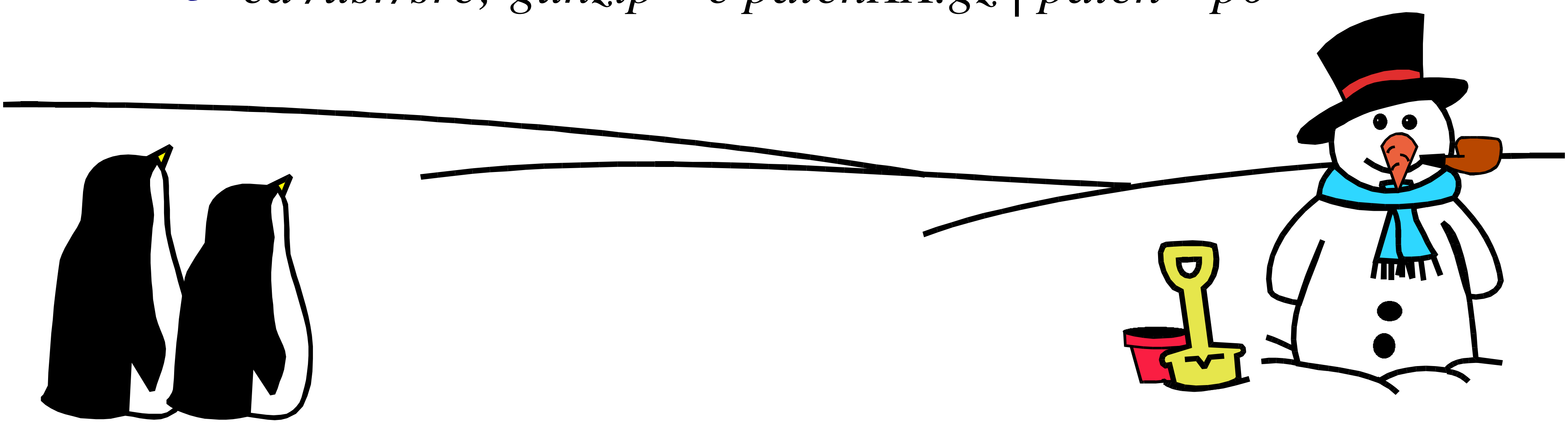
Tar file containing kernel sources

- Obtain kernel–x.y.z.tar.gz
- Go to the /usr/src directory
- Untar the kernel source tar file
  - tar xvzf kernel–x.y.z.tar.gz



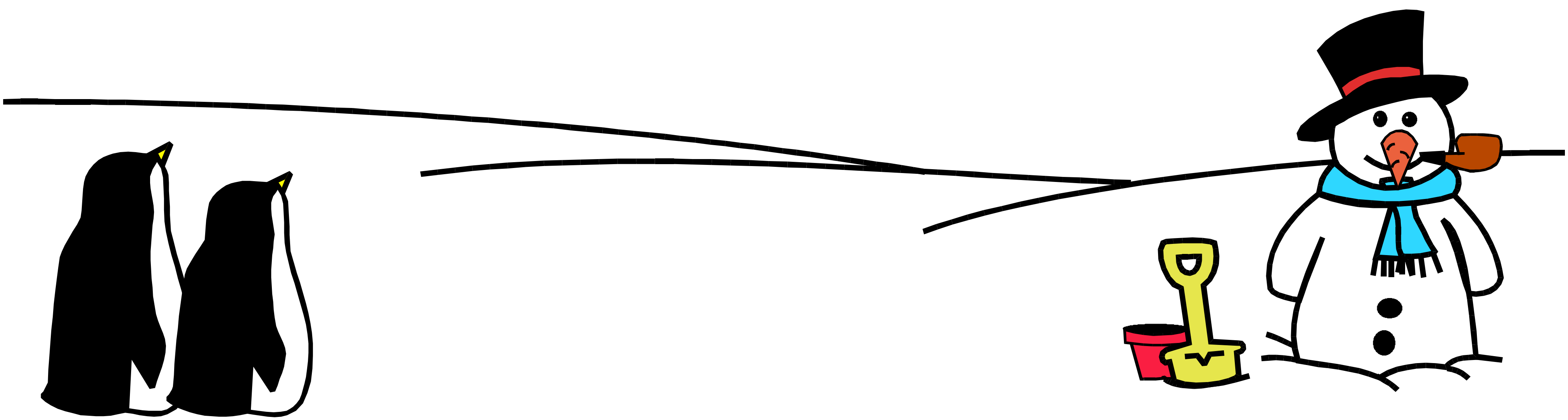
Patching a kernel source tree

- Patching a kernel source tree has advantages:
  - patches are smaller to download than full sources
  - its very quick to apply a patch
- To apply a patch:
  - cd /usr/src; gunzip –c patchXX.gz | patch –p0



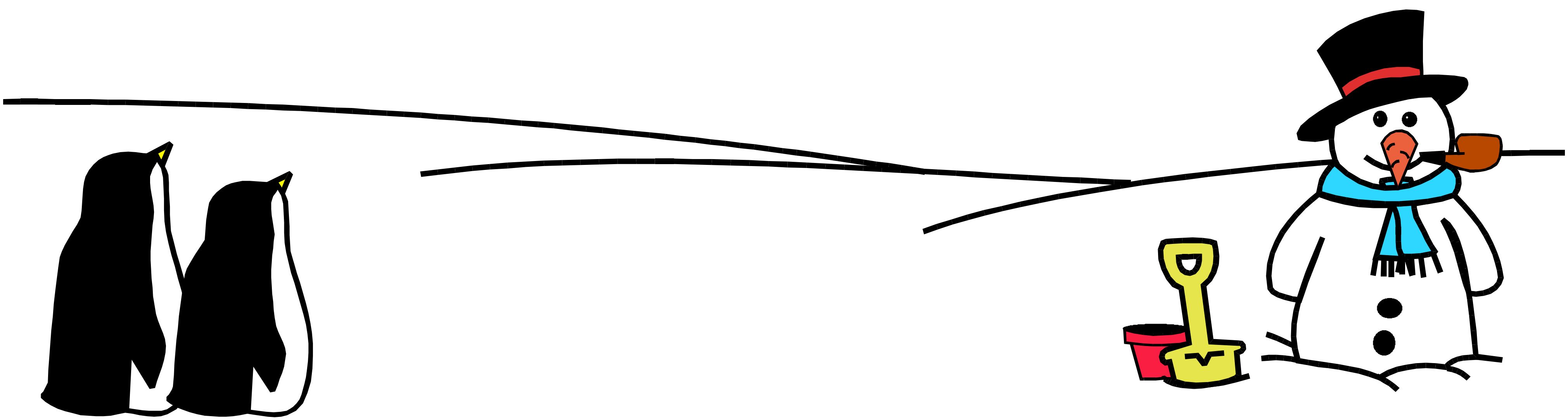
Prepare to configure your kernel

- *Insure that the following links exist:*
  - */usr/src/linux –> /usr/src/linux–x.y.z*
  - */usr/include/asm –> /usr/src/linux/include/asm*
  - */usr/include/linux –> /usr/src/linux/include/linux*
  - */usr/include/scsi –> /usr/src/linux/include/scsi*



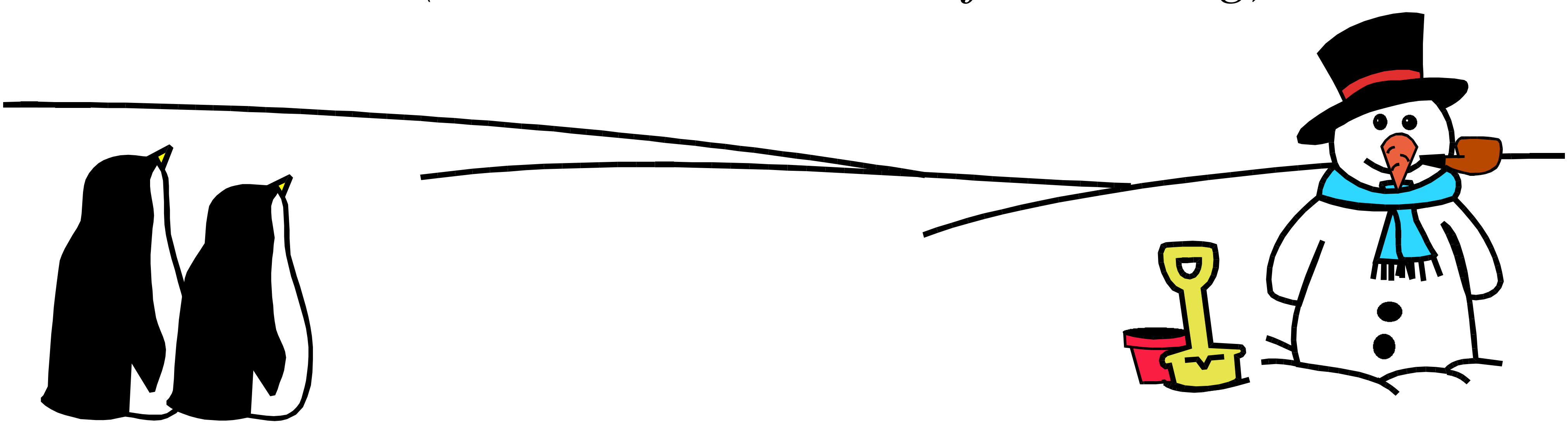
Start up the config program

- X–windows: make xconfig (Tk)
- Console: make menuconfig (ncurses)
- Dumb terminal: make config



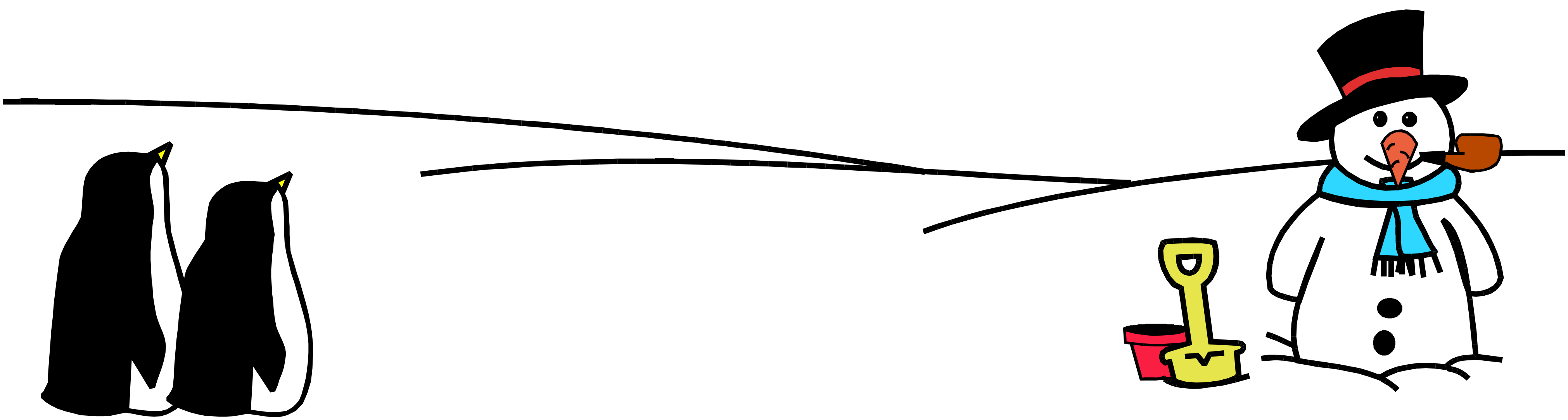
What are kernel modules?

- Pieces of kernel code which are not included directly into the kernel.
- Modules are loaded and removed as needed
- Key pieces of kernel code must not be built as modules (such as code needed for booting)



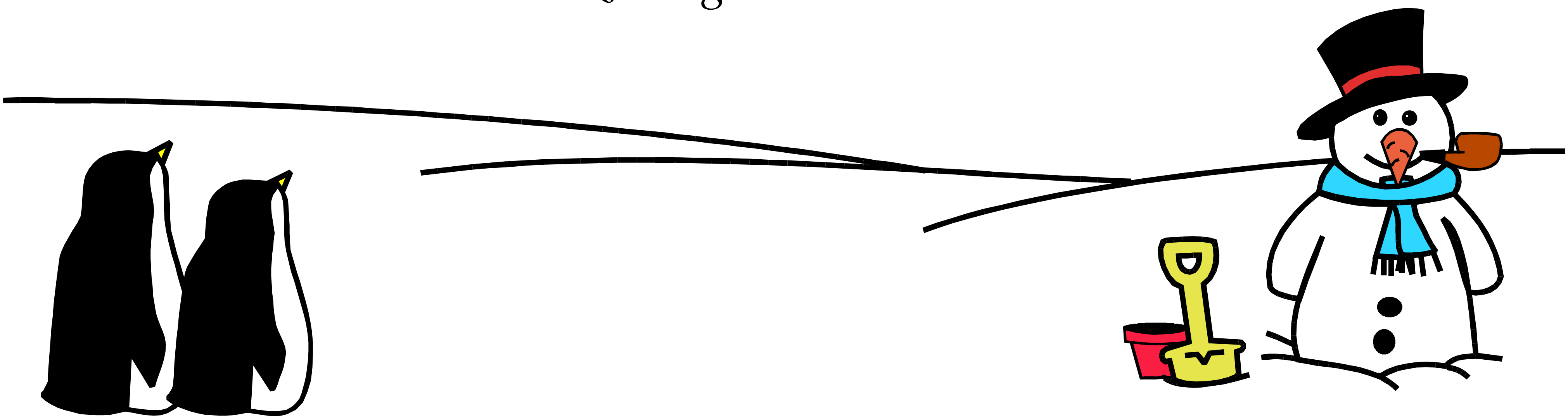
Configure your kernel

- *Answer all of the detailed questions*
- *Use the built in help*
- *Choose modules carefully*
- *Save your kernel configuration*



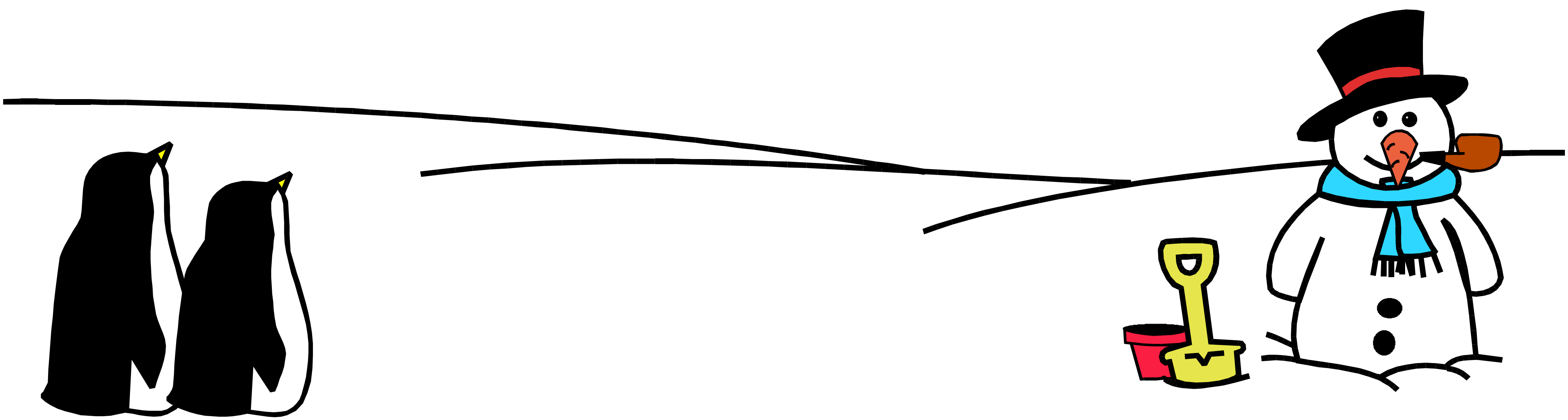
Compile your newly configured kernel

- make dep ; make clean
- Kernel destination
  - Floppy: make zdisk
  - LILO: make zlilo
  - Generic: make zImage



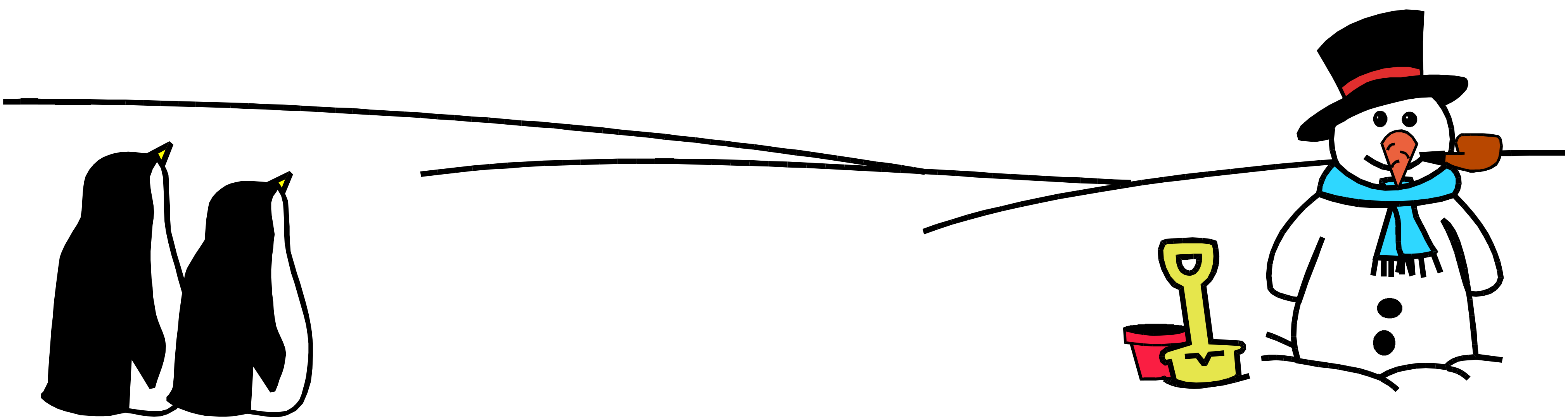
Wait for the kernel to finish building

- *Go get a coffee!*
- *Convert 2 more people to Linux.*
- *Tell folks about WLUG!*



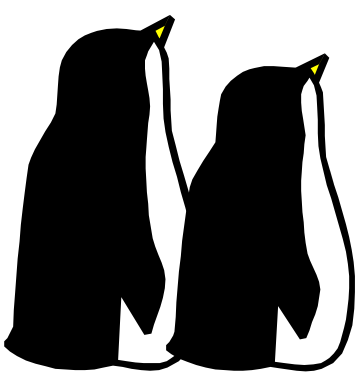
Compile your modules

- *If you configured any modules:*
  - *make modules*
  - *make modules_install*



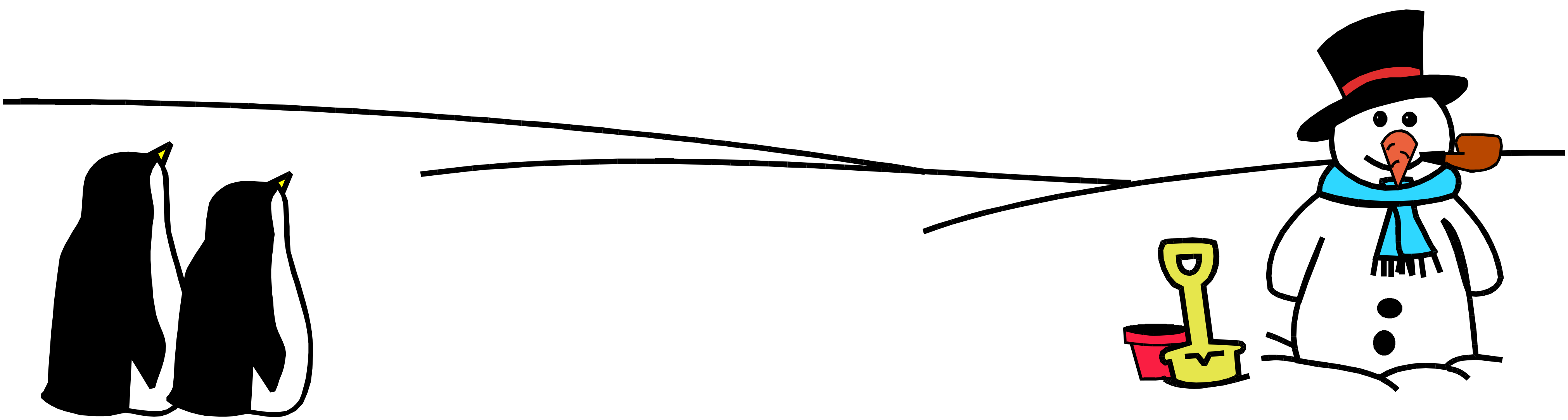
Test the newly built kernel

- Floppy:
  - insert floppy
  - reboot the machine gracefully
- LILO: reboot the machine gracefully
- Generic: copy zImage to proper place and reboot the machine gracefully.



Congratulations!

- *If your machine successfully rebooted, and everything works, fantastic!*
- *If not, reconfigure your kernel and try again.*



References

- The Linux Kernel HOWTO by Brian Ward
- /usr/src/linux/README