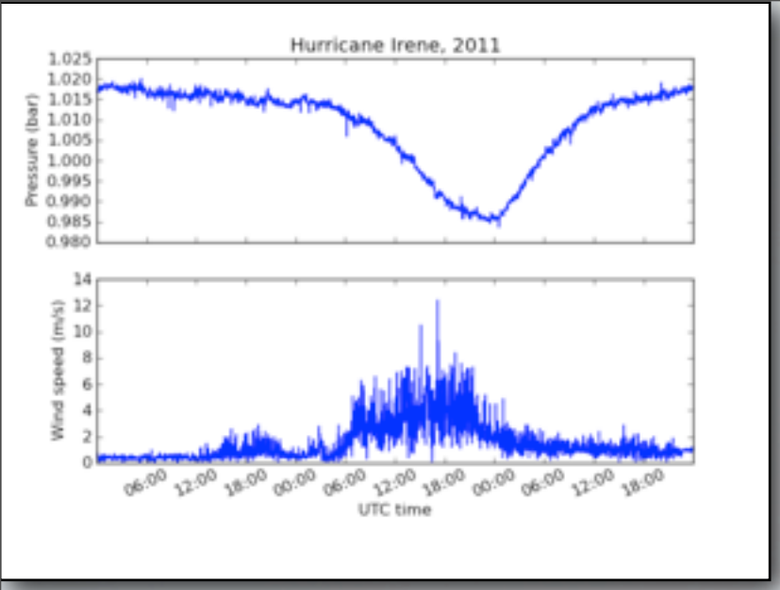

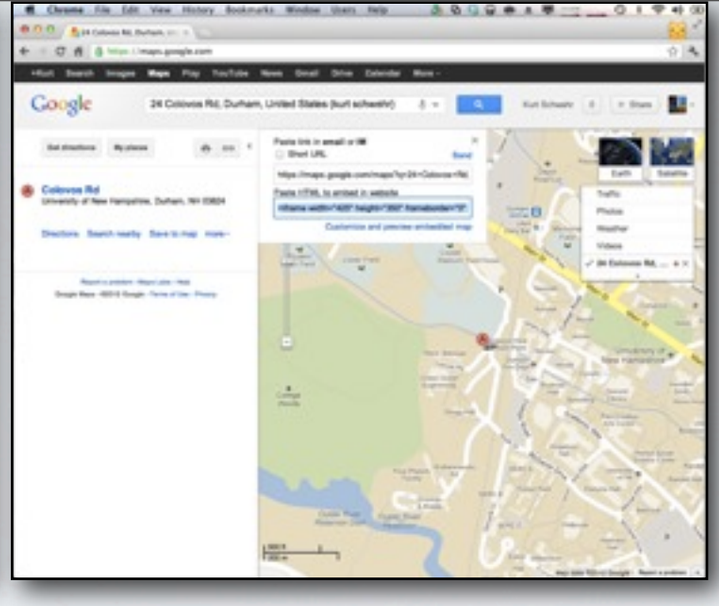

RESEARCH TOOLS 2011
LECTURE 03

2011-Sep-06

Kurt Schwehr
http://schwehr.org

UNH CCOM/JHC

Wiki editing, Weather Demo, Command Line

CC BY NC SA

Aquamacs File Edit Options Tools Org Tbl YASnippet Window Help

03-basic-command-line.org

New Open Recent Save Print Undo Redo Cut Copy Paste Search Preferences Help

class 2 | 02-irc-wiki-basic-shell.org 3 | 03-basic-command-line.org | researchtools 5 | HEADER.org 6

```
#+TITLE:     Class 3: Weather Demo, Basic Command line, VM Ware Linux (DRAFT)
#+AUTHOR:    Kurt Schwehr
#+EMAIL:     schwehr@ccom.unh.edu
#+DATE:      <2011-09-06 Tue>
#+DESCRIPTION: Marine Research Data Manipulation and Practices
#+KEYWORDS:
#+LANGUAGE:  en
#+OPTIONS:   H:3 num:nil toc:t \n:nil @:t ::t |:t ^:t -:t f:t *:t <:t
#+OPTIONS:   TeX:t LaTeX:nil skip:t d:nil todo:t pri:nil tags:not-in-toc
#+INFOJS_OPT: view:nil toc:nil ltoc:t mouse:underline buttons:0 path:http://orgmode.org/org-info.js
#+EXPORT_SELECT_TAGS: export
#+EXPORT_EXCLUDE_TAGS: noexport
#+LINK_HOME: http://vislab-ccom.unh.edu/~schwehr/Classes/2011/esci895-researchtools/

* Introduction

* Internet Relay Chat (IRC)

Start Firefox

Under "Tools," select "ChatZilla" at the bottom.

ChatZilla will use your login name (often referred to as you
"shortname") by default.  You can pick anything you like, but if you
don't use something related to your name, people may have trouble
which user in a chat is you.  For this class, make sure to use the
same short name as your CCOM account - please do not change your
alias.

We need to now sign into an "IRC Server" that hosts chat rooms.  There
are many thousands of servers in the world and we will even setup on
at CCOM later in the semester.  For now, I have created an unofficial
channel on http://freenode.net.  FreeNode supports free and opensource
software and this class is primarily about just those topics.  Type
this command right into the bottom window of ChatZilla:

#+BEGIN_SRC sh
/attach irc.freenode.net
/join #unhresearchtools
#+END_SRC

** Say "hi" in the IRC channel
```

U:--- 03-basic-command-line.org 1% (24,0) Hg:0 (Org yas Spc Fill) 12:21PM 0.91

Editing Research Tools 2011

The 2011 Research Tools (ESCI 895-003) course taught by Kurt Schwehr

Auditors (official or otherwise) welcome. You will have to provide your own computer/laptop if not a registered student.

== Instructor ==

[[User:Schwehr|Kurt Schwehr]]

== Meeting Time and Location ==

- TTh 11:10-12:30
- Chase Ocean Engineering Rm 140 (Computer Classroom)

== Resources ==

- [http://vislab-ccom.unh.edu/~schwehr/Classes/2011/esci895-researchtools/ Class Web Page]] '''Under construction!!!'''
- [[Researchtools.ccom.nh]] - Ubuntu Linux server (actually a virtual machine) for use during class projects

== Lectures ==

* 1 Introduction - topics that will be covered
* [[Lec 2 Research Tools 2011]] - Getting started - IRC via Firefox Chatzilla, the CCOM wiki, logging in to researchtools.ccom.nh
* Lecture 3 - 6-Sept-2011
* Lecture 4 - 8-Sept-2011 - VMWare, Short lecture for brown bag seminar

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Summary:

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navigation
- Main page
- Community portal
- Current events
- Recent changes
- Random page
- Help

search
Go Search

toolbox
- What links here
- Related changes
- Upload file
- Special pages

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24 Colovos Rd, Durham, Unit

https://maps.google.com

+Kurt Search Images Maps Play YouTube News Gmail Drive Calendar More

Google

24 Colovos Rd, Durham, United States (kurt schwehr)

Kurt Schwehr 0 + Share

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University of New Hampshire, Durham, NH 03824

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Paste link in **email** or **IM**

Short URL Send

https://maps.google.com/maps?q=24+Colovos+Rd,

Paste HTML to embed in website

<iframe width="425" height="350" frameborder="0"

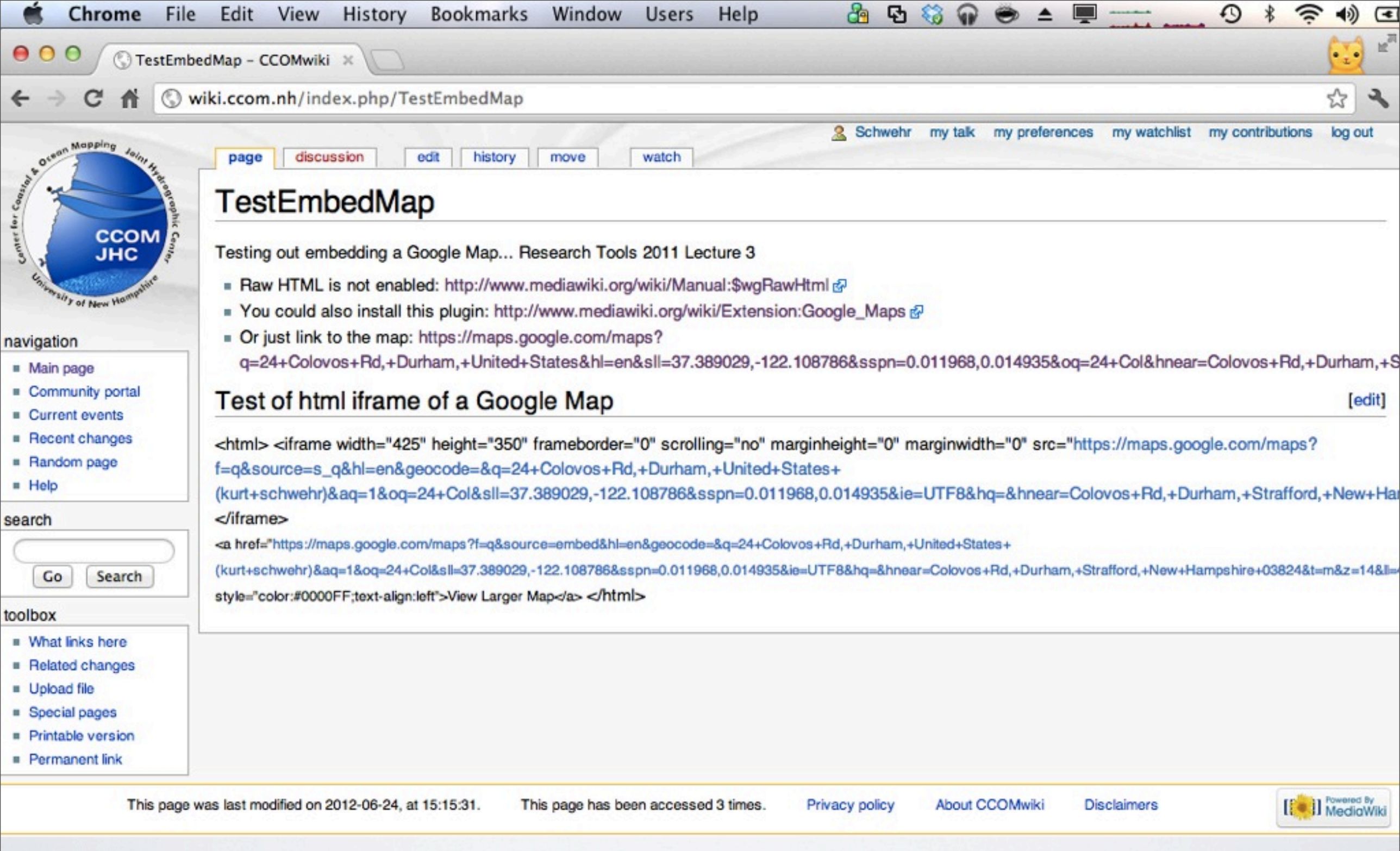
Customize and preview embedded map

Earth Satellite

Traffic
Photos
Weather
Videos
✓ 24 Colovos Rd, ...

Depot Road Lot
Durham Amtrak
UNH Dairy Bar
Memorial Field
Main St
Depot Road
Cowell Stadium
Field House
Lower Field
Student Rec Field
Nesmith
Kendall
College Road
Morrill
Congreve
Smith
James
Library Way
Combined Heat & Power Plant
Service
University of New Hampshire
Nacs
Ritzman
Colovos Rd
Durham Fire Dept
Hewitt
Conant
Zais
Chase Ocean Engineering
Rudman Hall
Dimond Library
Spaulding
Hamilton Smith
College Woods
Gregg Hall
Academic Way
Paul Creative Arts Center
South Dr
McDaniel Drive
Kingsbury Hall
Horton Social Science Center
Flow Physics Facility
18 Waterworks Rd
SERC A
SERC B
Forest Park
Parsons Hall
Grounds & Roads
Oyster River
Oyster River Reservoir Dam
Randall Hall
Babcock

Sunday, June 24, 12



It's better for security not to let users put any html they want into pages. Just link to the map

Chrome File Edit View History Bookmarks Window Users Help

media wiki embedding html | Manual:$wgRawHtml - Medi

www.mediawiki.org/wiki/Manual:$wgRawHtml

Manual:$wgRawHtml

HTML: $wgRawHtml	
Allow raw, unchecked HTML in <html>...</html> sections.	
Introduced in version:	1.3.4
Removed in version:	*still in use*
Allowed values:	(boolean)
Default value:	false

Other settings: Alphabetical | By Function

Main page
Browse categories
Community portal
Recent changes
Tech blog

Support
User help
Technical manual
FAQ
Support desk

Download
Development
Communication
Print/export
Toolbox

Details [edit]

When `$wgRawHtml = true;` the wiki will allow you to insert raw unchecked HTML. However, you must embed your html within the <html>... </html> tags so that mediawiki can differentiate it.

Warning: **This is very dangerous** on a publicly editable site, because it allows for arbitrary JavaScript code to be inserted, opening the door for session hijacking. Thus, you shouldn't enable it unless you've restricted editing to trusted users only with $wgGroupPermissions (version 1.3.x and 1.4.x can use $wgWhitelistEdit). See Manual:Preventing access for more information on restricting write access.

Note: This option does **not** affect how wikicode outside of <html>...</html> tags is handled.

Note: If you have $wgRawHtml turned on and you notice some HTML being stripped out, you may need to turn off $wgUseTidy.

Is enabling raw HTML necessary? [edit]

Some HTML tags are permitted in wikitext, even with `$wgRawHtml=false`. See meta:Help:HTML in wikitext. The vast majority of fancy formatting seen on Wikimedia sites is achieved using these limited tags (e.g. tables with CSS style tags). If you can make do with these limitations (leave `$wgRawHtml=false`), your wiki will be more secure.

Also note that the "limited" wiki syntax is actually a deliberate design feature of wikis. It is a compact simplified markup which is easily understood even by non-technical users, easily visualised in diff displays, and discourages stylistic tinkering in favour of getting on with writing useful/interesting text.

Chrome File Edit View History Bookmarks Window Users Help

media wiki embedding goog | Manual:$wgRawHtml – Medi | Extension:Google Maps – Me

www.mediawiki.org/wiki/Extension:Google_Maps

Extension:Google Maps

Introduction - Installation - Editor's Map icon - Coding instructions - Compatibility - Languages - Developers - Talk

Maps are a great way to present information, and the **Google Maps Extension** brings the coolness of interactive, annotated maps to your wiki. With Google Maps Extension, you can:

- Spice up articles with maps of anywhere in the world
- Marvel at detailed street maps and stunning satellite imagery
- Use the interactive **editor's map** to add markers and colored paths with wiki-fied captions
- Look up cities, addresses, and businesses with the built-in search engine

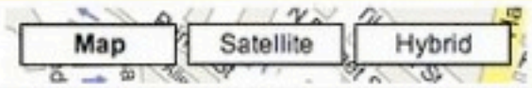
Contents [hide]

1 Google Maps Javascript API
2 What does it do?
3 How to Install?
4 Screenshot
5 How stable is it?
6 Who's using it?
7 See also
8 External links

MediaWiki extensions manual - list

Google Maps Extension

Release status: beta



Implementation	Tag
Description	Create Google maps populated with wiki-fied place markers.
Author(s)	Evan Miller et al.
Last version	0.9.43 2012-03-12
MediaWiki	1.5 and up
Database changes	no
License	GPL
Download	**Download snapshot** / Git master Git [?]: repo summary • tree • code changes SVN [?]: checkout-url • tree • code changes

Check usage *(experimental)*

Bugs: list open list all report

Google Maps Javascript API [edit]

Note: The Google Maps Javascript API Version 2 used by this extension has been officially deprecated as of May 19, 2010 by Google.

What does it do? [edit]

The extension hooks into your MediaWiki installation in two ways: first, it defines a <googlemap> tag that translates a special syntax into a map

Main page
Browse categories
Community portal
Recent changes
Tech blog

Support
User help
Technical manual
FAQ
Support desk

Download
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Communication
Print/export
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Firefox File Edit View History Delicious Bookmarks Tools Window Help

It's All Text! :: Add-ons for Firefox

It's All Text! :: Add-ons for Firef...

Mozilla Corporation (US) https://addons.mozilla.org/en-US/firefox/addon/its-

it's all text

Register or Log in | Other Applications | mozilla

ADD-ONS

EXTENSIONS | PERSONAS | THEMES | COLLECTIONS | MORE...

search for add-ons

» Extensions » It's All Text!

It's All Text! 1.6.4

by Christian Höltje (A.K.A. docwhat)

Edit textareas using an external editor, because it's all text!

Right click on a textarea, select "It's All Text!" and edit the text in the editor of your choice.

Alternatively, click on the edit buttons added for your convenience. Right click on the edit buttons for even more options, including preferences.

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★★★★☆
155 user reviews
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Add to collection
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Enjoy this add-on?

The developer of this add-on asks that you help support its continued development by making a small contribution.

♥ Contribute

$4.99 suggested

Sunday, June 24, 12

* Demonstration - Processing weather data

For this section, you do not need to try to follow along. Just watch what I am doing. The goal is to give you a feeling for what we will be covering. I do not you expect to understand all the steps just yet. It will take us a number of classes to cover all of this material.

This material has also been written up here on my blog:

http://schwehr.org/blog/archives/2011-09.html#e2011-09-05T19_50_00.txt

First, log into a linux computer and setup a project directory.

```sh
ssh researchtools.ccom.nh # or use putty
mkdir wx
cd wx # wx is short for "weather"
```

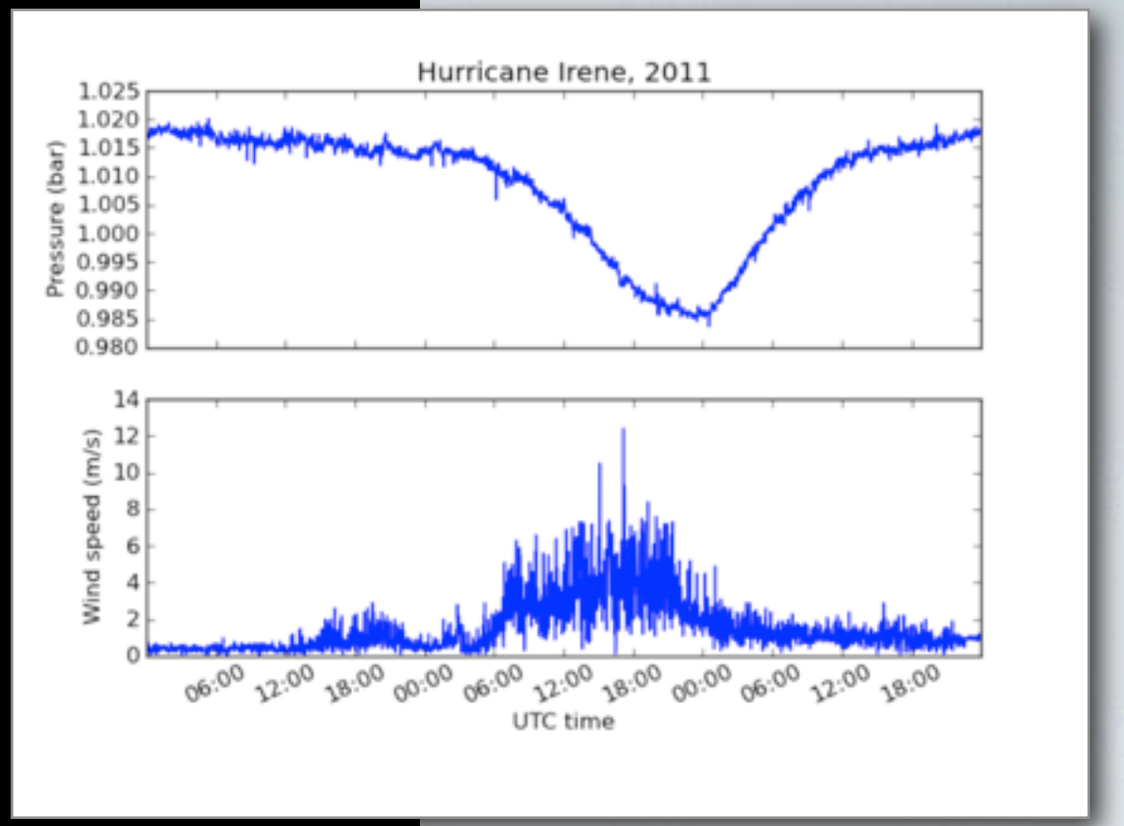
Check out the weather data that is available over the CCOM internal network. socat is a network data helper. It can dump what it sees from a network connection, pass it to other programs, or forward the data.

```sh
socat TCP4:datalogger1.ccom.nh:36000 - | head
```

You should see some NMEA weather data.

```
$WIMWV,140.3,R,1.8,N,A*2C,rccom-airmar,1315303659.98
$WIMDA,30.0438,I,1.0174,B,15.6,C,,,,,,,164.4,T,179.8,M,1.8,N,0.9,M*27,rccom-airmar,1315303660.12
$HCHDT,26.2,T*1F,rccom-airmar,1315303660.25
$GPZDA,100740,06,09,2011,00,00*47,rccom-airmar,1315303660.31
$WIMWD,164.6,T,180.0,M,1.7,N,0.9,M*59,rccom-airmar,1315303660.4
$WIMWV,138.6,T,1.7,N,A*2F,rccom-airmar,1315303660.45
$WIMWV,140.3,R,1.7,N,A*23,rccom-airmar,1315303660.51
$GPGGA,100740,4308.1261,N,07056.3764,W,2,9,0.9,42.2,M,,,,*0F,rccom-airmar,1315303660.63
$HCHDT,26.2,T*1F,rccom-airmar,1315303660.75
$GPVTG,303.8,T,319.2,M,0.1,N,0.1,K,D*27,rccom-airmar,1315303660.83
2011/09/06 06:07:40 socat[29595] E write(1, 0x9d6b410, 53): Broken pipe
```

U:--- 03-basic-command-line.org 9% (57,0) Hg:0 (Org yas Spc Fill) 12:23PM 0.94



Chrome File Edit View History Bookmarks Window Users Help

Research Tools 2011 – CCO | Kurt's Weblog: September 20

schwehr.org/blog/archives/2011-09.html#e2011-09-05T19_50_00.txt

09.05.2011 19:50

PYTHON DEVELOPMENT - HURRICANE IRENE

Today I gave a run through of a portion of what I aim to teach this semester in research tools. I wanted to make a demonstration of going from a sensor in the world, creating a parser for the data it produces, plotting up some results and releasing the code to the world. I'm using the CCOM weather station as an example. Andy and Ben got the Airmar PB150 setup quite a while ago. It spits out NMEA over a serial port at 4800 baud. I use my serial-logger script to read the serial port and rebroadcast the data over the internal network for anyone who is interested. Here is using socat to grab a few lines of the data:

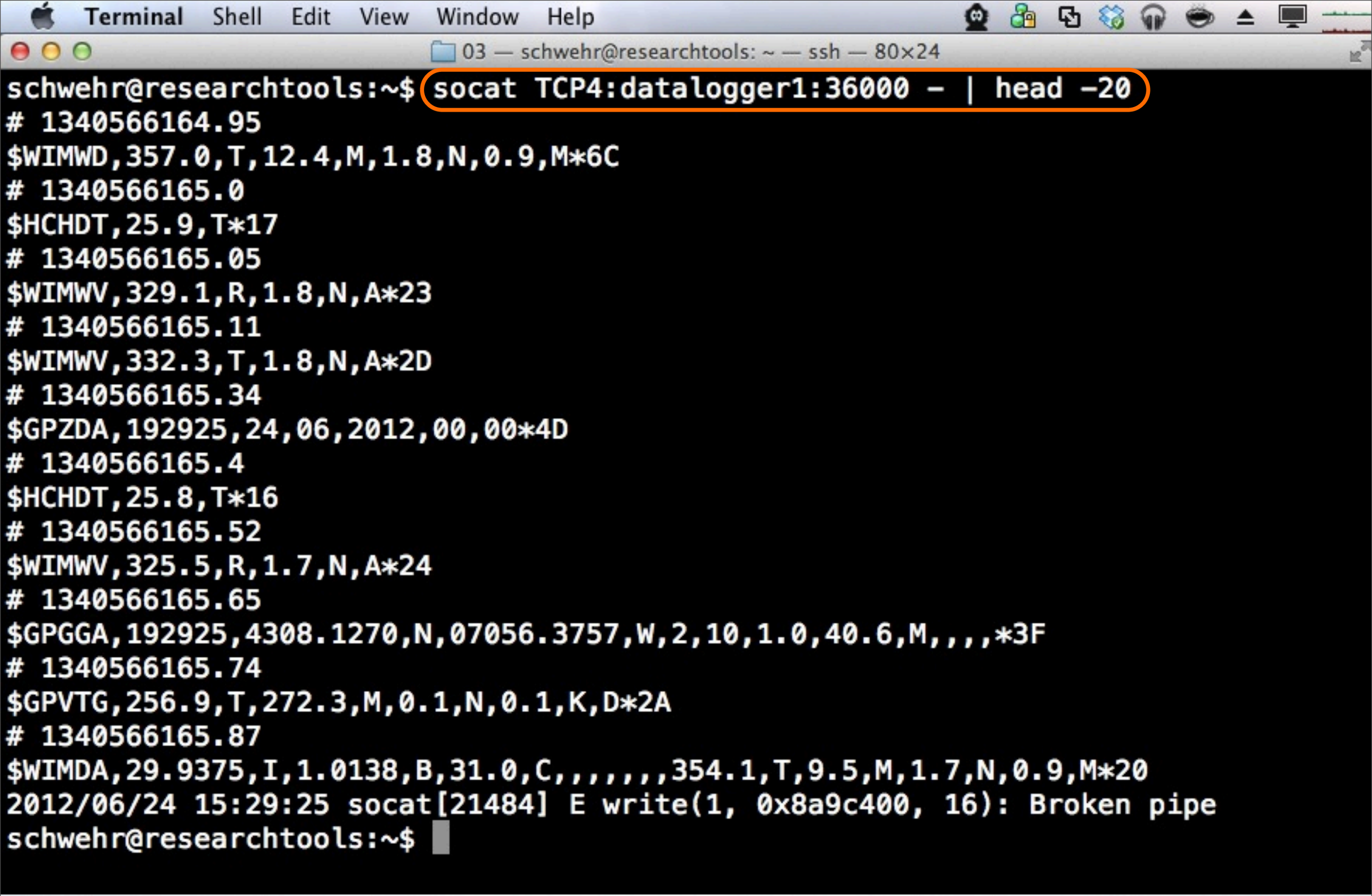
```
socat TCP4:datalogger1:36000 - | head
$HCHDT,26.2,T*1F,rccom-airmar,1314661980.3
$GPVTG,275.1,T,290.5,M,0.1,N,0.1,K,D*29,rccom-airmar,1314661980.38
$GPZDA,235300,29,08,2011,00,00*4E,rccom-airmar,1314661980.45
$WIMWV,143.9,R,1.9,N,A*24,rccom-airmar,1314661980.52
$GPGGA,235300,4308.1252,N,07056.3764,W,2,9,0.9,37.2,M,,,,*08,rccom-airmar,1314661980.64
$WIMDA,30.0497,I,1.0176,B,17.8,C,,,,,,,167.2,T,182.6,M,1.9,N,1.0,M*2A,rccom-airmar,1314661980.79
$HCHDT,26.2,T*1F,rccom-airmar,1314661980.82
$WIMWD,167.2,T,182.6,M,1.9,N,1.0,M*5C,rccom-airmar,1314661980.9
$WIMWV,141.0,T,1.9,N,A*29,rccom-airmar,1314661980.97
$WIMWV,144.5,R,1.9,N,A*2F,rccom-airmar,1314661981.02
```

The ",rccom-airmar,1314661980.97" is added by my serial-logger giving each line a station name and a UNIX UTC timestamp. Eric Raymond (ESR) has put together a very nice document on NMEA sentences: NMEA Revealed. It describes many of the scentences in common use. What do we have for contents? The unix "cut" command can pull out the "talker" + "sentence" part of each line. The -d specifies that the sort with "-u" for collapsing the output to the unique list of lines can get the job done.

```
egrep -v '^[#]' ccom-airmar-2011-08-28 |  cut -d, -f1 | sort -u
$GPGGA
$GPVTG
$GPZDA
$HCHDT
$PNTZNT
$WIMDA
$WIMWD
$WIMWV
```

All of those messages (except my custom PNTZNT message for NTP clock status) are documented in ESR's NMEA Revealed.

To look at the weather from Hurricane Irene, we want to look at the MDA is listed as "Obsolete"



http://en.wikipedia.org/wiki/Standard_streams

http://en.wikipedia.org/wiki/Head_(Unix)

catb.org/gpsd/NMEA.html

NMEA Revealed

Eric S. Raymond

<esr@thyrsus.com>

version 2.11, Mar 2012

Table of Contents

Sources and Applicable Standards
Relationship to NMEA 2000
NMEA 0183 physical protocol layer
Sentence Mixes and NMEA Variations
NMEA Encoding Conventions
Dates and times
Error status indications
Talker IDs
Satellite IDs
Obsolete sentences
NMEA-Standard Sentences
- AAM - Waypoint Arrival Alarm
- ALM - GPS Almanac Data
- APA - Autopilot Sentence "A"
- APB - Autopilot Sentence "B"
- BOD - Bearing - Waypoint to Waypoint
- BWC - Bearing & Distance to Waypoint - Geat Circle
- BWR - Bearing and Distance to Waypoint - Rhumb Line
- BWW - Bearing - Waypoint to Waypoint
- DBK - Depth Below Keel
- DBS - Depth Below Surface
- DBT - Depth below transducer
- DCN - Decca Position
- DPT - Depth of Water
- DTM - Datum Reference
- FSI - Frequency Set Information
- GBS - GPS Satellite Fault Detection
- GGA - Global Positioning System Fix Data
- GLC - Geographic Position, Loran-C
- GLL - Geographic Position - Latitude/Longitude
- GNS - Fix data
- GRS - GPS Range Residuals
- GST - GPS Pseudorange Noise Statistics
- GSA - GPS DOP and active satellites
- GSV - Satellites in view
- GTD - Geographic Location in Time Differences
- GXA - TRANSIT Position - Latitude/Longitude
- HDG - Heading - Deviation & Variation
- HDM - Heading - Magnetic
- HDT - Heading - True
- HFB - Trawl Headrope to Footrope and Bottom
- HSC - Heading Steering Command
- ITS - Trawl Door Spread 2 Distance
- LCD - Loran-C Signal Data
- MSK - Control for a Beacon Receiver
- MSS - Beacon Receiver Status
- MTW - Mean Temperature of Water
- MWV - Wind Speed and Angle
- OLN - Omega Lane Numbers
- OSD - Own Ship Data
- R00 - Waypoints in active route
- RMA - Recommended Minimum Navigation Infor
- RMB - Recommended Minimum Navigation Infor
- RMC - Recommended Minimum Navigation Infor
- ROT - Rate Of Turn
- RPM - Revolutions
- RSA - Rudder Sensor Angle
- RSD - RADAR System Data
- RTE - Routes
- SFI - Scanning Frequency Information
- STN - Multiple Data ID
- TDS - Trawl Door Spread Distance
- TFI - Trawl Filling Indicator
- TPC - Trawl Position Cartesian Coordinates
- TPR - Trawl Position Relative Vessel
- TPT - Trawl Position True
- TRF - TRANSIT Fix Data
- TTM - Tracked Target Message
- VBW - Dual Ground/Water Speed
- VDR - Set and Drift
- VHW - Water speed and heading
- VLW - Distance Traveled through Water
- VPW - Speed - Measured Parallel to Wind
- VTG - Track made good and Ground speed
- VWR - Relative Wind Speed and Angle
- WCV - Waypoint Closure Velocity
- WNC - Distance - Waypoint to Waypoint
- TPR - Trawl Position Relative Vessel
- TPT - Trawl Position True
- TRF - TRANSIT Fix Data
- TTM - Tracked Target Message
- VBW - Dual Ground/Water Speed
- VDR - Set and Drift
- VHW - Water speed and heading
- VLW - Distance Traveled through Water
- VPW - Speed - Measured Parallel to Wind
- VTG - Track made good and Ground speed
- VWR - Relative Wind Speed and Angle
- WCV - Waypoint Closure Velocity
- WNC - Distance - Waypoint to Waypoint
- WPL - Waypoint Location
- XDR - Cross Track Error - Dead Reckoning
- XTE - Cross-Track Error, Measured
- XTR - Cross Track Error - Dead Reckoning
- ZDA - Time & Date - UTC, day, month, year a
- ZFO - UTC & Time from origin Waypoint
- ZTG - UTC & Time to Destination Waypoint
- Other sentences

Vendor extensions
- PASHR - RT300 proprietary roll and pitch se
- PGRME - Garmin Estimated Error
- PMGNST - Magellan Status
- PRWIZCH - Rockwell Channel Status
- PUBX 00 - uBlox Lat/Long Position Data
- PUBX 01 - uBlox UTM Position Data
- PUBX 03 - uBlox Satellite Status
- PUBX 04 - uBlox Time of Day and Clock Infor

References

GGA - Global Positioning System Fix Data

Time, Position and fix related data for a GPS receiver.

```
                                                      11
        1          2       3 4        5 6 7  8   9  10 |  12 13  14   15
        |          |       | |        | | |  |   |   |  |   |  |   |    |
$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx*hh<CR><LF>
```

Field Number:

1. Universal Time Coordinated (UTC)
2. Latitude
3. N or S (North or South)
4. Longitude
5. E or W (East or West)
6. GPS Quality Indicator,
    - 0 - fix not available,
    - 1 - GPS fix,
    - 2 - Differential GPS fix (values above 2 are 2.3 features)
    - 3 = PPS fix
    - 4 = Real Time Kinematic
    - 5 = Float RTK
    - 6 = estimated (dead reckoning)
    - 7 = Manual input mode
    - 8 = Simulation mode
7. Number of satellites in view, 00 - 12
8. Horizontal Dilution of precision (meters)
9. Antenna Altitude above/below mean-sea-level (geoid) (in meters)
10. Units of antenna altitude, meters

To look at the weather from Hurricane Irene, we want to look at the MDA is listed as "Obsolete" by ESR according to a NMEA 2009 doc, but that is the message we want to use. In python we could parse this by hand. Here is an example "Meteorological Composite" NMEA line:

```
$WIMDA,30.0497,I,1.0176,B,17.8,C,,,,,,,167.2,T,182.6,M,1.9,N,1.0,M*2A
```

Python makes it easy to do splits on strings and use any separator that we line. For example, we could do:

```
fields = line.split(',')
```

This would break apart each of the blocks. However, this doesn't scale well and does not tell us when a message is too corrupted to be usable data. I have written a large number of regular expressions in Python for NMEA sentences based on emails that I get from the USCG Healy.

I wanted to start turning those into a library that I could make usable by anyone. I created the nmea decoder package. I used mercurial (hg) for version control and uploaded it to bitbucket as (nmeadec). It's pure python and simpler (but less powerful) than gpsd. I really like the way that python's regular expression syntax lets you name the fields and retrieve a named dictionary when messages are decoded. You can find the regular expression for MDA here: nmeadec/raw.py - line 39. With nmeadec 0.1 written, I can now parse NMEA in Python like this:

```
msg = nmeadec.decode(line)
```

The PasteScript package gave a helping hand for creating a basic python package. I did this from inside of a virtualenv to protect the system and fink python space.

```
virtualenv ve
cd ve
source bin/activate
mkdir src
paster create nmeadec
```

I answered a whole bunch of questions and it setup a simple package using setuptools/distribute.

Since you are not creating that package and might want to follow along, you can grab the package in src (and skip running the paster command to create a new project.

```
hg clone https://schwehr@bitbucket.org/schwehr/nmeadec
```

Because I set this up in a terminal using a virtualenv being active, then I can use this command to setup the package for development without funny python PATH hacks:

```
cd nmeadec
python setup.py develop
```

Obsolete sentences

The following NMEA sentences have been designated "obsolete" in a publicly available NMEA document dated 2009.

APA - Autopilot Sentence "A"
BER - Bearing & Distance to Waypoint, Dead Reckoning, Rhumb Line
BPI - Bearing & Distance to Point of Interest
DBK - Depth Below Keel
DBS - Depth Below Surface
DRU - Dual Doppler Auxiliary Data
GDA - Dead Reckoning Positions
GLA - Loran-C Positions
GOA - OMEGA Positions
GXA - TRANSIT Positions
GTD - Geographical Position, Loran-C TDs
GXA - TRANSIT Position
HCC - Compass Heading
HCD - Heading and Deviation
HDM - Heading, Magnetic
HDT - Heading, True
HVD - Magnetic Variation, Automatic
HVM - Magnetic Variation, Manually Set
IMA - Vessel Identification
MDA - Meteorological Composite

Terminal Shell Edit View Window Help

03 — schwehr@researchtools: ~/wx — ssh — 88×24

```
schwehr@researchtools:~/wx$ ls -l
total 163844
-rw-r--r-- 1 schwehr domain users 55808963 2011-09-06 06:05 ccom-airmar-2011-08-28
-rw-r--r-- 1 schwehr domain users 55979878 2011-09-06 06:05 ccom-airmar-2011-08-29
-rw-r--r-- 1 schwehr domain users 55977976 2011-09-06 06:05 ccom-airmar-2011-08-30
drwxr-xr-x 7 schwehr domain users     4096 2011-09-06 06:24 nmeadec
schwehr@researchtools:~/wx$ egrep -v '^[#]' ccom-airmar-2011-08-28 |  cut -d, -f1 | sort
 -u
$GPGGA
$GPVTG
$GPZDA
$HCHDT
$PNTZNT
$WIMDA
$WIMWD
$WIMWV
schwehr@researchtools:~/wx$
```

```
#+BEGIN_SRC sh
pwd # make sure you are in the "wx" directory
wget http://vislab-ccom.unh.edu/~schwehr/Classes/2011/esci895-researchtools/examples/ccom-airmar-2011-08-28.bz2
wget http://vislab-ccom.unh.edu/~schwehr/Classes/2011/esci895-researchtools/examples/ccom-airmar-2011-08-29.bz2
wget http://vislab-ccom.unh.edu/~schwehr/Classes/2011/esci895-researchtools/examples/ccom-airmar-2011-08-30.bz2

# If you are unfamiliar with .bz2 files, ask the computer if it knows
file ccom*
ccom-airmar-2011-08-28.bz2: bzip2 compressed data, block size = 900k
ccom-airmar-2011-08-29.bz2: bzip2 compressed data, block size = 900k
ccom-airmar-2011-08-30.bz2: bzip2 compressed data, block size = 900k

# Uncompress the data.  "*" matches any text
bunzip2 ccom*.bz2

file ccom-airmar-2011-08-*
ccom-airmar-2011-08-28: ASCII English text
```

To look at the weather from Hurricane Irene, we want to look at the MDA is listed as "Obsolete" by ESR according to a NMEA 2009 doc, but that is the message we want to use. In python we could parse this by hand. Here is an example "Meteorological Composite" NMEA line:

```
$WIMDA,30.0497,I,1.0176,B,17.8,C,,,,,,,167.2,T,182.6,M,1.9,N,1.0,M*2A
```

Python makes it easy to do splits on strings and use any separator that we line. For example, we could do:

```
fields = line.split(',')
```

This would break apart each of the blocks. However, this doesn't scale well and does not tell us when a message is too corrupted to be usable data. I have written a large number of regular expressions in Python for NMEA sentences based on emails that I get from the USCG Healy.

I wanted to start turning those into a library that I could make usable by anyone. I created the nmea decoder package. I used mercurial (hg) for version control and uploaded it to bitbucket as (nmeadec). It's pure python and simpler (but less powerful) than gpsd. I really like the way that python's regular expression syntax lets you name the fields and retrieve a named dictionary when messages are decoded. You can find the regular expression for MDA here: nmeadec/raw.py - line 39. With nmeadec 0.1 written, I can now parse NMEA in Python like this:

```
msg = nmeadec.decode(line)
```

The PasteScript package gave a helping hand for creating a basic python package. I did this from inside of a virtualenv to protect the system and fink python space.

```
virtualenv ve
cd ve
source bin/activate
mkdir src
paster create nmeadec
```

I answered a whole bunch of questions and it setup a simple package using setuptools/distribute.

Since you are not creating that package and might want to follow along, you can grab the package in src (and skip running the paster command to create a new project.

```
hg clone https://schwehr@bitbucket.org/schwehr/nmeadec
```

Because I set this up in a terminal using a virtualenv being active, then I can use this command to setup the package for development without funny python PATH hacks:

```
cd nmeadec
python setup.py develop
```

Now, we need to pull out the data. I created a little module called "process_wx.py". It let's you down sample the data there were more than 86,000 MDA messages in a day.

```
from __future__ import print_function
import nmeadec

def get_wx(filename, nth=None):
    pres = []
    speed = []
    timestamps = []
    mda_count = 0 # for handling the nth MDA entry

    for line in file(filename):
        try:
            msg = nmeadec.decode(line)
        except:
            continue

        try:
            if msg['sentence'] != 'MDA': continue
        except:
            print ('trouble:',line,msg)

        mda_count += 1
        if nth is not None and mda_count % nth != 1:
            continue # skip all but the nth.  start with first

        #print (msg['pressure_bars'], msg['wind_speed_ms'])
        pres.append(msg['pressure_bars'])
        speed.append(msg['wind_speed_ms'])
        timestamps.append(float(line.split(',')[-1]))

    return {'pres':pres, 'speed':speed, 'timestamps':timestamps}
```

We can then use that in ipython to see how it works:

```
ipython -pylab # Ask for ipython to preload lots
import process_wx
data = process_wx.get_wx('ccom-airmar-2011-08-28')
data.keys()
['timestamps', 'speed', 'pres']
len(data['timestamps'])
86361
data = process_wx.get_wx('ccom-airmar-2011-08-28', nth=10)
len(data['timestamps'])
8637
```

Now, we need to pull out the data. I created a little module called "process_wx.py". It let's you down sample the data there were more than 86,000 MDA messages in a day.

```
from __future__ import print_function
import nmeadec

def get_wx(filename, nth=None):
    pres = []
    speed = []
    timestamps = []
    mda_count = 0 # for handling the nth MDA entry

    for line in file(filename):
        try:
            msg = nmeadec.decode(line)
        except:
            continue

        try:
            if msg['sentence'] != 'MDA': continue
        except:
            print ('trouble:',line,msg)

        mda_count += 1
        if nth is not None and mda_count % nth != 1:
            continue # skip all but the nth.  start with first

        #print (msg['pressure_bars'], msg['wind_speed_ms'])
        pres.append(msg['pressure_bars'])
        speed.append(msg['wind_speed_ms'])
        timestamps.append(float(line.split(',')[-1]))

    return {'pres':pres, 'speed':speed, 'timestamps':timestamps}
```

We can then use that in ipython to see how it works:

```
ipython -pylab # Ask for ipython to preload lots
import process_wx
data = process_wx.get_wx('ccom-airmar-2011-08-28')
data.keys()
['timestamps', 'speed', 'pres']
len(data['timestamps'])
86361
data = process_wx.get_wx('ccom-airmar-2011-08-28', nth=10)
len(data['timestamps'])
8637
```

http://ipython.org/

Now to load 3 days:

```
import process_wx
from numpy import array

# explicit:
days = []
days.append( process_wx.get_wx('ccom-airmar-2011-08-27', nth=10) )
days.append( process_wx.get_wx('ccom-airmar-2011-08-28', nth=10) )
days.append( process_wx.get_wx('ccom-airmar-2011-08-29', nth=10) )

# Does the same as the above, but in one line with "list comprehensions"
days = [ process_wx.get_wx('ccom-airmar-2011-08-'+str(day), nth=10) for day in (27, 28, 29)  ]

# We then have to get the pressure, temperature, and timestamps for the 3 days and combine them
# This is pulling out a few too many tricks in one line!
pres =  array ( sum( [ day['pres'] for day in days ], [ ] ) )
speed = array ( sum( [ day['speed'] for day in days ], [ ] ) )
timestamps = array ( sum( [ day['timestamps'] for day in days ], [ ] ) )
```

We now have the data loaded and it's time to take a look at it!

```
min(data['speed']),max(data['speed'])
(0.0, 12.4)
min(data['pres']),max(data['pres'])
(0.98370000000000002, 1.0201)
average(data['speed'])
1.52199
average(data['pres'])
1.0084
median(data['speed'])
1.0
median(data['pres'])
1.013650
```

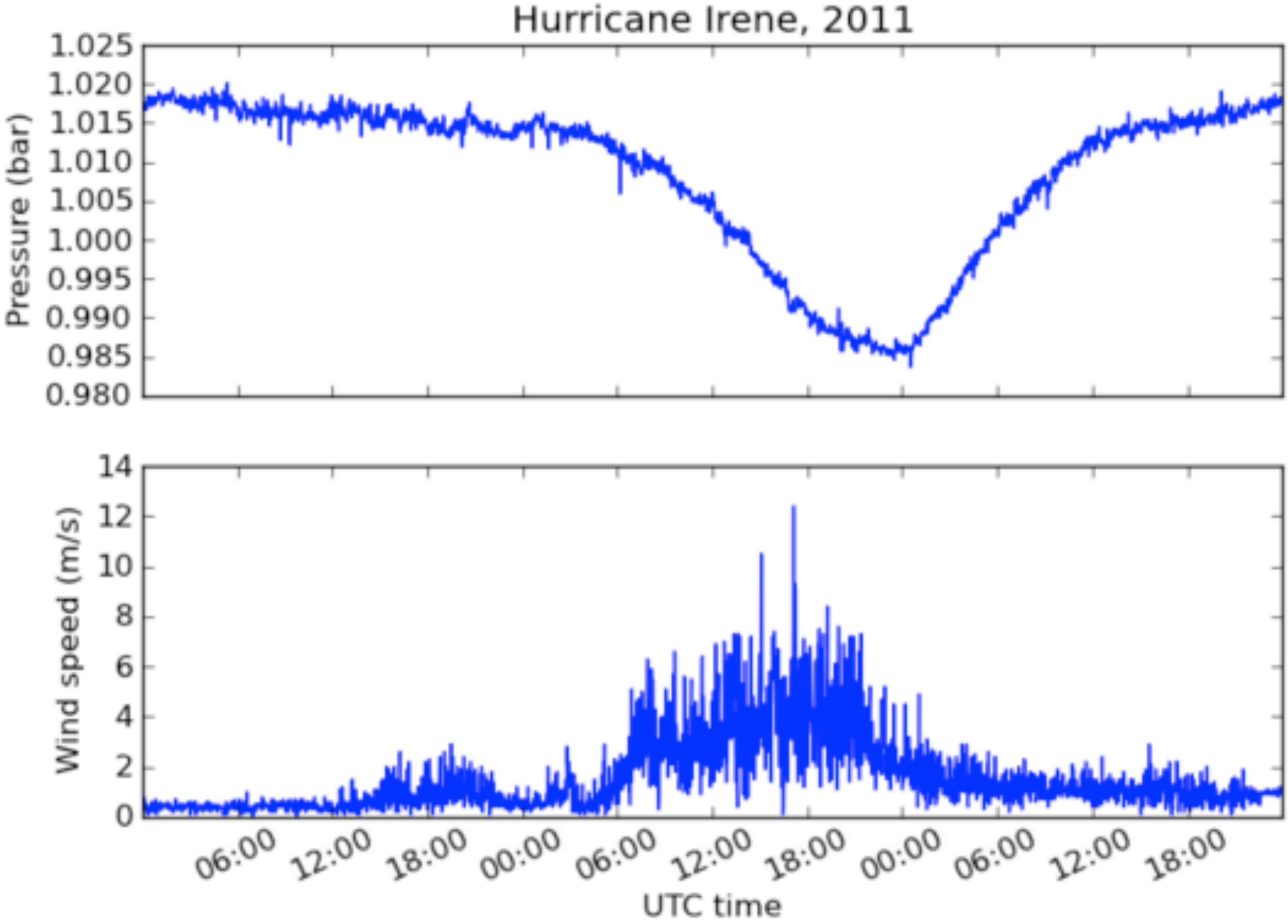
And finally, we would like to make a plot of these parameters. There are several plotting packages for python. Probably the most flexible and powerful is matplotlib. It is very similar to plotting in matlab.

```
# Top plot
subplot(211)
ylabel('Pressure (bar)')
xlabel('')

# Turn off labels for the xaxis
ax=gca()
ax.xaxis_date()
old_xfmt = ax.xaxis.get_major_formatter()
xfmt=DateFormatter('')
ax.xaxis.set_major_formatter(xfmt)

title('Hurricane Irene, 2011')
plot (data['dates'],data['pres'])

# Bottom plot
subplot(212)
xlabel('UTC time')
ylabel('Wind speed (m/s)')

# Label x-axis by Hour:Minute
xticks( rotation=25 )
subplots_adjust(bottom=0.2)
ax=gca()
ax.xaxis_date()
xfmt=DateFormatter('%H:%M')
ax.xaxis.set_major_formatter(xfmt)

# 30.6 (meters / second) = 68.5 mph
plot (data['dates'],data['speed'])
title('')
```

http://matplotlib.sourceforge.net/

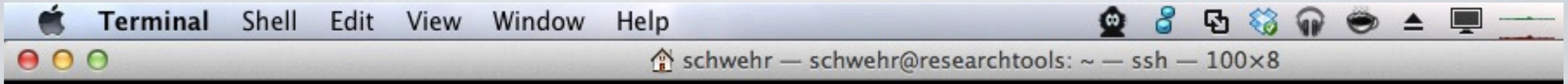
I used GraphicsMagick (fork of ImageMagick) to resize the image to have a width of 600 pixels. Yes, I could have set the output size in matplotlib.

```
convert -resize 600 ~/Desktop/raw-fig.png final-figure.png
```


Hurricane Irene, 2011
Pressure (bar)
1.025
1.020
1.015
1.010
1.005
1.000
0.995
0.990
0.985
0.980
Wind speed (m/s)
14
12
10
8
6
4
2
0
06:00
12:00
18:00
00:00
06:00
12:00
18:00
00:00
06:00
12:00
18:00
UTC time

Terminal Shell Edit View Window Help

schwehr — schwehr@researchtools: ~ — ssh — 100×8



```
schwehr@researchtools:~$ egrep some-string
^C
schwehr@researchtools:~$ # Control-C or q (lower case Q) are often the quit keys
schwehr@researchtools:~$
```

Check for common characters to confuse. It is easy to replace a "1" (number one) with an "l" (Lima) or vice versa if the fonts you have in your terminal and web browser make those two characters. Make sure you are using the right quote character (e.g. ", ', or ` are all different). Another pair of characters that is sometime trouble are the 0 (zero) and O (Oscar).

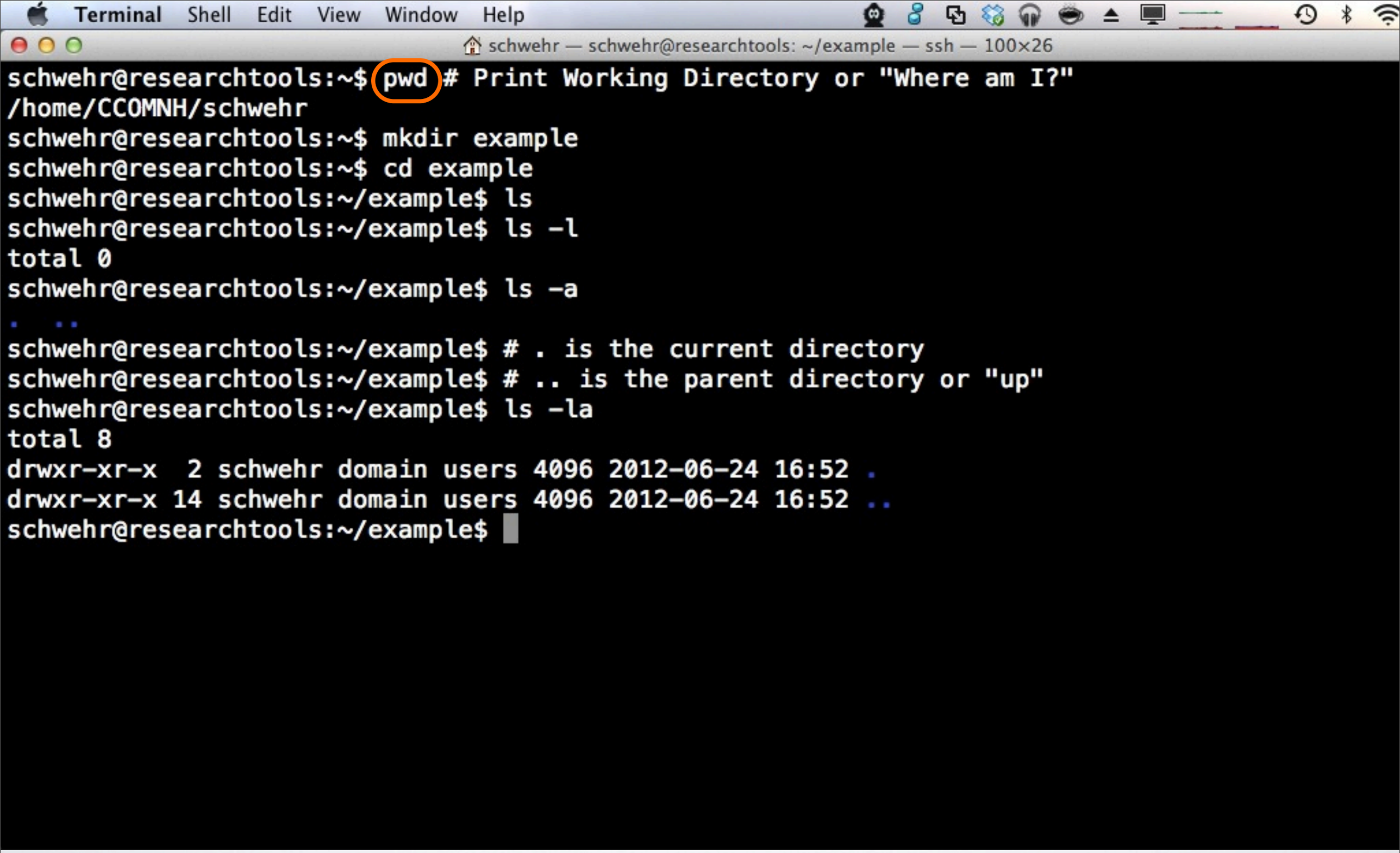
Note that the pipe character is a vertical bar: "|". This character is sometimes two vertical dashes. On US keyboards it is located between the delete and return/enter keys and is the shift of "\".

** What to do if you get stuck?

Before we get into the commands, we need to talk about what to do if things get stuck. If you mistype a command and it just sits there doing nothing, you should first try holding down the "control" key and hitting the "C" key. This sends a "break" or "kill" message to the program. This is often written as "Ctrl-C" or "C-c". Here is a command that hangs. I then use Ctrl-C to get out of it. The bash shell responds with a "^C" and gives a prompt again.

```
#+BEGIN_EXAMPLE
egrep some-string
^C
#+END_EXAMPLE
```

If the command really gets stuck and does not respond to the Ctrl-C, you can close the terminal window and open a new window. Later on, you will learn fancier techniques for controlling programs (also known as processes), but this will work for now.


schwehr — schwehr@researchtools: ~/example — ssh — 100×26
schwehr@researchtools:~$ pwd # Print Working Directory or "Where am I?"
/home/CCOMNH/schwehr
schwehr@researchtools:~$ mkdir example
schwehr@researchtools:~$ cd example
schwehr@researchtools:~/example$ ls
schwehr@researchtools:~/example$ ls -l
total 0
schwehr@researchtools:~/example$ ls -a
. ..
schwehr@researchtools:~/example$ # . is the current directory
schwehr@researchtools:~/example$ # .. is the parent directory or "up"
schwehr@researchtools:~/example$ ls -la
total 8
drwxr-xr-x 2 schwehr domain users 4096 2012-06-24 16:52 .
drwxr-xr-x 14 schwehr domain users 4096 2012-06-24 16:52 ..
schwehr@researchtools:~/example$

```
schwehr@researchtools:~$ pwd # Print Working Directory or "Where am I?"
/home/CCOMNH/schwehr
schwehr@researchtools:~$ mkdir example
schwehr@researchtools:~$ cd example
schwehr@researchtools:~/example$ ls
schwehr@researchtools:~/example$ ls -l
total 0
schwehr@researchtools:~/example$ ls -a
.  ..
schwehr@researchtools:~/example$ # . is the current directory
schwehr@researchtools:~/example$ # .. is the parent directory or "up"
schwehr@researchtools:~/example$ ls -la
total 8
drwxr-xr-x  2 schwehr domain users 4096 2012-06-24 16:52 .
drwxr-xr-x 14 schwehr domain users 4096 2012-06-24 16:52 ..
schwehr@researchtools:~/example$
```

```
schwehr@researchtools:~$ pwd # Print Working Directory or "Where am I?"
/home/CCOMNH/schwehr
schwehr@researchtools:~$ mkdir example
schwehr@researchtools:~$ cd example
schwehr@researchtools:~/example$ ls
schwehr@researchtools:~/example$ ls -l
total 0
schwehr@researchtools:~/example$ ls -a
.  ..
schwehr@researchtools:~/example$ # . is the current directory
schwehr@researchtools:~/example$ # .. is the parent directory or "up"
schwehr@researchtools:~/example$ ls -la
total 8
drwxr-xr-x  2 schwehr domain users 4096 2012-06-24 16:52 .
drwxr-xr-x 14 schwehr domain users 4096 2012-06-24 16:52 ..
schwehr@researchtools:~/example$
```

schwehr — schwehr@researchtools: ~/example — ssh — 100×26

```
schwehr@researchtools:~$ pwd # Print Working Directory or "Where am I?"
/home/CCOMNH/schwehr
schwehr@researchtools:~$ mkdir example
schwehr@researchtools:~$ cd example
schwehr@researchtools:~/example$ ls
schwehr@researchtools:~/example$ ls -l
total 0
schwehr@researchtools:~/example$ ls -a
.  ..
schwehr@researchtools:~/example$ # . is the current directory
schwehr@researchtools:~/example$ # .. is the parent directory or "up"
schwehr@researchtools:~/example$ ls -la
total 8
drwxr-xr-x  2 schwehr domain users 4096 2012-06-24 16:52 .
drwxr-xr-x 14 schwehr domain users 4096 2012-06-24 16:52 ..
schwehr@researchtools:~/example$
```

```
schwehr@researchtools:~$ pwd # Print Working Directory or "Where am I?"
/home/CCOMNH/schwehr
schwehr@researchtools:~$ mkdir example
schwehr@researchtools:~$ cd example
schwehr@researchtools:~/example$ ls
schwehr@researchtools:~/example$ ls -l
total 0
schwehr@researchtools:~/example$ ls -a
.  ..
schwehr@researchtools:~/example$ # . is the current directory
schwehr@researchtools:~/example$ # .. is the parent directory or "up"
schwehr@researchtools:~/example$ ls -la
total 8
drwxr-xr-x  2 schwehr domain users 4096 2012-06-24 16:52 .
drwxr-xr-x 14 schwehr domain users 4096 2012-06-24 16:52 ..
schwehr@researchtools:~/example$
```

```
schwehr@researchtools:~$ pwd # Print Working Directory or "Where am I?"
/home/CCOMNH/schwehr
schwehr@researchtools:~$ mkdir example
schwehr@researchtools:~$ cd example
schwehr@researchtools:~/example$ ls
schwehr@researchtools:~/example$ ls -l
total 0
schwehr@researchtools:~/example$ ls -a
.  ..
schwehr@researchtools:~/example$ # . is the current directory
schwehr@researchtools:~/example$ # .. is the parent directory or "up"
schwehr@researchtools:~/example$ ls -la
total 8
drwxr-xr-x  2 schwehr domain users 4096 2012-06-24 16:52 .
drwxr-xr-x 14 schwehr domain users 4096 2012-06-24 16:52 ..
schwehr@researchtools:~/example$
```

Terminal Shell Edit View Window Help

schwehr — schwehr@researchtools: ~/example — ssh — 100×26

```
schwehr@researchtools:~$ pwd # Print Working Directory or "Where am I?"
/home/CCOMNH/schwehr
schwehr@researchtools:~$ mkdir example
schwehr@researchtools:~$ cd example
schwehr@researchtools:~/example$ ls
schwehr@researchtools:~/example$ ls -l
total 0
schwehr@researchtools:~/example$ ls -a
.  ..
schwehr@researchtools:~/example$ # . is the current directory
schwehr@researchtools:~/example$ # .. is the parent directory or "up"
schwehr@researchtools:~/example$ ls -la
total 8
drwxr-xr-x  2 schwehr domain users 4096 2012-06-24 16:52 .
drwxr-xr-x 14 schwehr domain users 4096 2012-06-24 16:52 ..
schwehr@researchtools:~/example$
```

```
schwehr@researchtools:~$ pwd # Print Working Directory or "Where am I?"
/home/CCOMNH/schwehr
schwehr@researchtools:~$ mkdir example
schwehr@researchtools:~$ cd example
schwehr@researchtools:~/example$ ls
schwehr@researchtools:~/example$ ls -l
total 0
schwehr@researchtools:~/example$ ls -a
.  ..
schwehr@researchtools:~/example$ # . is the current directory
schwehr@researchtools:~/example$ # .. is the parent directory or "up"
schwehr@researchtools:~/example$ ls -la
total 8
drwxr-xr-x  2 schwehr domain users 4096 2012-06-24 16:52 .
drwxr-xr-x 14 schwehr domain users 4096 2012-06-24 16:52 ..
schwehr@researchtools:~/example$
```

schwehr — schwehr@researchtools: ~ — ssh — 100×26

```
schwehr@researchtools:~/example$ cd ..
schwehr@researchtools:~$ # ~ or tilde is a reference to your "home directory"
schwehr@researchtools:~$ ls ~
a-folder  another-folder  anothership  away  example  hw  myship2  wx
schwehr@researchtools:~$ echo ~
/home/CCOMNH/schwehr
schwehr@researchtools:~$ ls ~schwehr
a-folder  another-folder  anothership  away  example  hw  myship2  wx
schwehr@researchtools:~$ ls ~jchadwick/
schwehr@researchtools:~$ ls -a ~jchadwick/
.  ..  .bash_history  .bash_logout  .bashrc  .cache  .irssi  .profile  .viminfo
schwehr@researchtools:~$ ls -a ~schwehr
.           another-folder  .bash_aliases   .bash_logout  .emacs.d  hw          .lesshst  .ssh
..          anothership     .bash_aliases~  .bashrc       example   .ipython    myship2   wx
a-folder    away            .bash_history   .cache        .gnupg    .irssi      .profile
schwehr@researchtools:~$ ls ~sc # now press tab after the sc
ls: cannot access ~sc: No such file or directory
schwehr@researchtools:~$ ls ~schwehr/
a-folder  another-folder  anothership  away  example  hw  myship2  wx
schwehr@researchtools:~$
```

schwehr — schwehr@researchtools: ~ — ssh — 100×26

```
schwehr@researchtools:~$ alias ls
alias ls='ls --color=auto'
schwehr@researchtools:~$ ls --help
Usage: ls [OPTION]... [FILE]...
List information about the FILEs (the current directory by default).
Sort entries alphabetically if none of -cftuvSUX nor --sort.

Mandatory arguments to long options are mandatory for short options too.
  -a, --all                  do not ignore entries starting with .
  -A, --almost-all           do not list implied . and ..
      --author               with -l, print the author of each file
  -b, --escape               print C-style escapes for nongraphic characters
      --block-size=SIZE      use SIZE-byte blocks.  See SIZE format below
  -B, --ignore-backups       do not list implied entries ending with ~
  -c                         with -lt: sort by, and show, ctime (time of last
                               modification of file status information)
                               with -l: show ctime and sort by name
                               otherwise: sort by ctime
  -C                         list entries by columns
      --color[=WHEN]         colorize the output.  WHEN defaults to `always'
                               or can be `never' or `auto'.  More info below
  -d, --directory            list directory entries instead of contents,
                               and do not dereference symbolic links
  -D, --dired                generate output designed for Emacs' dired mode
  -f                         do not sort, enable -aU, disable -ls --color
```

schwehr — schwehr@researchtools: ~ — ssh — 100×26

```
schwehr@researchtools:~$ echo

schwehr@researchtools:~$ echo prints without doing anything
prints without doing anything
schwehr@researchtools:~$ echo hello world
hello world
schwehr@researchtools:~$ echo ~
/home/CCOMNH/schwehr
schwehr@researchtools:~$ echo ~jchadwick
/home/CCOMNH/jchadwick
schwehr@researchtools:~$ echo ~s
~sbenton              ~speech-dispatcher  ~ssuh                ~swright
~schwehr/             ~sranaweera         ~stephens            ~sync/
~sdenney              ~sree               ~sthein/             ~sys/
~semmed               ~srinivas           ~studenttest         ~syslog
~shachak              ~ssauth             ~svanhorn
~slee                 ~ssharma            ~sward
~soaresrosa           ~sshd/              ~swineberg
schwehr@researchtools:~$ echo ~g
~games/          ~glennm          ~gnats          ~gretchen        ~guest
~george          ~gmasetti/       ~greenaway      ~grice           ~guillermo
~ghostjewelfish  ~gmitchell/      ~greenlaw       ~gtibor
schwehr@researchtools:~$ echo ~g # pressing tab 2 times gives you all the matches
```

schwehr — schwehr@researchtools: ~ — ssh — 100×26

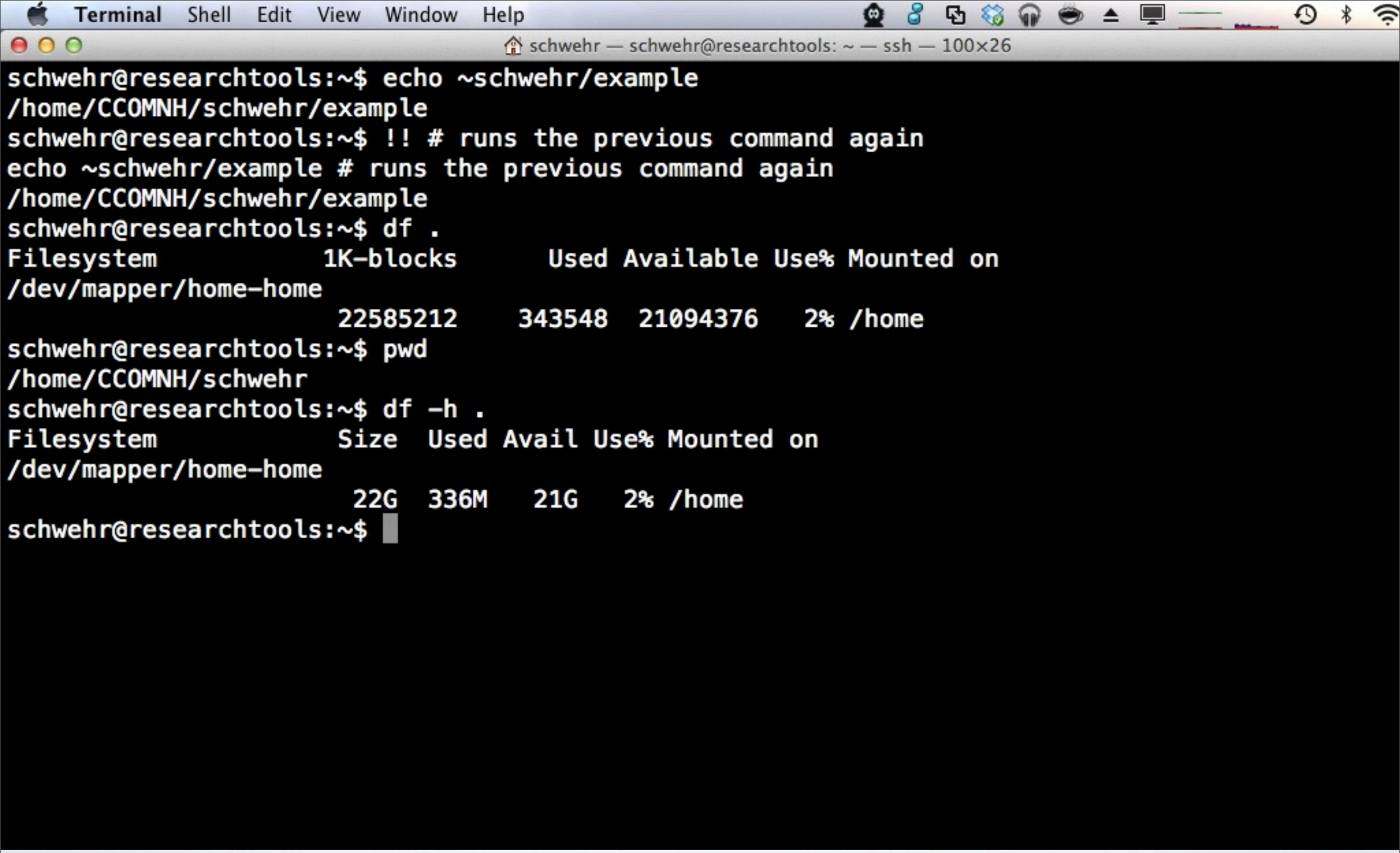
```
schwehr@researchtools:~$ ls ~schwehr/example
schwehr@researchtools:~$ echo ~schwehr/example
/home/CCOMNH/schwehr/example
schwehr@researchtools:~$ # press the "up arrow" to scroll back through history
schwehr@researchtools:~$ history | tail
 1086  echo
 1087  echo prints without doing anything
 1088  echo hello world
 1089  echo ~
 1090  echo ~jchadwick
 1091  clear
 1092  ls ~schwehr/example
 1093  echo ~schwehr/example
 1094  # press the "up arrow" to scroll back through history
 1095  history | tail
schwehr@researchtools:~$
```

schwehr — schwehr@researchtools: ~ — ssh — 100×26

```
schwehr@researchtools:~$ echo $HISTSIZE
1000
schwehr@researchtools:~$ history | head -5
  102  n
  103  ls -l
  104  ls 1*
  105  ls *0
  106  ls 1*2
schwehr@researchtools:~$ history | tail -5
 1098  echo $HISTSIZE
 1099  clear
 1100  echo $HISTSIZE
 1101  history | head -5
 1102  history | tail -5
schwehr@researchtools:~$
```

schwehr — schwehr@researchtools: ~ — ssh — 100×26

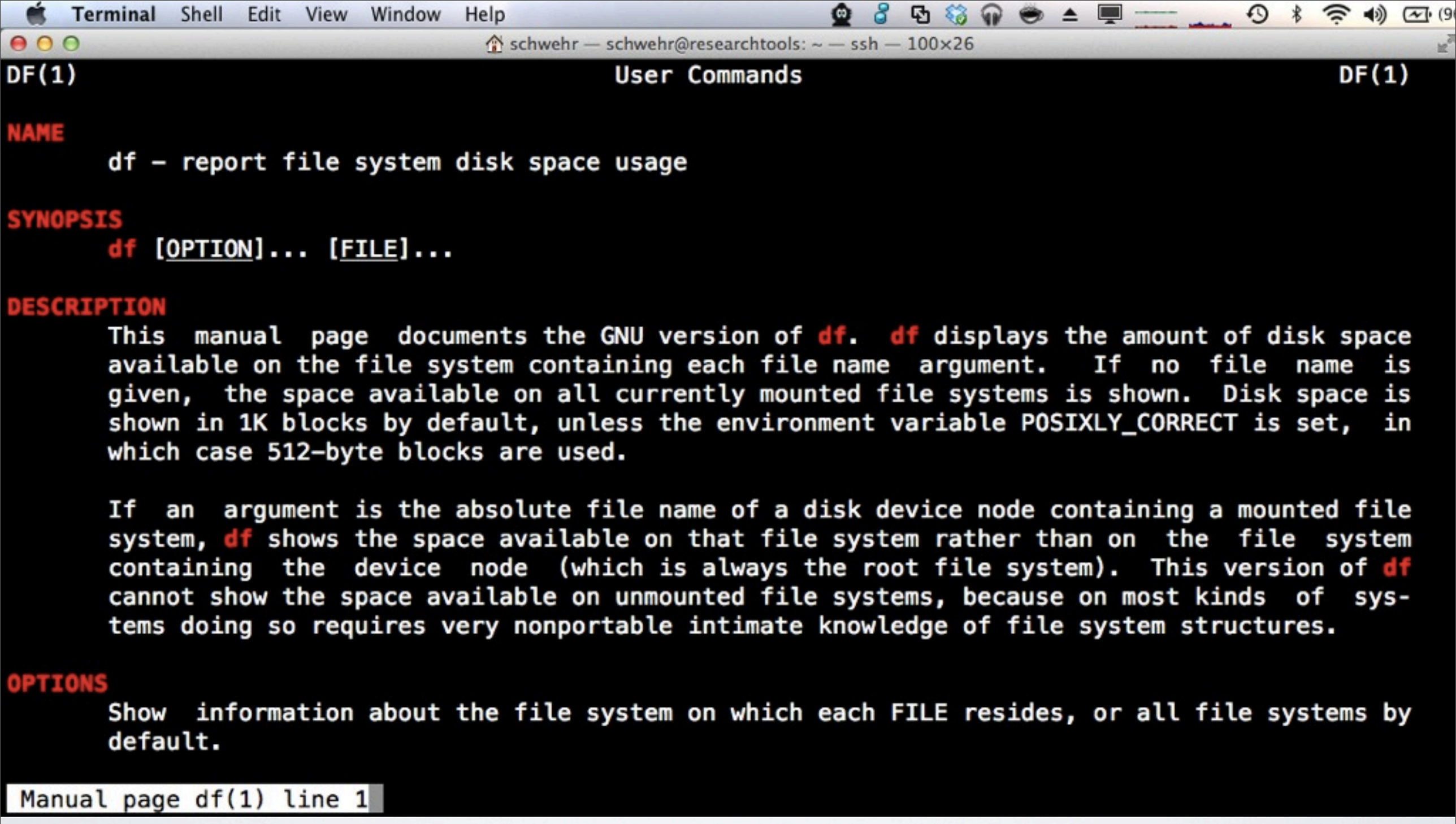
```
schwehr@researchtools:~$ history | tail -20
 1085  clear
 1086  echo
 1087  echo prints without doing anything
 1088  echo hello world
 1089  echo ~
 1090  echo ~jchadwick
 1091  clear
 1092  ls ~schwehr/example
 1093  echo ~schwehr/example
 1094  # press the "up arrow" to scroll back through history
 1095  history | tail
 1096  history | head -70 | tail -10
 1097  history | head
 1098  echo $HISTSIZE
 1099  clear
 1100  echo $HISTSIZE
 1101  history | head -5
 1102  history | tail -5
 1103  clear
 1104  history | tail -20
schwehr@researchtools:~$ !1093
echo ~schwehr/example
/home/CCOMNH/schwehr/example
(reverse-i-search)`echo': echo ~schwehr/example
```



SMB - http://en.wikipedia.org/wiki/Server_Message_Block

schwehr — schwehr@researchtools: ~ — ssh — 100×26

```
schwehr@researchtools:~$ man
What manual page do you want?
schwehr@researchtools:~$ # RTFM - Read the F* Manual
schwehr@researchtools:~$ # http://en.wikipedia.org/wiki/RTFM
schwehr@researchtools:~$ man df
```



You are in a "pager." Use the "q" key to quit out of the man page. The space bar gets the next page.

Terminal Shell Edit View Window Help

AUTHOR

Written by Torbjorn Granlund, David MacKenzie, and Paul Eggert.

REPORTING BUGS

Report df bugs to bug-coreutils@gnu.org
GNU coreutils home page: <http://www.gnu.org/software/coreutils/>
General help using GNU software: <http://www.gnu.org/gethelp/>
Report df translation bugs to <http://translationproject.org/team/>

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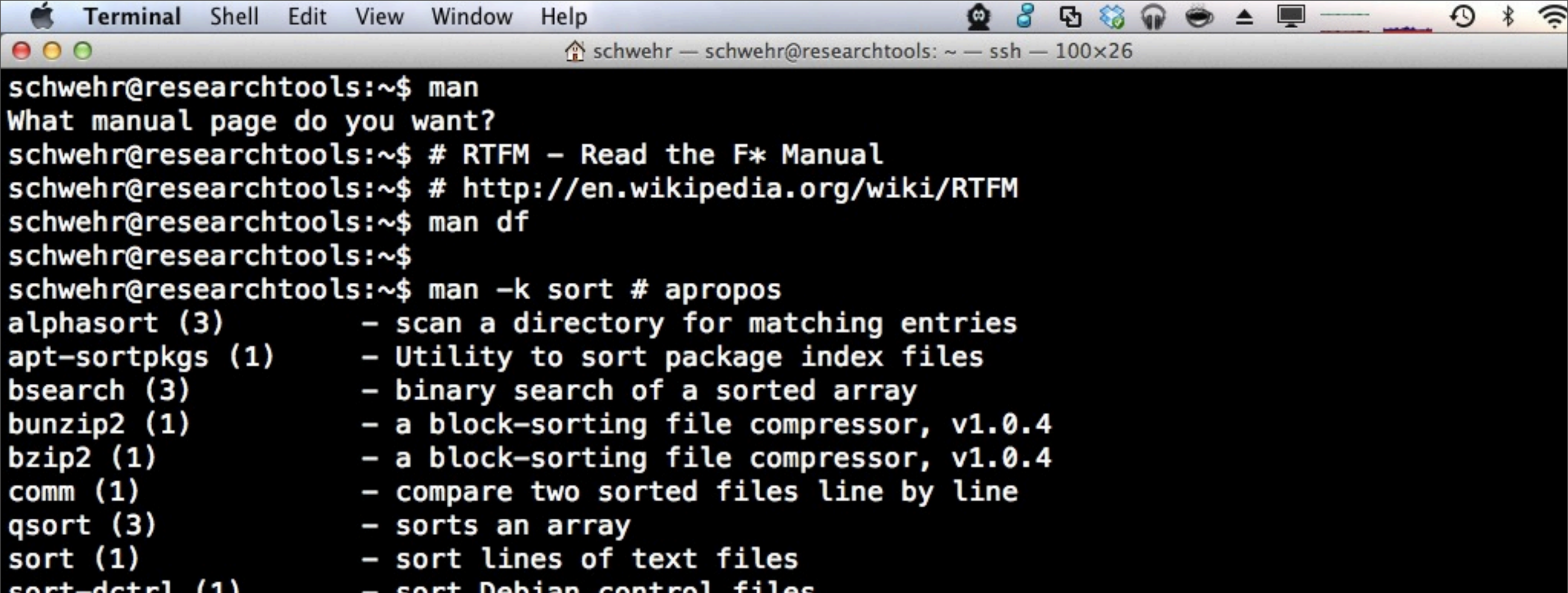
This is free software: you are free to change and redistribute it. There is NO WARRANTY, to the extent permitted by law.

SEE ALSO

The full documentation for **df** is maintained as a Texinfo manual. If the **info** and **df** programs are properly installed at your site, the command

info coreutils 'df invocation'

should give you access to the complete manual.



Terminal Shell Edit View Window Help

schwehr — schwehr@researchtools: ~ — ssh — 100×26

```
schwehr@researchtools:~$ man
What manual page do you want?
schwehr@researchtools:~$ # RTFM - Read the F* Manual
schwehr@researchtools:~$ # http://en.wikipedia.org/wiki/RTFM
schwehr@researchtools:~$ man df
schwehr@researchtools:~$
schwehr@researchtools:~$ man -k sort # apropos
alphasort (3)        - scan a directory for matching entries
apt-sortpkgs (1)     - Utility to sort package index files
bsearch (3)          - binary search of a sorted array
bunzip2 (1)          - a block-sorting file compressor, v1.0.4
bzip2 (1)            - a block-sorting file compressor, v1.0.4
comm (1)             - compare two sorted files line by line
qsort (3)            - sorts an array
sort (1)             - sort lines of text files
sort-dctrl (1)       - sort Debian control files
texindex (1)         - sort Texinfo index files
tsort (1)            - perform topological sort
versionsort (3)      - scan a directory for matching entries
winop (3blt)         - Perform assorted window operations
schwehr@researchtools:~$ man sort
```

```
SORT(1)                          User Commands                          SORT(1)

NAME
       sort - sort lines of text files

SYNOPSIS
       sort [OPTION]... [FILE]...
       sort [OPTION]... --files0-from=F

DESCRIPTION
       Write sorted concatenation of all FILE(s) to standard output.

       Mandatory  arguments  to  long  options  are  mandatory  for  short options too.  Ordering
       options:

       -b, --ignore-leading-blanks
              ignore leading blanks

       -d, --dictionary-order
              consider only blanks and alphanumeric characters

       -f, --ignore-case
              fold lower case to upper case characters

       -g, --general-numeric-sort
Manual page sort(1) line 1
```

schwehr — schwehr@researchtools: ~ — ssh — 100×26

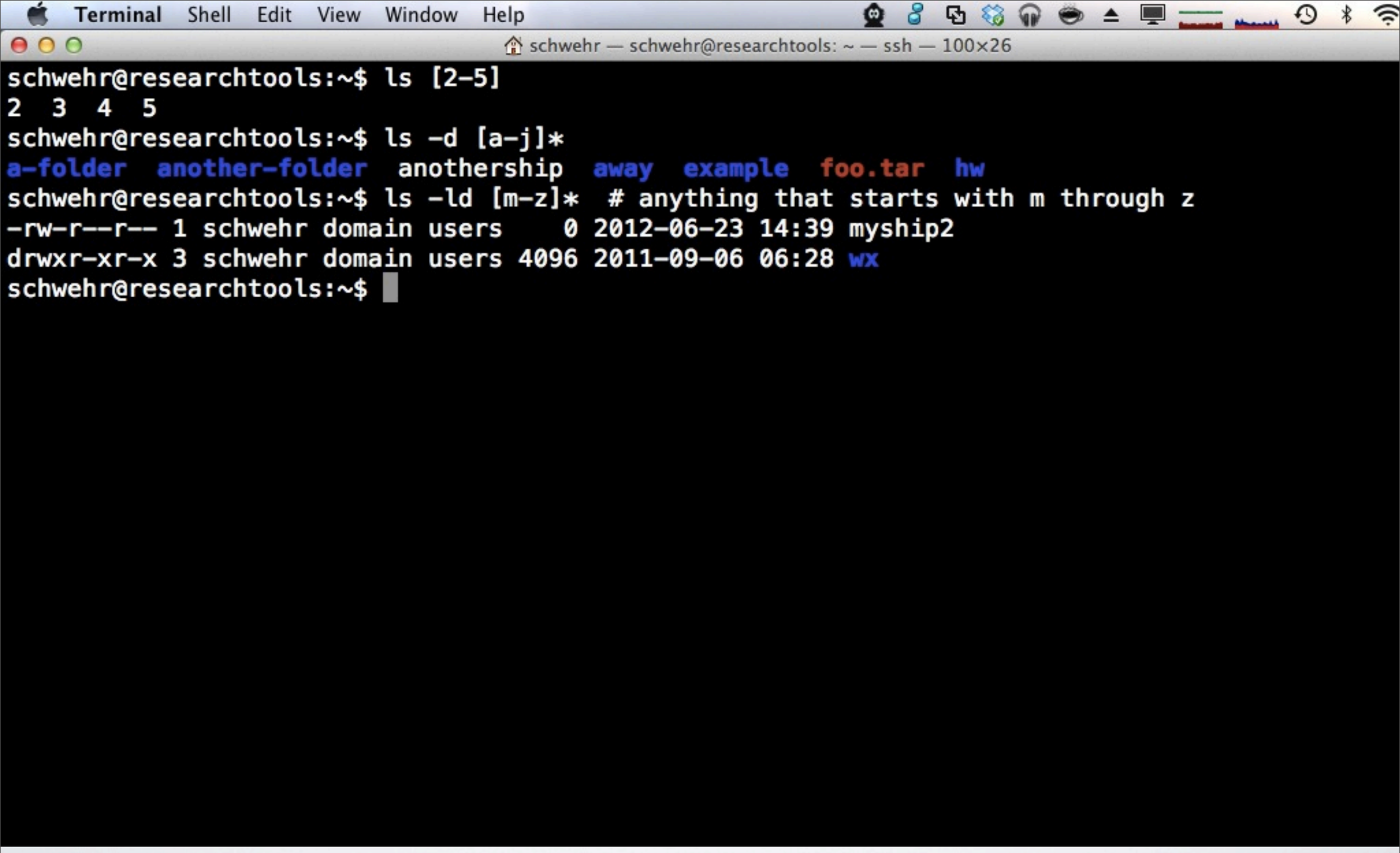
```
schwehr@researchtools:~/example$ cd
schwehr@researchtools:~$ touch 1 2 3
schwehr@researchtools:~$ ls -l
total 24
-rw-r--r-- 1 schwehr domain users    0 2012-06-24 17:24 1
-rw-r--r-- 1 schwehr domain users    0 2012-06-24 17:24 2
-rw-r--r-- 1 schwehr domain users    0 2012-06-24 17:24 3
drwxr-xr-x 2 schwehr domain users 4096 2012-06-23 14:44 a-folder
drwxr-xr-x 2 schwehr domain users 4096 2012-06-23 14:44 another-folder
-rw-r--r-- 1 schwehr domain users    0 2012-06-23 14:41 anothership
drwxr-xr-x 2 schwehr domain users 4096 2012-06-23 14:32 away
drwxr-xr-x 2 schwehr domain users 4096 2012-06-24 16:52 example
drwx------ 4 schwehr domain users 4096 2011-10-02 15:40 hw
-rw-r--r-- 1 schwehr domain users    0 2012-06-23 14:39 myship2
drwxr-xr-x 3 schwehr domain users 4096 2011-09-06 06:28 wx
schwehr@researchtools:~$ rm 1 2 3
rm: remove regular empty file `1'? y
rm: remove regular empty file `2'? y
rm: remove regular empty file `3'? y
schwehr@researchtools:~$ alias rm
alias rm='rm -i'
schwehr@researchtools:~$ touch 1 2 3
schwehr@researchtools:~$ rm -i 1 2 3
rm: remove regular empty file `1'? y
rm: remove regular empty file `2'? n
rm: remove regular empty file `3'?
```

schwehr — schwehr@researchtools: ~ — ssh — 100×26

```
schwehr@researchtools:~$ touch 1 2 3 4 5 6 7 8 9 10 100 11 12 13
schwehr@researchtools:~$ ls -d *
1   100  12  2  4  6  8  a-folder       anothership  example  myship2
10  11   13  3  5  7  9  another-folder  away         hw       wx
schwehr@researchtools:~$ # Don't do "rm *"  DANGER!
schwehr@researchtools:~$ ls 1*
1  10  100  11  12  13
schwehr@researchtools:~$ ls *0
10  100
schwehr@researchtools:~$ ls 1*0
10  100
schwehr@researchtools:~$ ls 1*3
13
schwehr@researchtools:~$ touch foo.tar
schwehr@researchtools:~$ ls *.tar
foo.tar
schwehr@researchtools:~$ ls *.txt
ls: cannot access *.txt: No such file or directory
schwehr@researchtools:~$ ls ?
1  2  3  4  5  6  7  8  9
schwehr@researchtools:~$ ls ??
10  11  12  13

hw:
02  03
```

schwehr — schwehr@researchtools: ~ — ssh — 100×26

```
schwehr@researchtools:~$ ls ??
10  11  12  13

hw:
02  03

wx:
ccom-airmar-2011-08-28  ccom-airmar-2011-08-29  ccom-airmar-2011-08-30  nmeadec
schwehr@researchtools:~$ ls -d ??
10  11  12  13  hw  wx
schwehr@researchtools:~$ ls -dl ??
-rw-r--r-- 1 schwehr domain users    0 2012-06-24 17:27 10
-rw-r--r-- 1 schwehr domain users    0 2012-06-24 17:27 11
-rw-r--r-- 1 schwehr domain users    0 2012-06-24 17:27 12
-rw-r--r-- 1 schwehr domain users    0 2012-06-24 17:27 13
drwx------ 4 schwehr domain users 4096 2011-10-02 15:40 hw
drwxr-xr-x 3 schwehr domain users 4096 2011-09-06 06:28 wx
schwehr@researchtools:~$ ls -d 1?
10  11  12  13
schwehr@researchtools:~$ ls -d ?3
13
schwehr@researchtools:~$
```



Terminal Shell Edit View Window Help

schwehr — schwehr@researchtools: ~ — ssh — 100×26

```
schwehr@researchtools:~$ ls [2-5]
2  3  4  5
schwehr@researchtools:~$ ls -d [a-j]*
a-folder  another-folder  anothership  away  example  foo.tar  hw
schwehr@researchtools:~$ ls -ld [m-z]*  # anything that starts with m through z
-rw-r--r-- 1 schwehr domain users    0 2012-06-23 14:39 myship2
drwxr-xr-x 3 schwehr domain users 4096 2011-09-06 06:28 wx
schwehr@researchtools:~$
```

Aquamacs File Edit Options Tools Org Tbl YASnippet Window Help

03-basic-command-line.org

New Open Recent Save Print Undo Redo Cut Copy Paste Search Preferences Help

scratch | class | 03-basic-command-line.org | researchtools

```
# anything with exactly two letters
ls ??
# 10  11  12  13

# the letter "1" followed by any single c
ls 1?
# 10  11  12  13
#+END_SRC

You can get fancier by using square brack
of characters or ranges by putting a dash
It's best to just see some examples.

#+BEGIN_SRC sh
# List files that are one character of the number 2 through 5
ls [2-5]
# 2  3  4  5

# List files that start with 1 and have a 1 or 3 following.
ls 1[13]
# 11  13

# Combine the * and ? to ask for any file ending in 1 or 3
ls *[13]
# 1  11  13  3

# Here we are using a special system directory for an example using a
# range of alphabetical characters (x, y, & z).
# Please do not worry about what these files are
ls /sbin/*[x-z]
# /sbin/fsck.minix  /sbin/getty  /sbin/iwspy  /sbin/mkfs.minix  /sbin/pam_tally
#+END_SRC

* Using a Virtual Machine (VM) version of Ubuntu Linux

Before we go any more into the shell, it is worth taking the time to
show you how to be able to do this type of thing on your own computer
and not always have to log into researchtools.ccom.nh.
```

Terminal Shell Edit View Window Help

schwehr — schwehr@researchtools: ~ — ssh

```
schwehr@researchtools:~$ type df
df is hashed (/bin/df)
schwehr@researchtools:~$ which df
/bin/df
schwehr@researchtools:~$ ls /bin/z*
/bin/zcat  /bin/zdiff   /bin/zfgrep  /bin/zgrep  /bin/zmore
/bin/zcmp  /bin/zegrep  /bin/zforce  /bin/zless  /bin/znew
schwehr@researchtools:~$
```

U:--- 03-basic-command-line.org Bot (671,0) Hg:0 (Org yas Spc Fill) 2:37PM 1.20