



# Scripting in GRASS GIS

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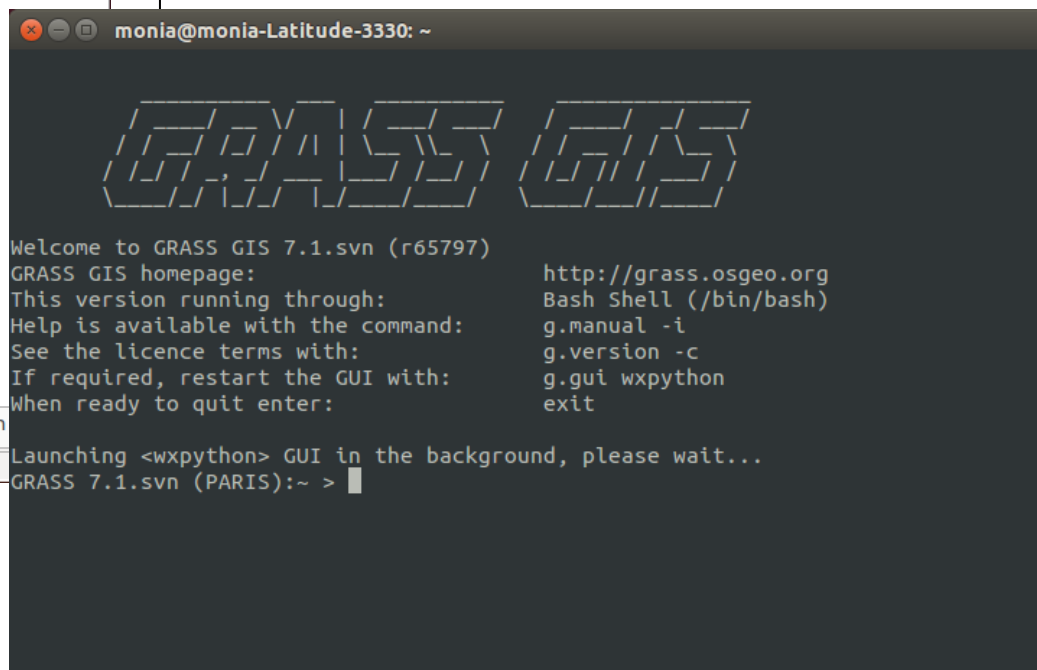
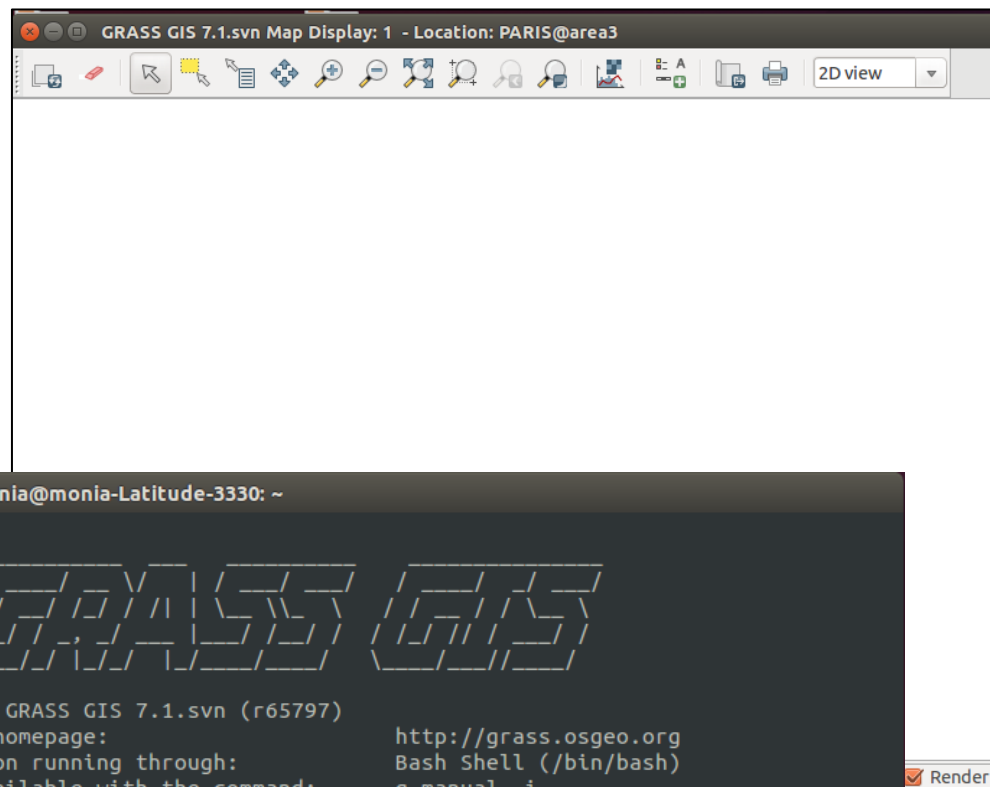
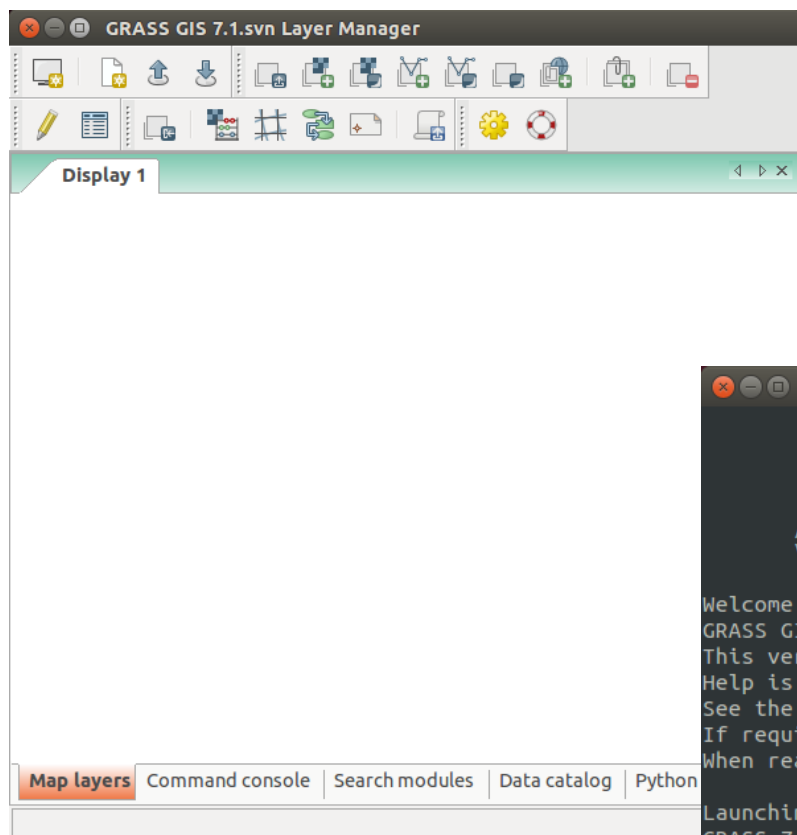
## Geographic Resources Analysis Support System



- 1982: first developments carried out at USA/CERL (Construction Engineering Research Laboratory)
- 1985: version 1.0 was released
- 1998: development transferred to an international GRASS Development Team led by Markus Neteler
- 1999: GRASS 5.0 release under **General Public License (GPL)**
- 2016: stable long term release GRASS 7.0.3



Not user-friendly...





...but very powerful GIS suite with over than 400 standard modules in the core version.

PREFIX	CLASS	FUNCTION
d.*	display	Visualization
db.*	database	Database management
g.*	general	General file operations
i.*	image	Image processing
ps.*	postscript	Map creation in Postscript
r.*	raster	Raster analysis
r3.*	voxel	Voxel analysis
v.*	vector	Vector analysis
t.*	timeseries	Temporal data processing
m.*	miscellaneous	Miscellaneous functions



Moreover, anyone can develop and upload his own extensions on the **GRASS Add-on repository** to make them available for other users

## Database

- [db.csw.admin](#): CSW database manager
- [db.csw.harvest](#): CSW database manager
- [db.csw.run](#): Csw wsgi handler

## Display

- [d.frame](#): Manages display frames on the user's graphics monitor.
- [d.mon2](#): Starts a graphics display monitor which can be controlled from the command line.
- [d.vect.thematic2](#): Displays thematic map created from vector features and numeric attributes.

## General

- [g.cloud](#): Connects GRASS session with another one in a cluster system.
- [g.compare.md5](#): Checks if two GRASS GIS maps are identical.
- [g.copyall](#): Copies all or a filtered subset of files of selected type from another mapset to the current working mapset
- [g.gui.cswbrowser](#): *g.gui.cswbrowser* support searching and browsing metadata catalog based on Catalogue Service(CSW) standard.
- [g.gui.mwprecip](#): *g.gui.mwprecip* The module for processing row data of microwave links to precipitation.
- [g.isis3mt](#): Generates an ISIS3 map template file according to the current GRASS coordinate reference system
- [g.proj.all](#): Reprojects raster and vector maps from given location and mapset to current mapset.
- [g.proj.identify](#): Autoidentifies EPSG code from WKT CRS definition.
- [g.rename.many](#): Renames maps in the current mapset

## Imagery

- [i.destripe](#): Destripes regularly, about vertical, striped image using Fourier.
- [i.eb.delta](#): difference of temperature between two heights as seen in Pawan (2004), this is part of sensible heat flux calculations, as in SEBAL (Bastiaanssen, 1995). A 'w' flag allows for a very generic approximation.
- [i.eb.hsebal95](#): Sensible Heat Flux iteration SEBAL 95
- [i.eb.z0m0](#): Momentum roughness length (z0m) and surface roughness for heat transport (z0h) as seen in Bastiaanssen (2004)
- [i.eb.z0m](#): Momentum roughness length (z0m) and surface roughness for heat transport (z0h) as seen in Bastiaanssen (2004)
- [i.edge](#): Canny edge detector. Region shall be set to input map. Can work only on small images since map is loaded into memory.
- [i.evapo.potrad](#): Potential evapotranspiration, radiative method after Bastiaanssen (1995)

<https://grass.osgeo.org/grass70/manuals/addons/>



# How can we create a script for GRASS?

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- Python is the default language in GRASS GIS 7 for creating a script
  - **Python Scripting Library:** to perform analysis and processing of data by chaining existing modules
  - **PyGRASS Library:** to create new datasets directly through Python calls (access to low-level C functions)
  - **NumPy, SciPy:** libraries for scientific and technical computing



# How can we run a script in GRASS?

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## Interactive Python Shell

```
GRASS GIS 7.1.svn Layer Manager  
Welcome to wxGUI Interactive Python Shell 0.9.8  
Type "help(grass)" for more GRASS scripting related information.  
Type "AddLayer()" to add raster or vector to the layer tree.  
  
Python 2.7.6 (default, Jun 22 2015, 17:58:13)  
[GCC 4.8.2] on linux2  
Type "help", "copyright", "credits" or "license" for more information.  
>>>  
  
Clear  
Command console | Search modules | Data catalog | Python shell
```

## Terminal

```
monia@monia-Latitude-3330: ~  
Welcome to GRASS GIS 7.1.svn (r65797)  
GRASS GIS homepage: http://grass.osgeo.org  
This version running through: Bash Shell (/bin/bash)  
Help is available with the command: g.manual -i  
See the licence terms with: g.version -c  
If required, restart the GUI with: g.gui wxpython  
When ready to quit enter: exit  
  
Launching <wxpython> GUI in the background, please wait...  
GRASS 7.1.svn (MILANO):~ ipython  
Python 2.7.6 (default, Jun 22 2015, 17:58:13)  
Type "copyright", "credits" or "license" for more information.  
  
IPython 4.1.2 -- An enhanced Interactive Python.  
? -> Introduction and overview of IPython's features.  
%quickref -> Quick reference.  
help -> Python's own help system.  
object? -> Details about 'object', use 'object??' for extra details.  
  
In [1]:
```

## Script / GRASS GIS module





1. Main functions of Python Scripting Library
2. Generation of a simple script
3. Generation of a GRASS GIS module

## **IPython Notebook**

It is an interactive computational environment, in which you can combine code execution and rich text