

The background of the slide features a complex, abstract pattern of blue lines and arrows. Solid blue lines intersect at various angles, while dashed blue lines form loops and curves. Small blue circles and arrows are scattered throughout, some pointing in different directions, creating a sense of movement and flow. The overall design is modern and technical, fitting for a data analysis presentation.

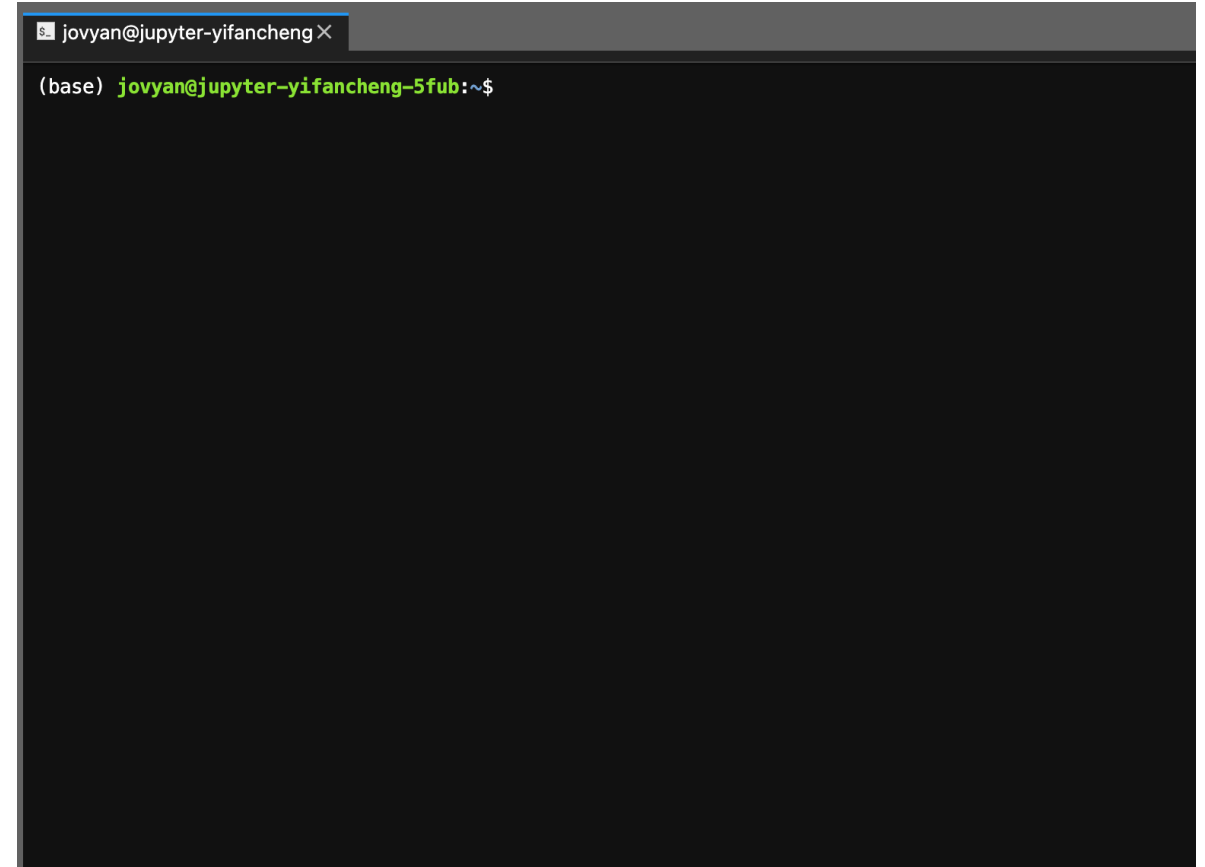
BASH SCRIPT

GLY 606 Water Data Analysis & Modeling

Sep 4th 2024

What is bash script?

- A bash script is a file containing a sequence of commands that are executed by the bash program line by line. It allows you to perform a series of actions, such as navigating to a specific directory, creating a folder, and launching a process using the command line.

A terminal window with a dark background. The title bar at the top reads 'jovyan@jupyter-yifancheng'. The prompt line shows '(base) jovyan@jupyter-yifancheng-5fub:~\$'.

Why is it important to learn Bash?

Automation

Allow you to automate repetitive tasks and processes, saving time and reducing the risk of errors that can occur with manual execution.

Portability

Can be run on platforms and operating systems

- Unix
- Linux
- macOS
- Windows (emulators or virtual machines)

Flexibility

Highly customizable and can be easily modified to suit specific requirements.

Accessibility

Easy to write and don't require any special tools or software. They can be edited using any text editor, and most operating systems have a built-in shell interpreter.

Integration

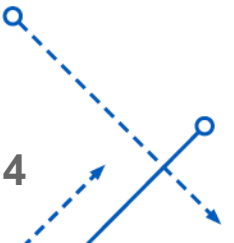
Can be integrated with other tools & applications

- databases
- web servers
- cloud services

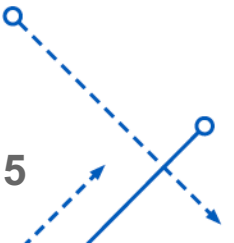
allowing for more complex automation & system management tasks.

What's the best way to learn coding?

Through solving problems!



Case: prepare configuration files for all Ameriflux sites



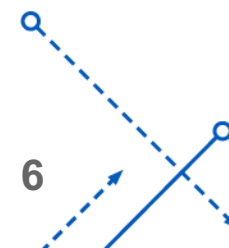
Case: prepare configuration files for all Ameriflux sites

- When running hydrologic models, we usually use following command

```
## run job  
# -rmk pbs: use pbs for resource management  
# run on one processor  
$vic_exe -g $global_param
```

↓
Executable file

↓
Configuration file



Case: prepare configuration files
for all Ameriflux sites

What's inside a
configuration file?

Input data streams

Output spec

Timestep

Simulation period

&run_setup

```
static_file      = "./ameriflux_static_fields.C1152.US-SRG.nc"  
init_file       = "./ameriflux_init_fields.C1152.US-SRG.2009-12-31_23-00-00.nc"  
forcing_dir     = "forcing/US-SRG"
```

```
output_dir      = "./ufs_land_output/prod/US-SRG"  
output_frequency_s = 3600
```

```
timestep_seconds = 3600
```

```
! simulation_start is required  
! either set simulation_end or run_* or run_timesteps, priority  
!   1. simulation_end 2. run_[days/hours/minutes/seconds] 3. run_timesteps
```

```
simulation_start = "2010-01-01 00:00:00" ! start date [yyyy-mm-dd hh:mm:ss]
```

```
run_days        = 365 ! number of days to run  
run_hours       = 0  ! number of hours to run  
run_minutes     = 0  ! number of minutes to run  
run_seconds     = 0  ! number of seconds to run
```

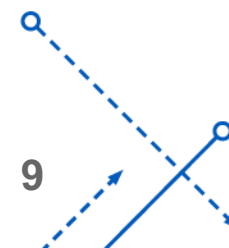
```
run_timesteps   = 0  ! number of timesteps to run
```

```
location_start  = 1  
location_end    = 1
```


Naming conventions

```
static_file      = "./ameriflux_static_fields.C1152.US-SRG.nc"  
init_file       = "./ameriflux_init_fields.C1152.US-SRG.2009-12-31_23-00-00.nc"  
forcing_dir     = "forcing/US-SRG"
```

- **static file** time-invariant fields, such as soil properties, vegetation types, etc.
- **init file**. Initial condition file
- **forcing dir** A directory contains time-variant meteorological forcing data, such as air temperature, precipitation, etc.



Naming conventions

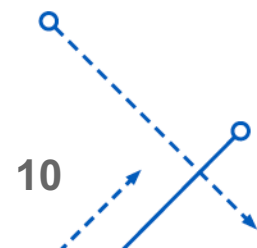
```
static_file = "ameriflux_static_fields.C1152.US-SRG.nc"
```

Prefix – information about file source (ameriflux), file types (static file), etc.

Data specifications

- Spatial resolution
- Versions

Locations



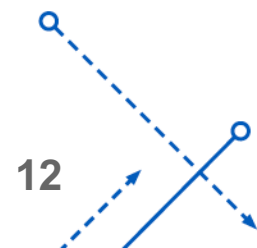
Naming conventions

```
init_file = "../ameriflux_init_fields.C1152.US-SRG.2009-12-31_23-00-00.nc"
```

**What's the differences
in the name of initial
conditions files?**

Case: prepare configuration files for all Ameriflux sites

- Given a configuration file has already been created for US-SRG site, input data and file structures for all other sites are similar to the US-SRG site, please use a Bash script to create configuration files for all other sites.



Bash script cheat sheets

- General Bash Scripting Cheat Sheets
 - <https://devhints.io/bash>
- Vim Editor Cheat Sheet
 - <https://github.com/sk3pp3r/cheat-sheet-pdf/blob/master/pdf/vim-cheat-sheet.pdf>
- Single bracket or double bracket
 - <http://mywiki.woledge.org/BashFAQ/031>

