

UAL Workshops: Using a local server for research and work

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2023-04-17

Housekeeping

Housekeeping



Housekeeping



If something doesn't make sense or is not clear,

PLEASE ASK!

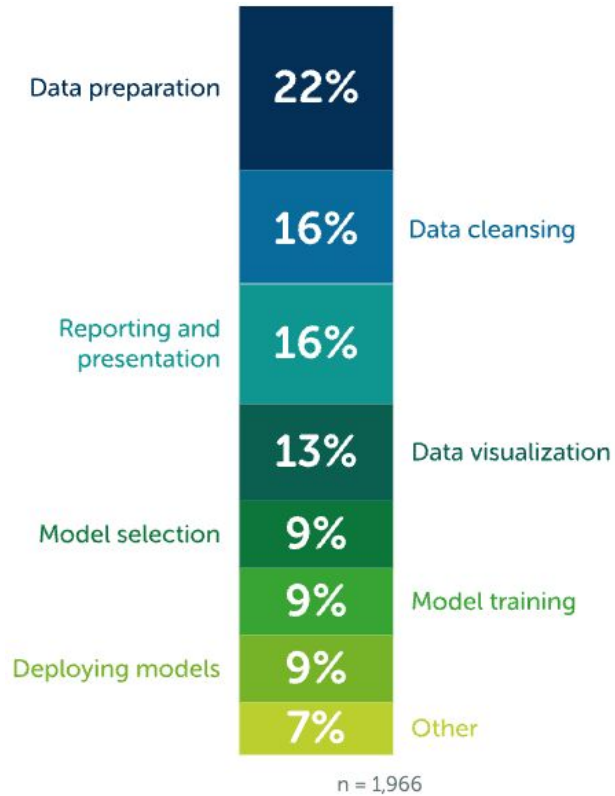
Why?

Why?

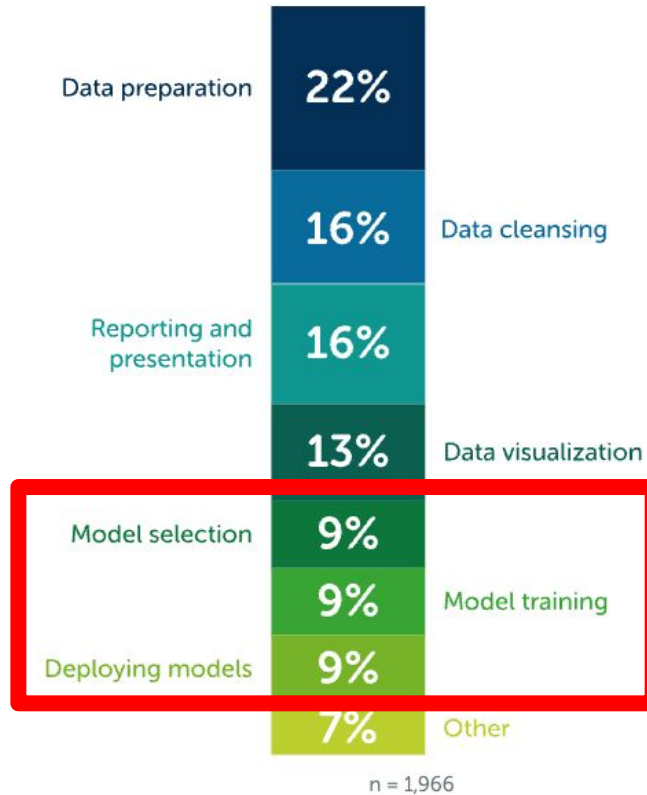
*Running ML
models*



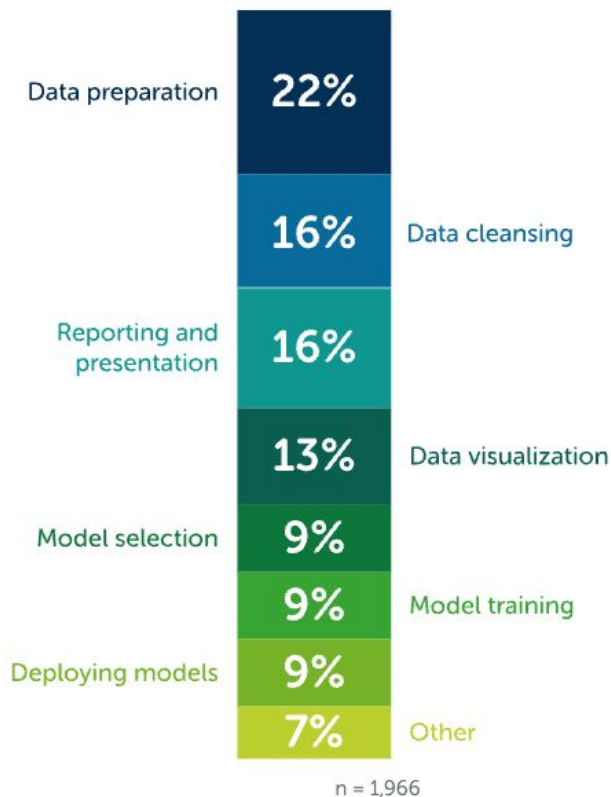
Why?



Why?

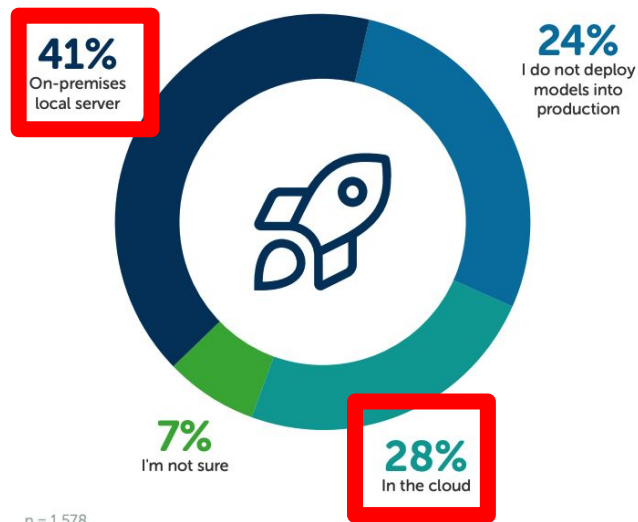


Why?

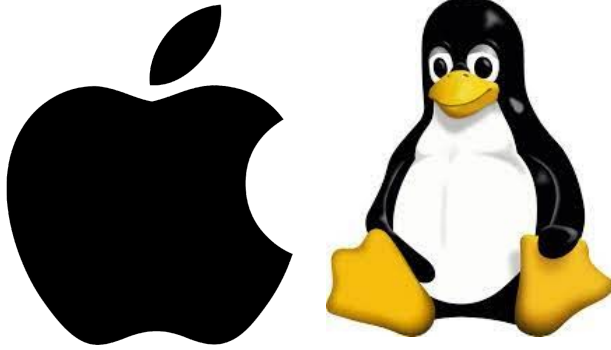


Where do you deploy models into production?

Only 23.70% of commercial respondents are not deploying models into production, which means the majority (69.20%) are deploying models into production (7.10% aren't sure), typically via an on-premises local server (41.32%) or the cloud (27.88%).

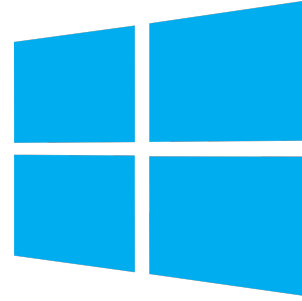


How to connect?



Terminal

```
my_essays
Last login: Fri Jun 4 13:10:49 on ttys000
tomrankin ~ % cd documents
tomrankin documents % mkdir my_essays
tomrankin documents % cd my_essays
tomrankin my_essays % touch history-essay.doc
tomrankin my_essays % touch notes.txt
tomrankin my_essays % mkdir images
tomrankin my_essays % ls
history-essay.doc  images          notes.txt
tomrankin my_essays %
```



Powershell

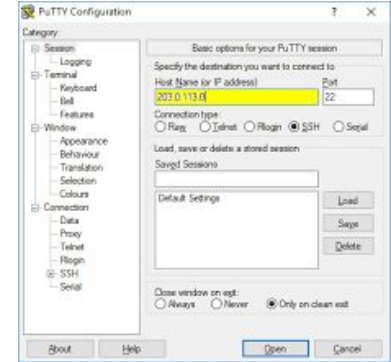
```
Windows PowerShell
PS C:\> ping google.com

Pinging google.com [172.217.14.78] with 32 bytes of data:
Reply from 172.217.14.78: bytes=32 time=76ms TTL=252
Reply from 172.217.14.78: bytes=32 time=76ms TTL=252
Reply from 172.217.14.78: bytes=32 time=84ms TTL=252
Reply from 172.217.14.78: bytes=32 time=76ms TTL=252

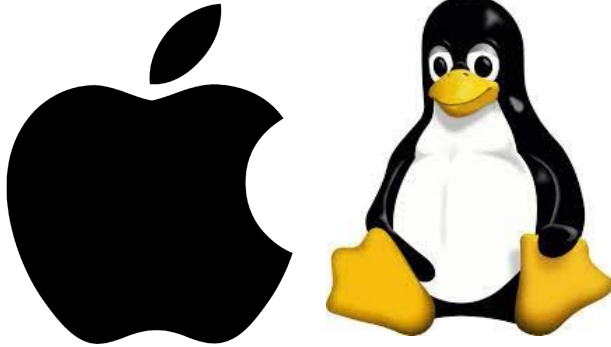
Ping statistics for 172.217.14.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 76ms, Maximum = 84ms, Average = 77ms
PS C:\> Test-Connection google.com

Source      Destination      IPv4Address      IPv6Address      Bytes  Time(ms)
-----
DESKTOP-E4... google.com        172.217.14.78      -                32      75
DESKTOP-E4... google.com        172.217.14.78      -                32      76
DESKTOP-E4... google.com        172.217.14.78      -                32      77
DESKTOP-E4... google.com        172.217.14.78      -                32      78
```

PutTY

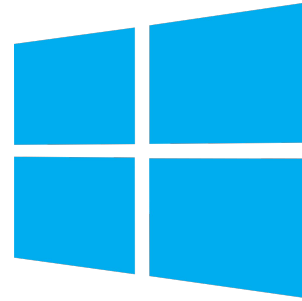


How to connect?



Terminal

```
my_essays
Last login: Fri Jun 4 13:10:49 on ttys000
tomrankin ~ %cd documents
tomrankin documents %mkdir my_essays
tomrankin documents %cd my_essays
tomrankin my_essays %touch history-essay.doc
tomrankin my_essays %touch notes.txt
tomrankin my_essays %mkdir images
tomrankin my_essays %ls
history-essay.doc  images          notes.txt
tomrankin my_essays %
```



Powershell

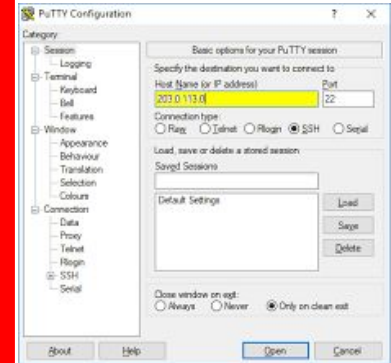
```
PS C:\> ping google.com

Pinging google.com [172.217.14.78] with 32 bytes of data:
Reply from 172.217.14.78: bytes=32 time=76ms TTL=252
Reply from 172.217.14.78: bytes=32 time=76ms TTL=252
Reply from 172.217.14.78: bytes=32 time=84ms TTL=252
Reply from 172.217.14.78: bytes=32 time=79ms TTL=252

Ping statistics for 172.217.14.78:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 76ms, Maximum = 84ms, Average = 77ms
PS C:\> Test-Connection google.com

Source      Destination      IPv4Address      IPv6Address      Bytes  Time(ms)
-----
DESKTOP-E4... google.com        172.217.14.78    -----
DESKTOP-E4... google.com        172.217.14.78    32      76
DESKTOP-E4... google.com        172.217.14.78    32      76
DESKTOP-E4... google.com        172.217.14.78    32      78
```

PutTY

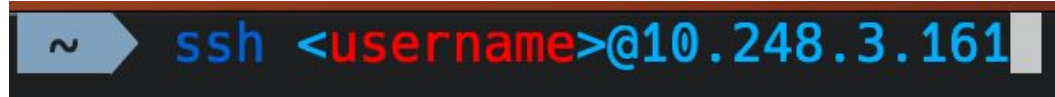


How to connect?

IP: **10.248.3.161**

Username: **your_first_name**

Password: **ua12023<number_of_characters_in_your_first_name>**

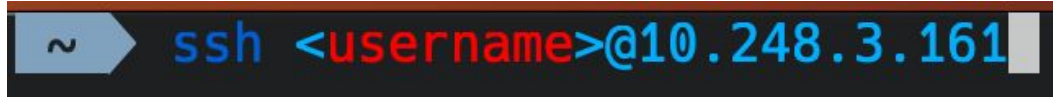


How to connect?

IP: **10.248.3.161**

Username: **your_first_name**

Password: **ua12023<number_of_characters_in_your_first_name>**



PLEASE change your password using **passwd**

How to connect?

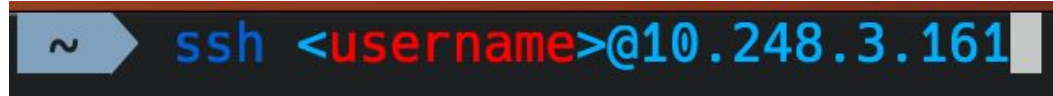
IP: 10.248.3.161

Username: `your_first_name`

Password: `ua12023<number_of_characters_in_your_first_name>`

You can only connect within the NUS network.

Off Campus? **VPN** to NUS, then connect to server

A terminal window with a dark background. On the left, there is a blue arrow pointing right with a white tilde (~) inside. To the right of the arrow, the text 'ssh <username>@10.248.3.161' is displayed in a light blue monospace font. A white cursor is positioned at the end of the command.

```
~ ssh <username>@10.248.3.161
```

PLEASE change your password using `passwd`

What can I do?

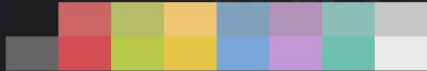
What can I do?

```
(base) ual@ual-server:~$ neofetch
  .-/+oosssso+/-.
  `:+ssssssssssssss++:`
    -+ssssssssssssssyyssss+-
    .osssssssssssssssssdMMMMyssso.
    /ssssssssssshdmmNNmmyNMMMMhssssss/
    +ssssssssshmydMMMMMMMNddddyssssssss+
    /ssssssssshNMMMyhhyyyyhmNMMMNhssssssss/
    .ssssssssdMMMNhssssssssshNMMMdssssssss.
    +ssssshhhyNMMNysssssssssssyNMMMyssssssss+
    ossyNMMMNyMMhssssssssssshmmhssssssso
    ossyNMMMNyMMhssssssssssshmmhssssssso
    +ssssshhhyNMMNysssssssssssyNMMMyssssssss+
    .ssssssssdMMMNhssssssssshNMMMdssssssss.
    /ssssssssshNMMMyhhyyyyhdNMMMNhssssssss/
    +ssssssssdmydMMMMMMMNddddyssssssss+
    /ssssssssssshdmNNNNmyNMMMMhssssss/
    .osssssssssssssssssdMMMMyssso.
    -+ssssssssssssssyyssss+-
    `:+ssssssssssssss++:`
      .-/+oosssso+/-.
      : More
      (FCL)

(base) ual@ual-server:~$
```

ual@ual-server

OS: Ubuntu 22.04.2 LTS x86_64
Kernel: 5.19.0-38-generic
Uptime: 15 mins
Packages: 1941 (dpkg), 11 (snap)
Shell: bash 5.1.16
Terminal: /dev/pts/1
CPU: Intel i5-7600 (4) @ 4.100GHz
GPU: Intel HD Graphics 630
GPU: NVIDIA GeForce GTX 1070
GPU: NVIDIA GeForce GTX 1070
Memory: 992MiB / 31970MiB



512GB HDD

Marcel 12:06 PM
Filip 12:15 PM

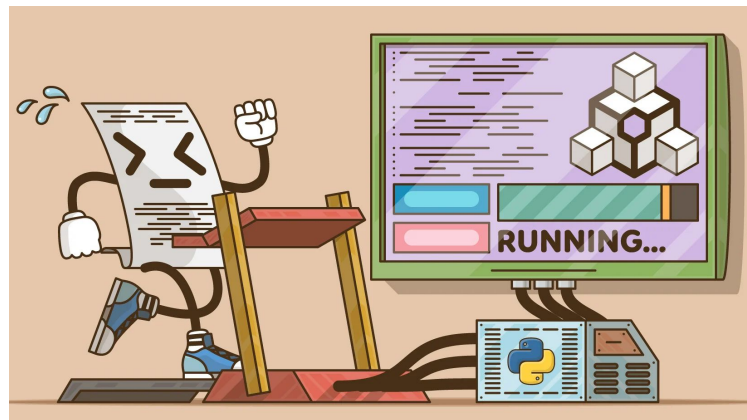
What can I do?



Train model



Moving files



Running scripts

What can I do?

In the server clone the repository:

```
git clone https://github.com/matqr/run-remote /home/<username>/run-remote/
```

A terminal window screenshot with a dark background. The prompt is 'matias@ual-server:/home\$'. The command 'ls matias/' has been executed, showing two directories: 'run-remote' and 'snap'.

```
matias@ual-server:/home$ ls matias/  
run-remote  snap  
matias@ual-server:/home$
```



Train model



Use an **ENVIRONMENT**.

Specially in a shared servers, you don't want to mess with someone else's dependencies.

Train model

Inside the cloned repo run:

```
conda env create -f environment_sandbox.yml
```

```
conda activate sandbox
```

```
python torch_example.py
```

```
(sandbox) matias@ual-server:~/run-remote$ python torch_example.py
```

```
Are we using GPUs? True
```

```
How many GPUs can you find? 2
```

```
Which device are you using? 0
```

```
What's your name? NVIDIA GeForce GTX 1070
```

```
tensor([[ -2.3889, -2.3127, -2.3151, -2.1710, -2.4112, -2.2448, -2.2118, -2.3052,  
         -2.4720, -2.2336]], grad_fn=<LogSoftmaxBackward0>)
```

```
(sandbox) matias@ual-server:~/run-remote$
```



Train model

Use an **ENVIRONMENT**.

Specially in a shared servers, you don't want to mess with someone else's dependencies.

Inside the cloned repo run: `jupyter lab`

Refresh (1 sec) <http://localhost:8888/lab?token=23ee18d35419b609a87b6394431e71d4873a14550e07ca98>

This page should redirect you to a Jupyter application. If it doesn't, click here to go to Jupyter.

localhost:8888/lab?token=23ee18d35419b609a87b6394431e71d4873a14550e07ca98

NUS Libraries Pro... World Clock - cur... READ Access



This site can't be reached

localhost refused to connect.

Try:

- Checking the connection
- Checking the proxy and the firewall

ERR_CONNECTION_REFUSED

Can't see the notebook!!

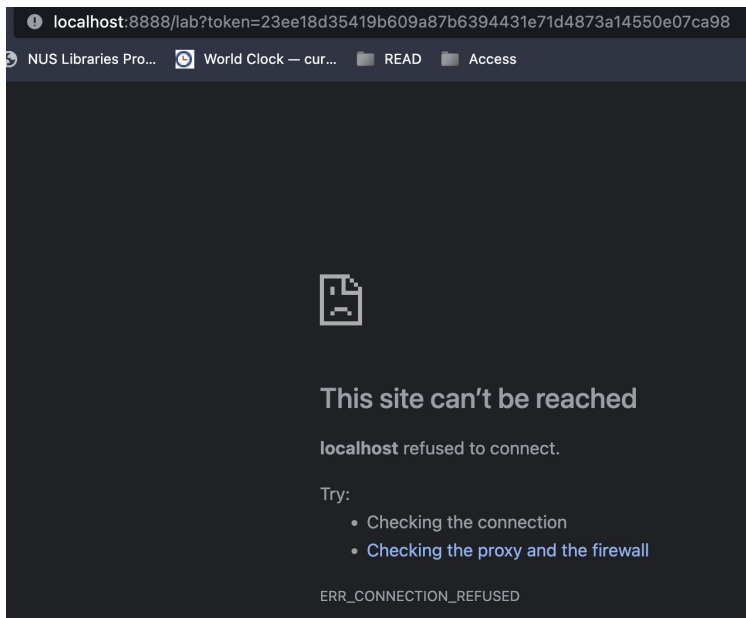


Train model

Use an **ENVIRONMENT**.

Specially in a shared servers, you don't want to mess with someone else's dependencies.

Inside the cloned repo run: `jupyter lab --no-browser --port=8080`



STILL?!



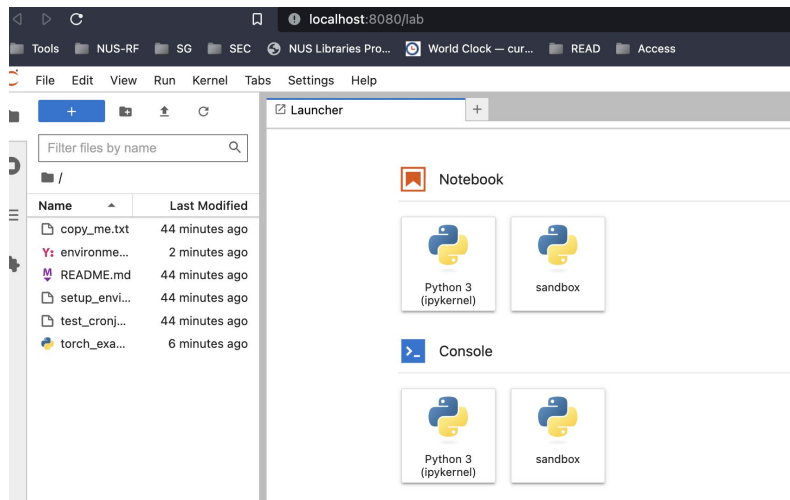
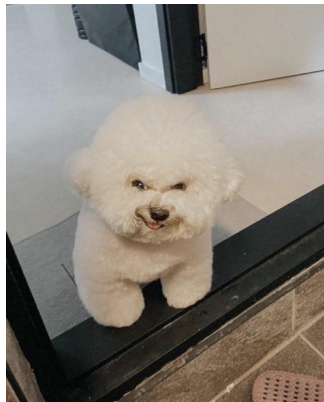
Train model

Use an **ENVIRONMENT**.

Specially in a shared servers, you don't want to mess with someone else's dependencies.

From your terminal: `ssh -L 8080:localhost:<PORT> <REMOTE_USER>@<REMOTE_HOST>`

`ssh -L 8080:localhost:8080 matias@10.248.3.161`



If you want to use jupyter like this, ssh to the server like this from now on.

You can use any 80xx port



Train model

Use an **ENVIRONMENT**.

Specially in a shared servers, you don't want to mess with someone else's dependencies.

But I want to keep using the terminal in the server! Should I ssh again? **NO**



Train model

Use an **ENVIRONMENT**.

Specially in a shared servers, you don't want to mess with someone else's dependencies.

Inside the cloned repo run:

```
screen jupyter lab --no-browser --port=8080
```



Train model

Use an **ENVIRONMENT**.

Specially in a shared servers, you don't want to mess with someone else's dependencies.

Detach from the screen, press:

ctrl+a+d

```
(sandbox) matias@ual-server:~/run-remote$ screen jupyter lab --no-browser --port=8080  
[detached from 20501.pts-1.ual-server]  
(sandbox) matias@ual-server:~/run-remote$
```



Use an **ENVIRONMENT**.

Specially in a shared servers, you don't want to mess with someone else's dependencies.

Train model

List current screens:

```
screen -ls
```

```
(sandbox) matias@ual-server:~$ screen -ls
There is a screen on:
  20501.pts-1.ual-server  (17/04/23 08:07:26)      (Detached)
1 Socket in /run/screen/S-matias.
(sandbox) matias@ual-server:~$
```

Attach to screen:

```
screen -r <screen-id>
```

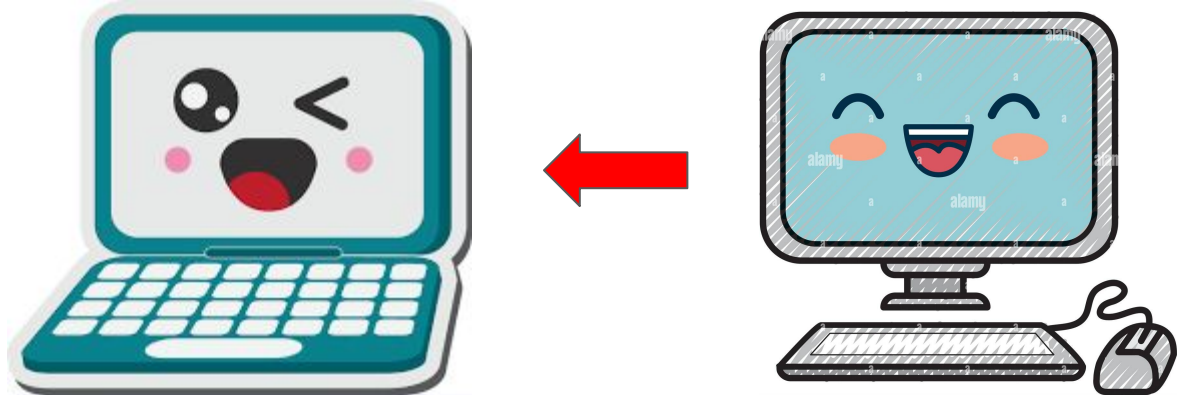


Moving files



Moving files

From your computer:



```
scp <username>@10.248.3.161:~/run-remote/copy_me.txt .
```

```
❌ ~/Developer ➤ scp matias@10.248.3.161:~/run-remote/copy_me.txt . (base)
matias@10.248.3.161's password:
copy_me.txt 100% 271 35.3KB/s 00:00
~/Developer ➤ (base)
```



Moving files

Let's rename the file we just copied from the server

Inside the cloned repo run: `mv copy_me.txt copied_you.txt`

```
~/Developer ➤ mv copy_me.txt copied_you.txt
```

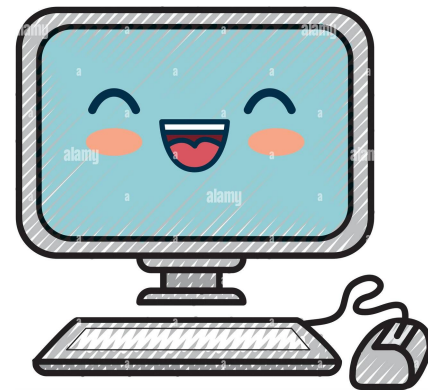
```
~/Developer
```

```
(base)
```

```
(base)
```



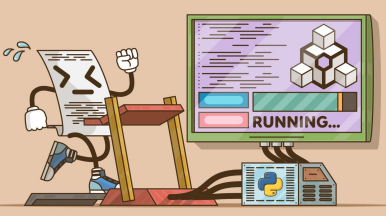
Moving files



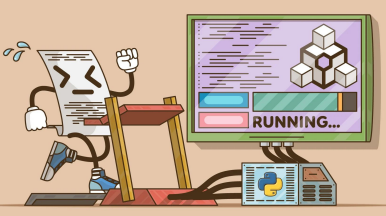
From your computer:

```
scp copied_you.txt <username>@10.248.3.161:~/run-remote/
```

```
✖ ~/Developer ➤ scp copied_you.txt matias@10.248.3.161:~/run-remote/ (base)
matias@10.248.3.161's password:
copied_you.txt 100% 271 39.9KB/s 00:00
~/Developer ➤ (base)
```



Running scripts



Running scripts

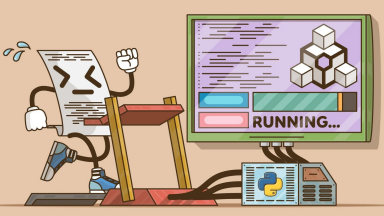
cron: job scheduler (scripts that run at specific timestamps)

Where are they? **crontab** (text file)

Run command: **crontab -e**

```
(sandbox) matias@ual-server:~/run-remote$ crontab -e
no crontab for matias - using an empty one

Select an editor. To change later, run 'select-editor'.
 1. /bin/nano          <---- easiest
 2. /usr/bin/nvim
 3. /usr/bin/vim.tiny
 4. /bin/ed
Choose 1-4 [1]:
```



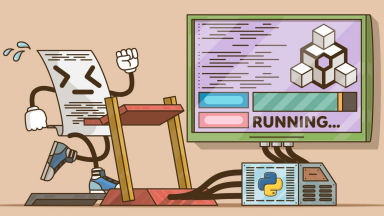
Running scripts

```
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').
#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow  command
```

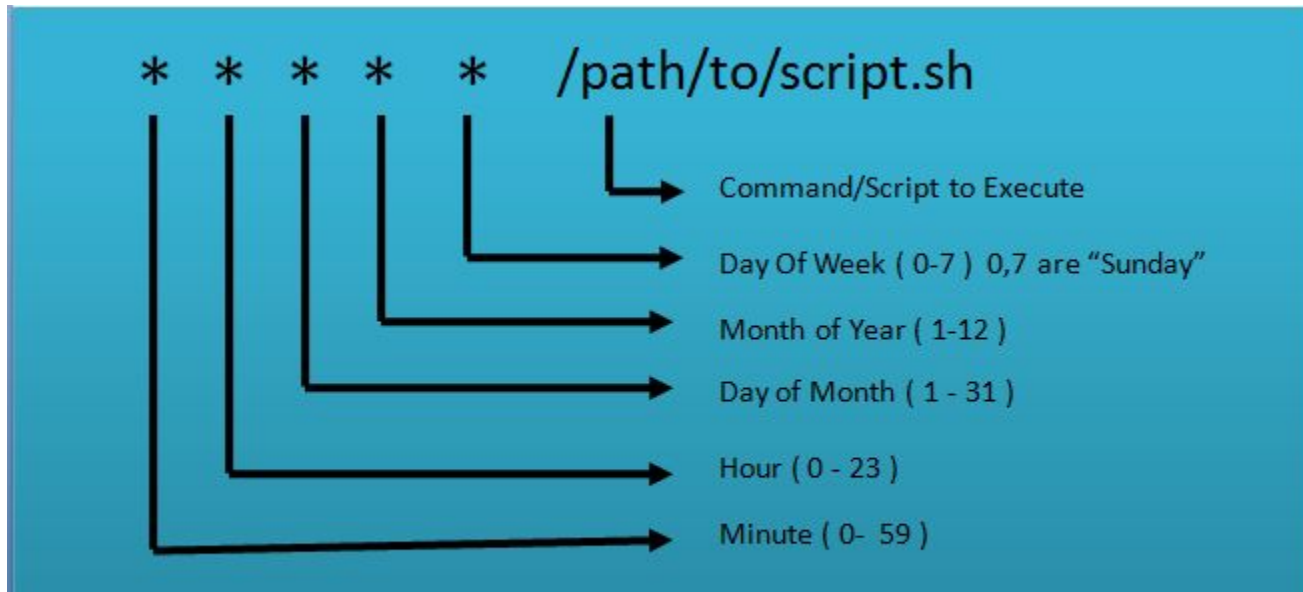
crontab.PrAl1H/crontab

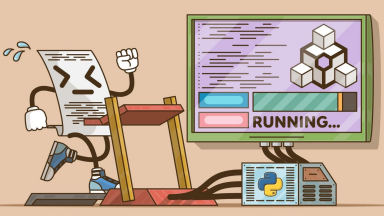
23.1

All



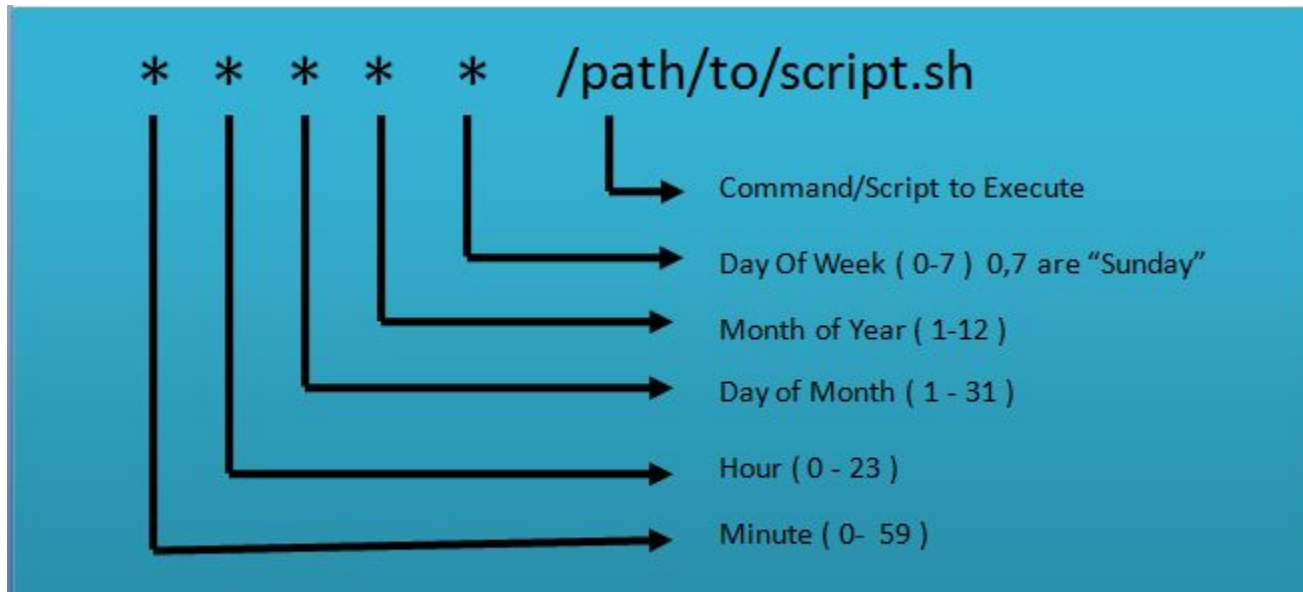
Running scripts

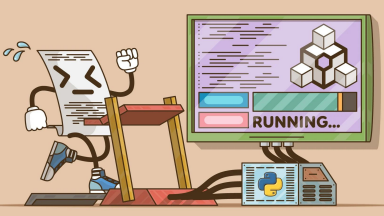




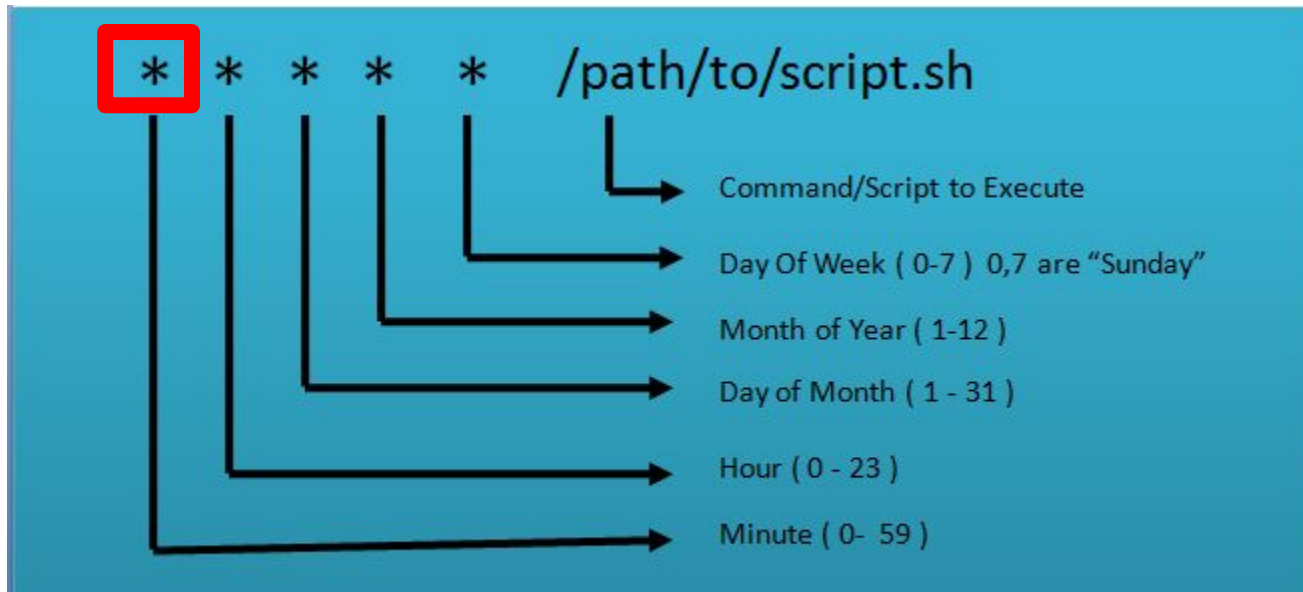
"I want to query an API every 2 minutes to give me the outside temperature on Campus (nearest weather station)"

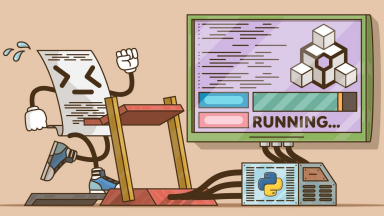
Running scripts





Running scripts

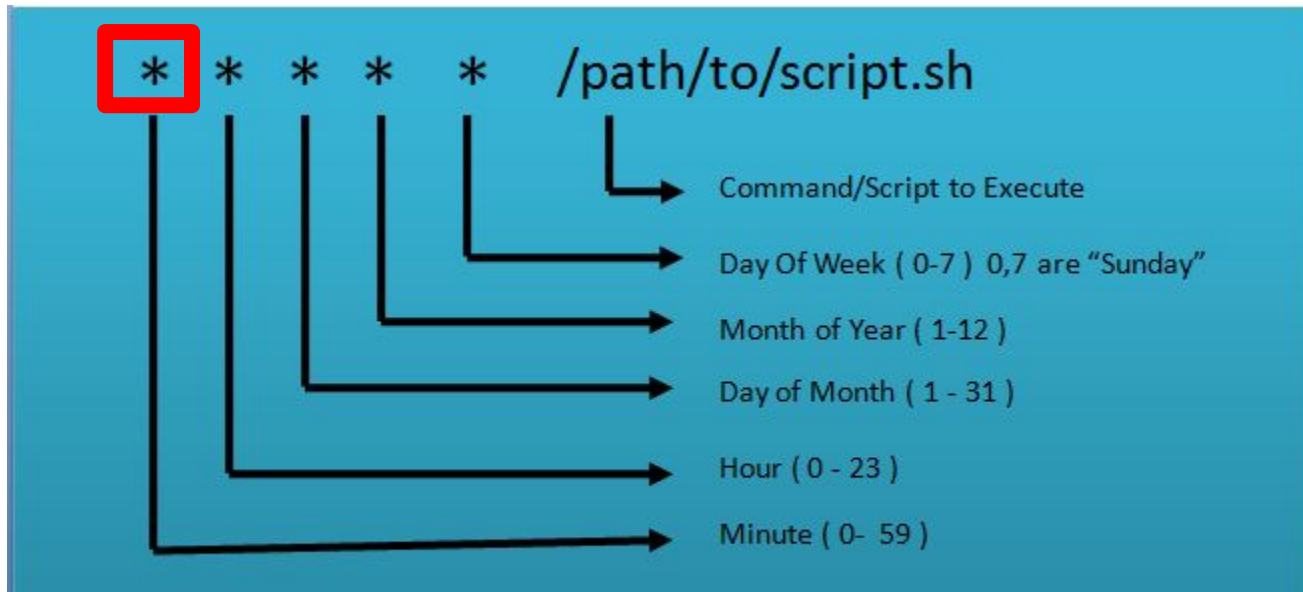


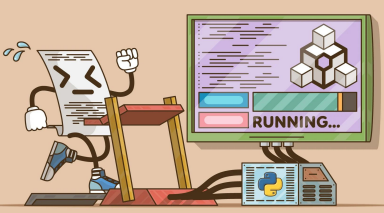


"I want to print 'first UAL workshop' to a new file, or if exist append to it, every 2 minutes"

Running scripts

```
#!/bin/sh  
echo "first UAL workshop!" >> output_cronjob.txt
```





Running scripts

crontab guru

The quick and simple editor for cron schedule expressions by [Cronitor](#)

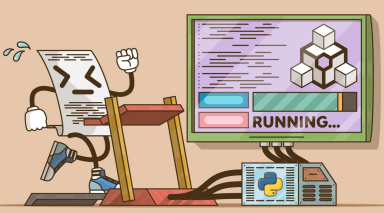
“At every minute.”

next at 2023-04-15 16:49:00

random

* * * * *

minute	hour	day (month)	month	day (week)
		*	any value	
		'	value list separator	
		-	range of values	
		/	step values	
		@yearly	(non-standard)	
		@annually	(non-standard)	
		@monthly	(non-standard)	
		@weekly	(non-standard)	
		@daily	(non-standard)	
		@hourly	(non-standard)	
		@reboot	(non-standard)	



Running scripts

crontab guru

The quick and simple editor for cron schedule expressions by [Cronitor](#)

“At every 2nd minute.”

next at 2023-04-15 16:50:00

random

`* / 2 * * * *`

<code>minute</code>	<code>hour</code>	<code>day</code> (month)	<code>month</code>	<code>day</code> (week)
---------------------	-------------------	-----------------------------	--------------------	----------------------------

<code>*</code>	any value
----------------	-----------

<code>'</code>	value list separator
----------------	-------------------------

<code>-</code>	range of values
----------------	-----------------

<code>/</code>	step values
----------------	-------------

<code>@yearly</code>	(non-standard)
----------------------	----------------

<code>@annually</code>	(non-standard)
------------------------	----------------

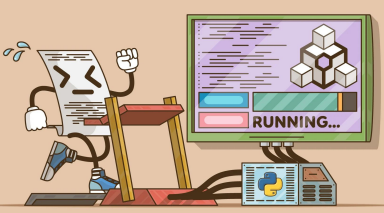
<code>@monthly</code>	(non-standard)
-----------------------	----------------

<code>@weekly</code>	(non-standard)
----------------------	----------------

<code>@daily</code>	(non-standard)
---------------------	----------------

<code>@hourly</code>	(non-standard)
----------------------	----------------

<code>@reboot</code>	(non-standard)
----------------------	----------------



Add to the last line:

```
*/2 * * * * ~/run-remote/test_cronjob.sh
```

Running scripts

```
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').
#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow  command
*/2 * * * * ~/run-remote/test_cronjob.sh
```

(More) Housekeeping

- Where can I keep learning?
 - The missing semester (<https://missing.csail.mit.edu/>)
 - Vim/NeoVim (https://youtu.be/w7i4amO_zxE)
 - Stackoverflow
 - ChatGPT
 - Etc
- Next Workshops
 - Use Minimum Working Examples (MWE) (i.e., github repos)
 - Keep it hands-on!