Programming fundamentals with Python

Session 1

Pepe García jgarciah@faculty.ie.edu

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Plan for today

- Course introduction

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- Start using VS Code

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Plan for today

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- Start using VS Code
- Learn a bit about CLI tools
- Learn about version control systems
- Introduction to Git

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Course introduction

- **Professor**: Pepe García
- **Email**: jgarciah@faculty.ie.edu
- **Please, ask me anything**

Course introduction. Objectives

The objectives for this course are that:

- Students learn how to use industry grade tools for programming (git, pip...)
- Students will further their knowledge of the Python programming language.
- Students will understand how to apply programming to resolve real world problems.

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Course introduction. Grading

Section	Score %
Final Exam	25 %
Workgroups	25 %
Individual Work	40 %
Class Participation	10 %

In this course we'll use alpha grading (Honors, Excellence, Proficiency, Pass, Fail), using a normal distribution of grades and percentiles 15, 50, 85, 100.

If someone is 2 $*$ low, they get an automatic **Fail**

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Course introduction. Important dates

- Session 10th: Workgroup assignment is sent out (you'll have some days to work on it)
- Session 13th: Individual assignment is out (you'll have some days to work on it)
- Session 15th: Final exam

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Course introduction

Questions?

VS Code

Since Spyder is not working correctly for us, we'll start by changing to VS Code editor.

https://code.visualstudio.com/

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VS Code

Demo

Let's see how to use VS Code:

- Opening a folder to start working on it (we can drag and drop the folder to the editor)
- Installing the Python extension
- Creating files (`File > New File`, `File > Open...`)

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Installing Git

If you don't have it installed, you can get it from **https://git-scm.com/downloads**

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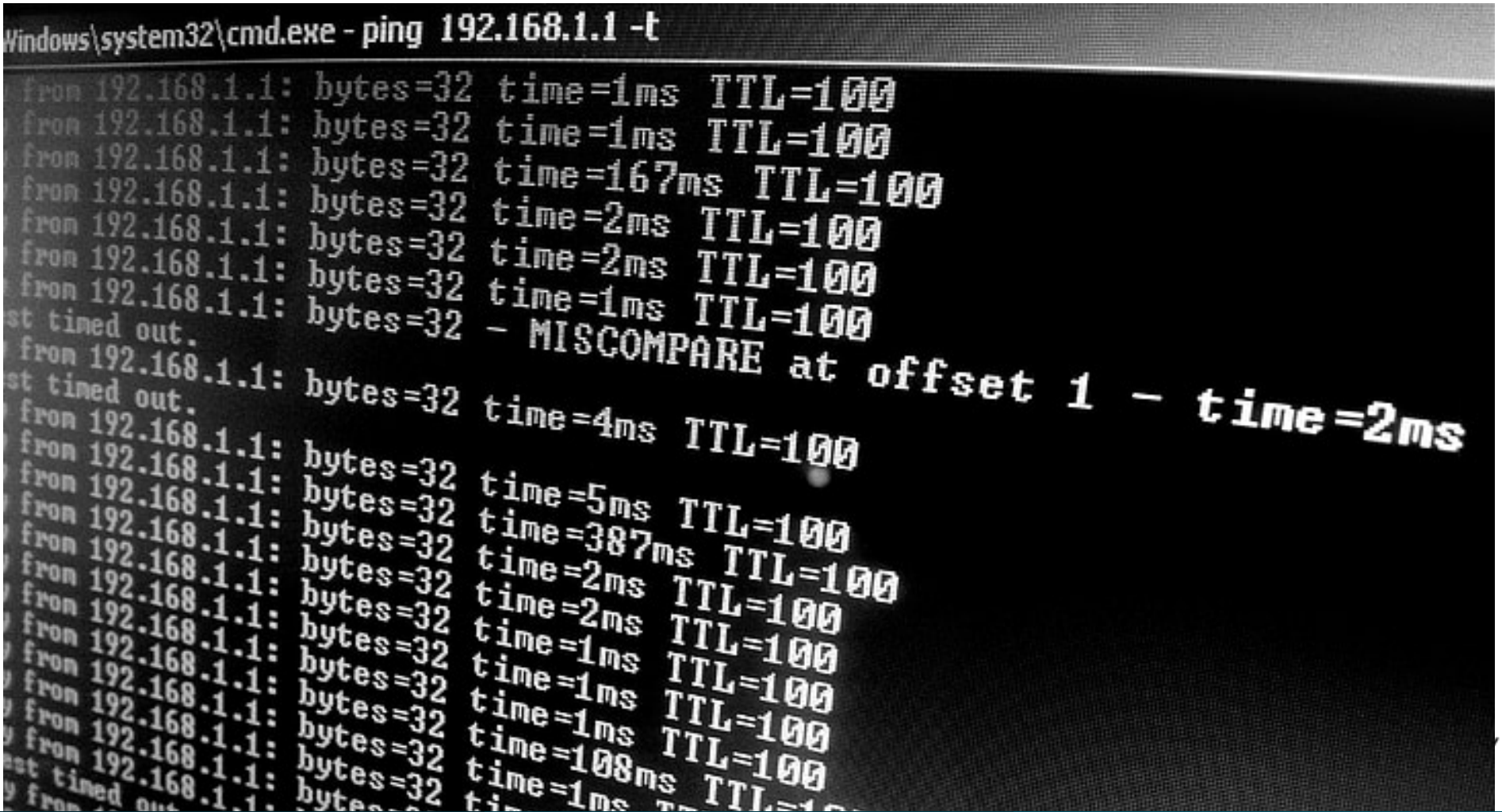
Command line

The command line allows users to navigate the computer and manage it. We can do almost the same things with the command line and a graphical user interface.



Command line

Disclaimer

In this slide set, every time you see a **$** at the beginning of the line it means that that's a command to be written in the terminal.

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Disclaimer 2

If you're on Mac, we will use the **Terminal** for today's session, if you're on Windows, please open **Git Bash**.

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Listing files

We can **list files** in a folder using the **ls** command.

```
$ ls
```

```
Desktop   Documents Downloads Library   Movies    Music     Pi
```

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Changing directories

We change directories (move around) using **cd**.

```
$ ls

Desktop   Documents Downloads Library   Movies    Music     Pi

$ cd Desktop
```

Changing directories

We can go to *upper* directories using **cd ..**

```
$ ls

Desktop   Documents Downloads Library   Movies    Music     Pi

$ cd Desktop

$ cd ..

$ ls

Desktop   Documents Downloads Library   Movies    Music     Pi
```

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Getting current directory

We can see where we are with the **pwd** command

```
$ pwd
/Users/pepe

$ cd Desktop

$ pwd
/Users/pepe/Desktop
```

pwd stands for print working directory

Creating directories

One can create directories using the **mkdir** command:

```
$ pwd
/Users/pepe

$ mkdir hello_dolly

$ cd hello_dolly

$ pwd
/Users/pepe/hello_dolly
```

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Version control

Why do we need version control software?

Have you ever found yourselves with a bunch of copies of a file (an assignment maybe?) that you save to not loose what you've created?

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Version control

Version control is the process of handling programs, versions, changes, and differences in files.

With **version control** systems we can see:

- **Who** made changes

The version control system we're going to use in this course is **git**.

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Git concepts

Git terminology can be very broad, but we'll focus on the parts that matter

Working directory

The **working directory** is the folder in which our code will be. The contents of this folder will be controlled by **git**.

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Staging area

Whenever we're happy about the state of a file, we move it to the **staging area**. In the **staging area** we save files that are ready to be saved.

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Local repository

The **local repository** is the place in which we store all the changes made to all the files of our projects, over time.

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Creating our first repository

Practice (5 mins)

- Create a folder called **my-first-repo** in your desktop
- Navigate to it using the terminal (**cd**)
- Open **VS Code**, create a python file and save it in **my-first-repo** folder
- In the terminal, initialize the repository with **git init**

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Git operations

We can always see the status of our repository:

```
$ git status

On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committe

file.py

nothing added to commit but untracked files present (use "git
```

Git operations

We can use **git add file.py** to add the file to the staging area, in which we store the files ready to be commited.

```
$ git add file.py

$ git status

On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)

new file:   file.py
```

Git operations

When there is a meaningful change we want to save, we use **git commit** to save it to our local repository.

We use **git commit -m "message"** and try to use a meaningful description of the changes we just made.

```
$ git commit -m "add file.py to git"
[master (root-commit) 123cd8b] add file.py to git
 1 file changed, 0 insertions(+), 0 deletions(-)
 create mode 100644 file.py
```

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Git concepts

Git operations

One of the most powerful features of **git** is handling changes. Let's add this function to our **file.py**.

```
def func(a, b):
    return a + b
```

Git operations

And let's see the changes now! **git diff**

Git will show the lines we added with a **+ sign** before, and those we removed with a **- sign**

```
$ git diff

diff --git a/file.py b/file.py
index e69de29..c09bd0e 100644
--- a/file.py
+++ b/file.py
@@ -0,0 +1,3 @@
+
+def func(a, b):
+    return a + b
(END)
```

In the picture we can see we added three lines

Commit the last changes

Practice

Now, let's commit our latest changes

Git operations

Other of the cool features of **git** is watching the history of our repository. With `git log` we will see a log of all the changes that happened to our repository.

```
$ git log

commit 123cd8b45ae31065cdd7cf0ecd8ce83b444886db (HEAD -> maste
Author: Pepe García <pepe@pepegar.com>
Date:   Mon Nov 11 23:55:49 2019 +0100

add file.py to git
```

Github

Now, let's create an account in Github!

Go to github.com and create an account. (if you've one already, that's OK)

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Bibliography

Images and inspiration drawn from

How to teach Git

Learn git concepts, not commands

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