Programming fundamentals with Python

Session 1

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Plan for today

- Course introduction

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- Start using VS Code

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- Learn a bit about CLI tools

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- Learn about version control systems
- Introduction to Git

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 understand how algorithms are designed and implemented.
- Students will learn how to work with different data structures and apply them to different cases.

Course introduction. Grading

Section	**Score %**
Final Exam	14 %
Intermediate Tests	16 %
Workgroups	20 %
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 $2 * \sigma$ low, they get an automatic **Fail**

Course introduction. Important dates

- October 21st: Midterm 1
- November 19th: Midterm 2
- November 26th: Workgroup assignment is sent out (you'll have some days to work on it)
- December 13th: Individual assignment is out (you'll have some days to work on it)
- December 16th: Final exam

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/

VS Code

Demo

Let's see how to use VS Code:

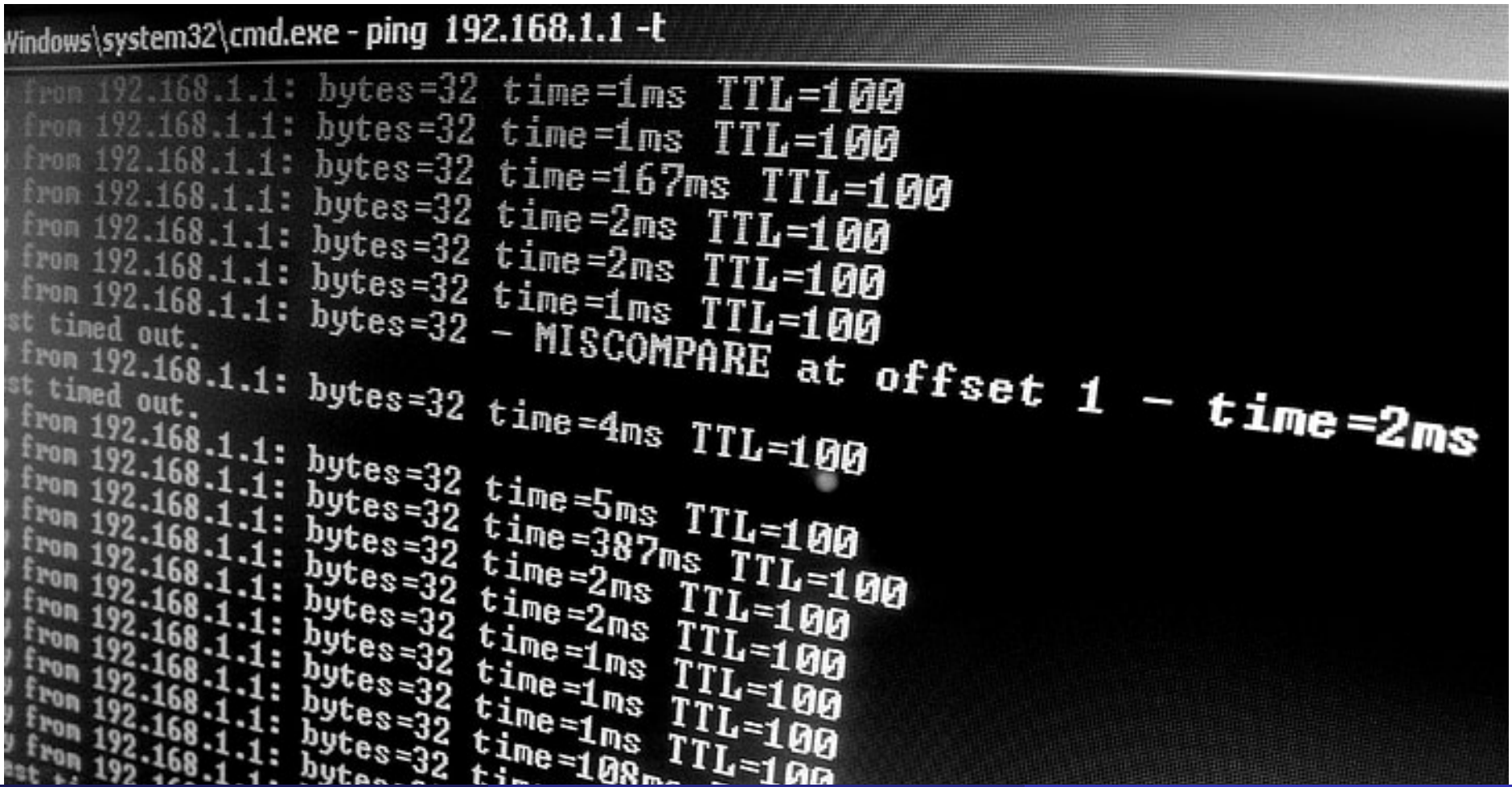
- Opening a folder to start working on it (we can drag and drop the folder to the editor)
- Creating files (`File > New File`, `File > Open...`)

Installing Git

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

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**.

Listing files

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

```
$ ls
```

```
Desktop  Documents Downloads Library  Movies   Music    Pictures Public   o
```

Changing directories

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

```
$ ls
```

```
Desktop  Documents Downloads Library  Movies   Music    Pictures Public   o
```

```
$ cd Desktop
```

Changing directories

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

```
$ ls

Desktop  Documents Downloads Library  Movies   Music    Pictures Public   o

$ cd Desktop

$ cd ..

$ ls

Desktop  Documents Downloads Library  Movies   Music    Pictures Public   o
```

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
```

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?

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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- **Why** did they do it

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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**.

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.

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.

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**

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 committed)

file.py

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

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
```

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)
```

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 -> master, origin/m
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)

Bibliography

Images and inspiration drawn from

How to teach Git

Codecademy - get started with Git and Github

Learn git concepts, not commands