



UNIX Project

ft_ping

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Summary: This project is about recoding the ping command.

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Chapter I

Foreword

Ettore Majorana (born in Catana on 5 August 1906 – probably died after 1959) was an Italian theoretical physicist who worked on neutrino masses. On March 25, 1938, he disappeared under mysterious circumstances while going by ship from Palermo to Naples. The Majorana equation and Majorana fermions are named after him. In 2006, the Majorana Prize was established in his memory.

There are several categories of scientists in the world; those of second or third rank do their best but never get very far. Then there is the first rank, those who make important discoveries, fundamental to scientific progress. But then there are the geniuses, like Galilei and Newton. Majorana was one of these.

He began his university studies in engineering in 1923 but switched to physics in 1928 at the urging of Emilio Segrè. His first papers dealt with problems in atomic spectroscopy. In 1926, Professor Corbina, wishing to promote in Rome modern physics had Enrico Fermi named at the chair of Theoretical Physics, Edoardo Amaldi and Emilio Segrè joined the team in the fall of 1927. Segrè convinced Majorana that physics were a perfect match for his aspirations and his capacities, and made him join them at the physic academy. That transfer happened in January 1928, after a meeting with Fermi.

The meeting gives rise to a significant anecdote: Majorana inquires about the current research at the Institute. Fermi then is working on the statistical model of the atom: he assumes that the electrostatic potential to which an electron is subjected is approximately equal to the median potential created by the nucleus and the other electrons, which makes it possible to determine the approximate value of the energy level of the electron. Fermi exposes to Majorana the general lines of this “universal potential of Fermi” -which will later take the name of Thomas-Fermi’s model and then shows him a picture in which he has gathered some of the numerical values of this median potential, which he calculated in a week using a mechanical calculator. Majorana listens with interest, and after asking for some details, goes away. The next day, at the end of the morning, Majorana returns to the institute, enters Fermi’s office, and without preamble asks to see again the picture he had seen the day before. He then drew from his pocket a paper on which, in one night, he made a similar but complete picture, he concludes that Fermi’s results are correct. Then he gets out of the office.

[Source.](#)

Chapter II

Introduction

Ping is the name of a command that allows to test the accessibility of another machine through the IP network. The command measures also the time taken to receive a response, called round-trip time.

Mike Muuss wrote this program in December 1983 to debug an abnormal behavior on the IP network. The name comes from the sound emitted by a sonar since their behavior are so similar (sending a signal that bounces on a target to return to sender).

Later, David L. Mills gave a retro-acronym: “Packet InterNet Groper”.

Chapter III

Objectives

The goal of this project is to make you recode the Ping command and to have you step a foot in the wondrous world of network.

```
$> man ping
```

Chapter IV

General Instructions

- This project will be corrected by humans only. You're allowed to organise and name your files as you see fit, but you must follow the following rules.
- A `Makefile` must compile the binary and must contain the following rules: `all`, `clean`, `fclean`, `re`. It must recompile and re-link the programs only if necessary.
- Your project must be written in C in accordance with the Norm. Only `norminette` is authoritative.
- You have to handle errors carefully. In no way can your program quit in an unexpected manner (Segmentation fault, bus error, double free, etc).
- Besides the RTT line, the result will have to have an indentation identical to the real ping.
- Within the mandatory part, you are allowed to use the following functions:
 - `getpid`.
 - `getuid`.
 - `getaddrinfo`.
 - `gettimeofday`.
 - `inet_ntop`.
 - `inet_pton`.
 - `exit`.
 - `signal`.
 - `alarm`.
 - `setsockopt`.
 - `recvmsg`.
 - `sendto`.
 - `socket`.

- the functions of the printf.family
- the function authorized within your libft (read, write, malloc, free, for exemple :-)).



WARNING: The use of the fcntl, poll and ppoll functions is forbidden and unjustifiable.

- You are allowed to use other functions to complete the bonus part as long as their use is justified during your defence. Be smart!
- You can ask your questions on the forum, on slack...

Chapter V

Mandatory part

- The executable must be named `ft_ping`.
- You have to manage the `-v -h` options.



The `-v` option here will also allow us to see the results in case of a problem or an error linked to the packets, which logically shouldn't force the program to stop (the modification of the TTL value can help to force an error).

- You will have to manage a simple IPv4 (address/hostname) as parameters.
- You will have to manage FQDN without doing the DNS resolution in the packet return.



You are allowed to use all the functions of the `printf` family as well as one global variable.



For the smarty pants (or not)... Obviously you are NOT allowed to call a real ping.

Chapter VI

Bonus part



We will look at your bonus part if and only if your mandatory part is EXCELLENT. This means that you must complete the mandatory part, beginning to end, and your error management needs to be flawless, even in cases of twisted or bad usage. If that's not the case, your bonuses will be totally IGNORED.

Find below a few ideas of interesting bonuses:

- IPv6 management
- Additional -f -m -l -I -m -M -n -w -W -p -Q -S -t -T flags...



The -V flag isn't a bonus.

Chapter VII

Submission and peer-evaluation

- Submit your work on your `GiT` repository as usual. Only the work on your repository will be graded.
- You have to be in a VM with a Linux kernel > 3.14 . Note that grading was designed on a Debian 7.0 stable.