



# UNIX Project

ft\_traceroute

42 Staff [pedago@staff.42.fr](mailto:pedago@staff.42.fr)

*Summary: This project is about recoding the traceroute command.*

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# Chapter I

## Foreword

Paul Adrien Maurice Dirac (8 August 1902 – 20 October 1984) was an English theoretical physicist who made fundamental contributions to the early development of both quantum mechanics and quantum electrodynamics. He was the Lucasian Professor of Mathematics at the University of Cambridge, a member of the Center for Theoretical Studies, University of Miami, and spent the last decade of his life at Florida State University.

Among other discoveries, he formulated the Dirac equation which describes the behaviour of fermions and predicted the existence of antimatter. Dirac shared the 1933 Nobel Prize in Physics with Erwin Schrödinger “for the discovery of new productive forms of atomic theory”. He also made significant contributions to the reconciliation of general relativity with quantum mechanics.

Dirac was regarded by his friends and colleagues as unusual in character. In a 1926 letter to Paul Ehrenfest, Albert Einstein wrote of Dirac, “This balancing on the dizzying path between genius and madness is awful”.

He is regarded as one of the most significant physicists of the 20th century.

[Source.](#)

# Chapter II

## Introduction

Traceroute (Tracert in Windows) is a utilitarian program that allows to trace the various paths a data packet (IP packet) will take to go from a local machine to another connected to the IP network. It was designed by the National Laboratory Lawrence-Berkeley.

# Chapter III

## Objectives

The goal of this project is to make you recode traceroute and to understand a little better what happens inside your network.

```
$> man traceroute
```

# 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.
- You must use C and submit a Makefile.
- Your **Makefile** must compile the project and must contain the usual rules. It must recompile and re-link the program only if necessary.
- You have to handle errors carefully. In no way can your program quit in an unexpected manner (Segmentation fault, bus error, double free, etc).
- Within the mandatory part, you are allowed to use the following functions:
- The result will have to have an indentation identical to the real traceroute.



A difference of +/- 30ms is acceptable on a hop.

- getpid.
- getuid.
- getaddrinfo.
- gettimeofday.
- inet\_ntoa.
- inet\_pton.
- exit.
- select.
- setsockopt.

- recvfrom.
  - sendto.
  - htons.
  - ntohs.
  - bind.
  - socket.
  - the functions of the printf.family
  - the function authorized within your libft (read, write, malloc, free, for exemple :-) ).
- You are allowed to use other functions to complete the bonus part as long as their use is justified during your defence. Be smart!



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

- You can ask your questions on the forum, on slack...

# Chapter V

## Mandatory part

- The executable must be named `ft_traceroute`.
- You must manage the `-h` flag.
- You must only manage a simple IPv4 (address/hostname) as program parameter.
- You must manage FQDN however you don't have to make the DNS resolution in the hop display.



You are allowed to use the functions from the `printf` family.



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



# Chapter VI

## Bonus part



We will look at your bonuses 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 must 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.
- DNS management.
- Additional -i -m -p -s -q -N -t -l 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.