Project UNIX

ft_traceroute

Summary: This project will make you recode the traceroute command.

Version: 4.4

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Chapter I

Preamble

Paul Adrien Maurice Dirac (08/08/1902 in Bristol, England. 10/20/1984, in Tallahassee, Florida, USA) was a british physicist and mathematician. He is regarded as one of the godfathers of quantum mechanics and he as heralded the existence of antimatter. He received the Nobel Prize in Physics in 1933 along with Erwin Schrödinger "for the discovery of new productive forms of atomic theory".

His father, Charles Dirac, was born in Saint-Maurice, Switzerland. He moves to Bristol and marries Florence Holten. Together, they will have 3 children : Charles Félix Dirac, Isabelle Marguerite Béatrice and Paul (the cadet). His father's family originated from the small town of Dirac in the Charente region in France.

In school Paul already showed amazing skills in mathematics. At 12 years old, he enters the secondary school his father teaches at. WWI starts at the same time. It will have a major impact on Paul's career it offered young boys a privileged access to science and laboratories from school to military service.

Once in technical college, he is initiated to maths, physics and chemistry at a very young age. He starts studying maths in books ahead of the school programs. He then goes to study maths in the college of his city of birth before entering Cambridge University where Ralph Fowler will be his supervisor. In 1925, he encounters Niels Bohr and Werner Heisenberg. 6 months after his arrival in Cambridge, he publishes two documents about statistic mechanics and atomic quantum physics. In May of 1924, Dirac ends his first document about quantum problems. In 1925, he has finished 4 more. The same year, while he writes his thesis, his brother, Felix, kills himself.

In 1926, he notes that Heisenberg's uncertainty principle is a declaration to the non-commutativity of quantum mechanics. He proves the physical equivalence of the wave mechanics and the matrix mechanics. He is responsible for the fishermen analogy in hamiltonian mechanics.

Source.

Chapter II

Introduction

Traceroute (aka tracert on Windows) is a utility program that allows to track the route a data packet (IP packets) will follow from one local machine to another one that's connected to the same IP network. It was designed within the Lawrence-Berkeley national Laboratory.

The introduction presents the outlines of the project. A succinct idea of the expected work and its context will be appreciated. This way, reading these lines, a student will have an overview of the themes they will deal with.

Chapter III

Objectives

The subject aims to make you recode the traceroute command so you can have a clearer view of what's going on in your network.

```
$> man traceroute
```

Chapter IV

Mandatory part

- The executable will be named ft_traceroute.
- You must code in C and turn-in a Makefile (respecting the usual rules).
- The only option you'll have to manage is `--help`.
- You have to solely manage a simple IPv4 (address/hostname) as a program parameter.
- You have to manage the FQDN without running the DNS resolution in the jump display.
- A 30ms +/- difference on a jump will be tolerated.
- fcntl, poll and ppoll functions are stricly forbidden.
- For your mandatory part, you will be able to use the following functions:
  - getpid / getuid.
  - getaddrinfo / gettimeofday.
  - getnameinfo.
  - gethostbyaddr.
  - inet_ntoa / inet_pton.
  - freeaddrinfo
  - exit.
  - select.
  - setsockopt.
  - recvfrom / sendto.
  - ntohs / htons.
  - bind / socket / close.
  - strerror / gai_strerror.
  - the printf type functions.
  - the functions authorized in your libft (read, write, malloc, free).

Hey, smarty (or not so smarty) pants ! You cannot call the real traceroute, of course !

Chapter V

Bonus part

You are free to add bonuses of your choice up to five for the maximum points, here is some interesting ideas:

- DNS management
- adding -i -m -p -s -q -N -t -l... flags

For your bonus part, you can use other functions as long as you can justify their use during the evaluation. Be smart.

The -V flag is not a valid bonus.

The bonus part will only be assessed if the mandatory part is PERFECT. Perfect means the mandatory part has been integrally done and works without malfunctioning. If you have not passed ALL the mandatory requirements, your bonus part will not be evaluated at all.

Chapter VI

Submission and peer-evaluation

Turn in your assignment in your `Git` repository as usual. Only the work inside your repository will be evaluated during the defense. Don't hesitate to double check the names of your folders and files to ensure they are correct.

This project will only be reviewed by humans. You're free to organize and name your files as you will as long as you respect the following instructions.

- You must manage errors a reasonable way. Your program should never quit unexpectedly (segmentation fault, etc).
- You will have to be in a VM with a Linux core >= 4.0 for the evaluation. For your information, the grading scale was built with a stable 64 bits Debian 7.0.
- The result will have the same indentation as the real traceroute.