Hello friends,

I hope you're all doing well.
The following exercises are not exam questions, but rather open-ended prompts whose answers can often be found online, through chatbots, or even in technical interviews. These are intended to encourage deeper exploration and self-directed learning based on your current knowledge.
We've selected these questions based on real-world experience and past exam patterns to help you better understand the types of concepts that appear in the LPIC exam. Many of the questions don't have a single correct answer — instead, they are designed to broaden your perspective and understanding.

Please be kind and patient with yourself as you write and research your responses.

Please complete the following exercises using the same format as the directory structure below. Combine your answers into a single PDF file named `answer.pdf` and submit a pull request.

📁 Reference format:

https://github.com/devopsdoctors/Academy/tree/main/L1-JavanPahlevanan/Exercises/T(x)/name-family(emailAddress)/answer.pdf

📄 Sample answer file:

https://github.com/devopsdoctors/Academy/tree/main/L1-JavanPahlevanan/Exercises/T1/ali-farhadian(alifrd49@gmail.com)/answer.pdf

1. Please explain private IP ranges in WAN, LAN, and MAN. What are the differences between them and what are the use cases of each?
2. How do we map between private and public networks? What is this translation called? Why do we use this translation and why not assign public networks to all sites?
3. Imagine you are a sysadmin or DevOps engineer building a new infrastructure with at least 15 separate products, each requiring at least 500 IP addresses initially and up to 2000 later. How would you design private CIDR blocks to support this?
4. Please explain the TCP three-way handshake.
5. Why don't we use only two steps for the handshake?
6. Why do we have two FIN-WAIT states in TCP? What is their purpose?
7. Please capture a screenshot and explain the live TCP connection states on your own device.
8. Please compare TCP and UDP.
9. What is the main concern of TCP?
10. When do we use UDP?
11. Why is TCP very popular?
12. Why does IPv6 exist? Does IPv6 have any translation mechanism, and if so, why is it needed?
13. What do TX and RX mean in the output of `ip -c a` or `ifconfig`?
14. What do these interface flags mean: `<UP,BROADCAST,RUNNING,MULTICAST>`?
15. What is a DNS server? Does DNS use UDP or TCP? What are the important DNS servers?
16. Use tracepath or other tools to analyze the traffic path to youtube.com with and without a proxy.
17. How does the ICMP protocol work?
18. What is the `nc` command and what can we use it for?
19. Please create both TCP and UDP connections with `nc`.
20. Explain the output of `dig youtube.com` vs `dig varzesh3.com` and how DNS resolution works.
21. Please explain your thoughts about the `lsof` command in the context of the Linux philosophy that "everything is a file."