Recruitment test (Systems Engineer)

Instructions: Please answer the following questions to the best of your ability and return your solutions to X-Formation for review.

1. You are hosting a mail server, documentation, issues tracker and a few other services that must be available from outside the office for our customers. Please keep in mind that you don't want to expose other PCs in the internal network to risk. How will you set up the network to make the above services available outside the office and minimize the risk of hacking the internal network? Please present all suitable approaches.

2. Which approach in network firewalling do you prefer: blacklisting or whitelisting? Please explain your choice.

3. You are an administrator of the 131.132.0.0 network. You need to split it into three subnets with 10.000, 1.000 and 100 hosts. Using the VLSM technique, please propose network addresses and subnet masks.

4. You want to have two different versions of PHP-FPM servers running on the same physical machine running Debian. Is this possible, and if so, how? Is this also possible with tools like GCC, and if so, how?

5. You are an administrator of a virtualized environment (e.g., VMware) with hundreds of VMs. What tools are you going to use to manage this environment and automate daily routines? Could you give some examples of what tasks can be done by automation, and what you would prefer to run manually?

6. Write a shell script that will recursively print a list of directories that are empty, starting from the current working path. An empty directory does not contain any files, nor does any subdirectory of it. For example, for the following directory tree:

```
.
├── bar
│   └── baz
├── baz
└── foo
    └── bar
        └── baz
            └── file.txt

6 directories, 1 file
```

The script will output:

```
./bar
./bar/baz
./baz
```

7. You are running a few programs in Docker containers on a host. One of the programs (e.g., a container with PHP-FPM) stopped responding. How are you going to diagnose issues?

8. You are building an infrastructure with a few virtualization servers (hosts), SAN, edge routers, core and access switches, LAN for users, IoT, etc. All units must work together. What kind of IP addressing are you going to use (static, dhcp reservation, dhcp pools) and why?