Linux: Concepts and Applications

the exam was written 12.07.2021
available under the github repo:
https://github.com/Pierrefha/linux-exam-protocol
created by Pierre Dahmani

1. Free Software

- What are the software freedoms?
- Does Open Software cost something? If not, name how one could make money with an Open Software project.
- What is a copyleft license? Explain the concept.

2. Shell

- What are the different types of shells in an unix system?
- Name the possibilites to put a process from from foreground to the background.
- How can we kill a process that is running in the background? Give an example.
- Explain the concept of pipelining. How does it work? Give a practical example.
- What is the difference between pipelining and redirection? Give an example how you would redirect the output of stderr to a file.

3. Make

NOTE: A specific makefile was given here. It contained default variables (CC, LINKFLAGS, etc..) and some rules. It contained one phony rule "delete" which did delete objects. It contained two more rules to automate the compilation of given cpp files into an executable. e.g.

```
%.o: %.cpp
    $(CC) -c $^ -o $@
```

- Explain the functionality of the given makefile. What are the automatic variables? Explain automatic variables.
- Change the makefile so that the resulting binary will be built using multiple source files.
- How does make check if a file has to be recompiled or rebuilb?

4. CMake

- What is the difference between cmake and make?
- What is the purpose of CMakeLists.txt?
- How can we use cmake to create a hello_world executable from the source file hello_world.cpp?

5. PID namespaces

- What is a pid namespace? What does it mean? How are pid namespaces created? (The exact command does not have to be given, if not remembered) Whats the situation for the system like, after the first process in the namespace was created?

6. COW copy on write

- Explain how the update process of a file is handled when using the copy on write mechanism. Drawings are allowed, but only to support your answer, they are not enough to answer the question.

7. init system

- What is/was suspected of a traditional init system? What is nowadays expected of a modern init system? Name three specific examples use cases for a modern init system.