Exercise Sheet 1

The exercise sheets of the operating systems course contain theoretical and practical exercises. For solving the practical exercises you need a UNIX shell. A very popular one is the Bash [1]. The Apple Mac OS X Terminal or WSL for MS Windows are sufficient for most practical exercises. The Windows command prompt and the Windows PowerShell are not sufficient for the exercises.

To prepare yourself, it is ideal, if you install on your system the Linux operating system. An installation in a virtual machine is sufficient. Easy to use distributions are, for example, Debian [2], Ubuntu [3], Manjaro [4] and Mint [5]. A free virtualization solution is VirtualBox [6]

Alternatively, you can work with a live system on CD, DVD, or USB flash memory drive. In this case no local installation is required. A powerful live distributions KNOPPIX [7].

[1] `http://tiswww.case.edu/php/chet/bash/bashtop.html`
[2] `http://www.debian.org`
[3] `http://www.ubuntu.com`
[4] `https://manjaro.org`
[5] `http://www.linuxmint.com`
[6] `http://www.virtualbox.org`
[7] `http://www.knopper.net/knoppix`

Exercise 1 (Batch Processing)

1. Describe the objective of batch processing.

2. Describe why batch processing causes an acceleration effect, when multiple tasks are executed.

3. Name the preconditions that must be satisfied for batch processing before the execution of a task can begin.

4. Name tasks for which batch processing is well suited.

5. Batch processing is always...
   ☐ interactive ☐ non-interactive

6. Name an application of batch mode, which is still popular today.

7. Describe what spooling is.

Exercise 2 (Time-Sharing)

1. Describe the objective of time-sharing.

2. Describe how time-sharing distributes the computing time among the processes.

3. Give the name of the pseudo parallel program or process execution.

4. Describe the objective of the pseudo parallel program or process execution.

5. Describe what scheduling is.

6. Describe what swapping is.

7. Describe how memory protection works.

8. Describe the purpose of memory protection.

Exercise 3 (Files and Directories)

1. Create in your home directory a directory `BTS`.
2. Navigate to the directory `BTS` and create inside an empty file with the filename `File1.txt`.
   - Do not use an editor application to create the file, but a command line command.
3. Check the file size of the file `File1.txt`.
4. Change the modification time of the file `File1.txt` to your birth date.
5. Create a new file in the shell `File2.txt` and insert any text with more than just a single line as content into the new file.
   - Do not use an editor application to insert the text into the file, but a command line command.
6. Print out the first line of the file `File2.txt` in the shell.
7. Append the content of `File2.txt` to `File1.txt`.
   - Do not use an editor application, but a command line command.
8. Create in your home directory, a directory with the directory name `BTS_new_semester`.
9. Copy the files `File1.txt` and `File2.txt` from the directory `BTS` into the directory `BTS_new_semester`.
10. Erase the directory `BTS`.