

## Exercise Sheet 3

### Exercise 1 (Computer Architecture)

1. Which three components contains the CPU?
2. Which three digital bus systems contains each computer system according to the Von Neumann architecture?
3. Which tasks are carried out by the three digital bus systems of subtask 2?
4. What is the Front Side Bus (FSB)?
5. Which two components contains the chipset?
6. Name the task of each component of the chipset.

### Exercise 2 (Input/Output Devices)

1. Which two groups of Input/Output devices for computer systems are distinguished according to their minimum transfer unit?
2. Describe the different operating principles of the groups of subtask 1?
3. Name two examples for each group from subtask 1.
4. Name three possible ways for processes to read data from Input/Output devices.
5. Name a benefit and a drawback for each possible way from subtask 4.

### Exercise 3 (Digital Data Storage)

1. Name one mechanic digital data storage.
2. Name two rotating magnetic digital data storages.
3. Name two non-rotating magnetic digital data storages.
4. Name four benefits of data storage without moving parts compared with data storage with moving parts.
5. What is random access?

6. Name one non-persistent data storage.
7. The storage of computer systems is distinguished into the categories primary storage, secondary storage and tertiary storage. Which category or categories can the CPU access directly?
8. Which category or categories of subtask 7 can the CPU only access via a controller?
9. Name two examples for each category of subtask 7.
10. Name the two categories of tertiary storage.
11. Describe the two categories of subtask 10.

## Exercise 4 (Write policies)

1. Name the two basic cache write policies.
2. With which cache write policy of subtask 1 may inconsistencies occur?
3. With which cache write policy of subtask 1 is the system performance lower?
4. With which cache write policy of subtask 1 are so called dirty bits used?
5. For what reason are dirty bits used?

## Exercise 5 (Permissions and Links)

1. Which command can be used to specify that all new created files have this permissions: `-r--r--r--`  
*Attention! If you executed the command, you should fix your permissions as a next step. Otherwise it will be not so comfortable for you to work in your home directory.*
2. Create in your home directory a directory with the name `BTS_Links`. Navigate to the new directory and try to erase the entry „.“.
3. Create in the directory `BTS_Links`...
  - an empty file `Original`.
  - a hard link `HardLink`, which points to the file `Original`.
  - a symbolic link `SymbLink`, which points to the file `Original`.
4. Check the inodes of the file `Original` and of both links via `ls -li`.

5. Is it possible to copy hard links? Try to copy the link.
6. Is it possible to copy symbolic links? Try to copy the link.
7. Check the result of your copying via `ls -li`. What are your conclusions?
8. The so called *link count* of files indicates the number of directory entries, which refer to an inode. What indicates the link count of directories and what influences the link count of directories?

## Exercise 6 (Wildcards and Filters)

1. Create in your home directory a directory `DiverseDateien`. Navigate to this directory and create these files:  
`abcdefg.bat`   `cdata3.sav`   `cdata7.sav`   `datei3.txt`   `datei7.txt`  
`abcxyz.bat`   `cdata4.sav`   `datei10.txt`   `datei4.txt`   `datei8.txt`  
`cdata1.sav`   `cdata5.sav`   `datei1.txt`   `datei5.txt`   `datei9.txt`  
`cdata2.sav`   `cdata6.sav`   `datei2.txt`   `datei6.txt`   `xyzabc.bat`
2. Which command can be used to print out a list of all files in the directory, whose filenames start with the pattern `datei`?
3. Which command can be used to print out a list of all files in the directory, whose filenames contain the pattern `cd`?
4. Which command can be used to print out a list of the files `cdata2.sav`, ..., `cdata5.sav` in the directory?
5. Which command can be used to print out a list of all files in the directory, whose filenames contain the characters `c` or `z` on position 3?
6. Which command can be used to print out a list of all files in the directory, whose filenames start with the character `a` and end with the character `t` and also contain the character `c` on any position?
7. Which command can be used to print out a list of the files `datei1.txt`, ..., `datei9.txt` in the directory but without the files `datei3.txt` and `datei4.txt`.