Exercise 1

Description:

- Create *_ex1.txt*
- Link it to *_ex1_1.txt* and *_ex1_2.txt*
- Check i-node numbers of all the files and save the output to the file *ex1.txt*

Constraints:

- You have created the file _ex1.txt.
- The file should include some content, for example, your name.
- You have linked the created file to two different files.
- You have checked the i-nodes of all 3 files and saved the output in a file ex1.txt.
- You have to put all commands that you executed in a script *ex1.sh*.
- You have submitted all files ex1.sh, _ex1.txt, _ex1_1.txt, _ex1_2.txt and ex1.txt.
- The results should be reproducible by running the script ex1.sh

Exercise 2

Description:

- Create *file.txt* in *week01* directory and access this file from *week10* directory via

```
$ link <source> _ex2.txt
```

- Trace all links to *file.txt*:

```
$ find <path> -inum inodenumber
```

- Remove all links from *file.txt*

```
$ find <path> -inum inodenumber -exec rm {} \;
```

- Save output of all the steps to file *ex2.txt*

Exercise 2

Constraints:

- You have created *week01* directory if it doesn't exist.
- You have created *file.txt* in *week01* directory.
- The file should have some content, for example, your name.
- You have created *week10* directory if it doesn't exist.
- You have linked the file *file.txt* with *_ex2.txt* which resides in *week10* directory.
- You have to find all links to the file *file.txt* and store the output in a file *ex2.txt*.
- You have to remove all links from the file *file.txt* and append the output to the file *ex2.txt*.
- You have to put all commands that you executed in a script *ex2.sh*.
- You have submitted all files ex2.sh, file.txt, ex2.txt.
- The results should be reproducible by running the script ex2.sh

Exercise 3

Description:

- Make a file *_ex3.txt* and try the following:
- Remove execute permission for everybody
- Grant all permissions to owner and others (not group)
- Make group permissions equal to user permissions
  - What does 660 mean for *ex3.txt*?
  - What does 775 mean for *ex3.txt*?
  - What does 777 mean for *ex3.txt*?
- After each step save the output/answer to the *ex3.txt*

Exercise 3

Constraints:

- You have created *_ex3.txt* file.
- The file should have some content, for example, your name.
- You have removed the execute permission from everyone for *_ex3.txt* file and saved the output in a file ex3.txt
- You have granted all permissions to only the owner and others for *_ex3.txt* file and appended the output in a file ex3.txt
- You have to make all group permissions equal to user permissions for *_ex3.txt* file and appended the output in a file ex3.txt
- You have answered the 3 questions and appended the answers to the file ex3.txt
- You have to put all commands that you executed in a script *ex3.sh*.
- You have submitted all files ex3.sh, *_ex3.txt*, ex3.txt.
- The results should be reproducible by running the script ex3.sh

Exercise 4

Description:

- Create *tmp* directory with two empty files (*file1*, *file2*)
- Create one hard link named *link1* to *file1*
- Write a program that scans *tmp* directory, locates all i-nodes with a hard link count of two or more
- For each such file it should display **together** all file names that point to the file
- Save the output of the program to *ex4.txt* and also submit the code *ex4.c*

Exercise 4

Constraints:

- You have created *tmp* directory.
- You have created two empty files *file1* and *file2* in the folder *tmp*.
- You have created a hard link *link1* to *file1*
- You should write a C program *ex4.c*. The program should find all files from *tmp* directory in which they have two or more hard links.The program should display all file names linked to the file under consideration.
- The output should look like this:
  - **File —— Hard Links**
  - file1 —— link1, link2, link3, ...
- You have to put all commands that you executed in a script *ex4.sh*.
- You have to run the program *ex4.c* and add the command to the script *ex4.sh*, also save the output of the program in a file *ex4.txt*
- You have submitted all files *ex4.sh*, *ex4.txt*, *ex4.c*.
- The results should be reproducible by running the script *ex4.sh*

Exercise 4

Example: (to test your implementation)

- Based on the previous constraints. Your program should give a similar output:
  - **File —— Hard Links**
  - file1 —— file1, link1
  - link1 —— file1, link1

Exercise 5 (Optional)

Implement a simulated file system that will be fully contained in a single regular file stored on the disk. This disk file will contain directories, i-nodes, free-block information, file data blocks, etc. Choose appropriate algorithms for maintaining free-block information and for allocating data blocks (contiguous, indexed, linked). Your program will accept system commands from the user to create/delete directories, create/delete/open files, read/write from/to a selected file, and to list directory contents