

## Assignment #1 Using standard filters

### Part I Environment Setup

1. Create a folder for your data and programs. Give it a meaningful name. You will use it for your work during the whole semester.
2. Create a shortcut to a command window that starts its work in your folder.
3. Copy and the Nostromo.txt file from the Board.
4. Read carefully the description of the findstr and sort commands and practice its usage. Their descriptions you can find e.g. on the pages:
  - <https://www.computerhope.com/findstr.htm>and
  - <https://www.computerhope.com/sorthlp.htm>

### Part 2 Using Filters

Filter is a program that reads data from the standard input (keyboard) and stores the results of its work in in standard output (screen). Pipeline connects two or more filters, see the description at the end of the file.

Select from the Noostromo.txt file the lines that:

1. Start with the string Martin
2. End with comma (,)
3. Start with the string Martin and contain the word lighter
4. Start with the string Martin and end with comma
5. Start with the string Martin and contain the letter m
6. Start with the string Martin and do not contain the letter m
7. Start with the string Martin and contain any of the letters i or f
8. Start with the string Martin and contain both i and f
9. Contain any number
10. Contain any number greater than 9.

### Remarks:

1. Each of the above tasks should be solved using just one pipeline and redirection. The main features of pipelining and redirection are listed at the end of the page.
2. You must be able to sort on demand the resulting lines in ascending or descending order.
3. You must be able to store the resulting lines in a file with the name: results.txt

### REDIRECTION

The standard input and output could be replaced by files. This is achieved with the redirection.

There are 3 redirection operators:

- < replace keyboard by a file;
- > replace screen by a newly created or rewritten file;
- >> replace screen but a new file or appended data to an existing file.

filter <in.asc >out.asc

means that:

- instead of the keyboard the file in.asc is used
- instead of the screen the file out.asc is used.

## PIPELINING

Only one operator is |.

- o Pipelining means that the standard input of one program is redirected directly to the standard input of another program. The process could be repeated many times and is done by the operating system.
- o The flow of data is implemented by temporary files that are automatically created and deleted.
- o The data flows in blocks so the processing of even huge files does not pose a problem.
- o The synchronization of the work of all programs is done automatically. There are no restrictions on the processing speed of filter elements. The filters wait for not yet available data or stop producing data if previously generated data is not yet processed by consecutive filters.

The data flows through programs like water or oil in a real world pipeline.

Pipelining could be used with redirection:

```
findstr gloom < Nostromo.txt | findstr !  
>results.txt
```

In the above pipeline:

- Selects all lines that contain the strong gloom from the file Nostromo.txt
- from the selected lines only lines containing ! are accepted
- and are finally stored in the file results.txt

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