04JCJLZ - COMPUTER SCIENCES - 2015/2016

Laboratory 10

Objectives

- To write programs able to receive parameters from the command line
- To write programs able to manage big amount of data efficiently

Technical content

- *argc* and *argv* command line parameters
- Consolidating read data from files.

Preferably to be solved in the laboratory

Exercise 1. Write a C program that receives from the command line two integer numbers in the interval [-10000;10000], computes their addition, and prints the result. The program must perform all the needed checks, about the number of parameters and their correctness.

Exercise 2. Write a C program that, given three parameters from the command line, named *vall*, *val2*, and *ch*, corresponding to 2 integers numbers (*vall* and *val2*) and 1 character (*ch*), performs the following operations, according to the value of *ch*, and displays on the screen the corresponding result:

- *ch = a: val1 + val2*
- *ch = b: val1 – val2*
- *ch = c: val1 * val2*
- *ch = d: val1 / val2* , if *val2* is different from 0, otherwise print on the screen an error message.

Exercise 3. Write a program that allows the storage of a set of coordinates in the Cartesian coordinate system.

The program shall acquire from the keyboard the coordinates *x* and *y* of 4 points, corresponding to the points of a path and manipulates the received data according to a parameter received from the command line:

- Parameter *"—m"* : computes and prints on the screen the length of the path composed by the 4 segments.
- Parameter *"—a"* : computes and prints on the screen the minimum length between the given coordinates.

To be solved at home

Exercise 4. [1]Extend the program realized in the exercise 3, in order to receive from the command line, other than the parameter *"-m"* or *"-a"*, also the coordinates of the 4 points, as follows:

```
program.exe –a  x1,y1 x2,y2 x3,y3 x4,y4
or:
program.exe –m  x1,y1 x2,y2 x3,y3 x4,y4
```

Note: each pair of coordinates x_i, y_i must be entered with no spaces in between, while the 4 pairs must be separated by at least a spacing character.

Exercise 5. Consider the following exercise, already proposed for the laboratory exercise 8 and reported hereafter. It is asked to implement it reading the matrix from a file (and not from the keyboard, as in the original exercise), which name is passed as the first argument of the command line. In the OPTIONAL parts, the length and the value of the sequence to find are passed as the second and the third arguments, respectively.
Text of the exercise:

Write a C program that:

a. Reads a square matrix (5 rows by 5 columns) from the keyboard, loading the values by rows, or by column, at will
b. Finds the contiguous sequences of 0s in the rows of the matrix, having a length greater or equal to 3, if any
c. Prints the row index of such sequences.

For example: If the matrix is the following:

0 0 0 4 5
1 2 0 4 5
1 0 0 4 0
1 2 3 4 5
1 0 0 0 0

The sequence of values "0 0 0" is found in the first and in the last row, then the program should print:

```
The sequence is found in the row 0
The sequence is found in the row 5
```

Note that the third row does not contain the indicated sequence, due to the fact that the three 0s are not contiguous.

OPTIONAL
Perform the same search also in the matrix columns. In the previous example, a further message should be print:

```
The sequence is found in the column 2
```

[1]This exercise will be solved using a multimedia format, and its solution will be provided in the course site during the following weeks.

OPTIONAL

Generalize the exercise in order to handle sequences of variable length and variable value. It details, the two parameters are acquired from the keyboard, and specify the length and the value of the sequence to find.

For example: using

Length of the sequence = 3

Value in the sequence = 0

the output should be the same of the previous exercise.

Instead, using:

Length of the sequence = 4

Value in the sequence = 1

The program should search sequences of values “1 1 1 1” in the matrix.