

## INFO 206 IMPERATIVE PROGRAMMING II

### Exercise 1

We will manipulate simple linked lists of intervals. An interval of integers  $[x\dots y]$  is represented by the couple  $(x,y)$ . The empty interval is defined by a couple  $(x,y)$  where  $x>y$ .

- 1.1 Define the appropriate data structure.
- 1.2 Define the function *inter* that takes as parameters two intervals and returns their intersection (which is also an interval). Ex :  $\text{inter}((3,6), (4,8)) = (4,6)$ .
- 1.3 Define the function *inter\_list* that takes as a parameter a list of intervals and returns the intersection of all the intervals in the list (one interval). Distinguish the case where the list is empty (no intersection), and the case where the intersection is null (the result is an empty interval).
- 1.4 Define the function *count\_int* that takes as parameters a list of intervals and an interval I and returns the number of intervals in the list that are included in I.

### Exercise 2

- 2.1 Define a function *sepa* that decides whether a character is a separator or not. If so, it returns the logical value 1, else it returns 0. The function *sepa* uses an array that contains the separators to be detected. We suppose that the separators are the following characters: end of line, space, punctuations ( $. : , ; ? !$ ), parenthesis ( $()$ ), quotes ( $" '$ ).
- 2.2 Write a program that reads a text file of name given by the user and displays the following information :
  - the number of characters in the file,
  - the number of each letter in the alphabet (without distinction between capitals and smalls),
  - the number of words,
  - the number of paragraphs (new lines),

New lines must not be counted as characters. We suppose that a word is always delimited by a separator.

**Example:**

*Name of the file: myfile.txt*

*Your file contains : 12 paragraphs, 571 words, 4186 characters*

*in which*

*279 times, the letter a*

*56 times, the letter b*

*...*

*3 times, the letter z*

*and 470 other characters*

**GOOD LUCK**