Universidad
de Alcalá

Laboratory Assignment 2

Data Structures

Fall 2013

Terms and conditions:

- Assignment should be done in groups (preferred size of 2, max. 3 people).
- Assignment shall be zipped and submitted to BlackBoard. Accepted formats are .zip, .rar and .7z.
- Rename the zipped file as *Surname_Firstname* before submission. Only one person per group will send the assignment and the file will be named after this sender.
- Assignment shall include the source files/projects as well as a document (.doc or .pdf). The document must also include the IDs and names of all the members of the group.

Students have to present every assignment to the teacher and answer the teacher's questions about it on the corresponding lab session (see deadlines).

Submission deadlines:

- Assignment 1: 5-Nov-2013
- Assignment 2: 3-Dec-2013
- Assignment 3: To be added…

Submissions that do not meet the deadlines and/or the requirements may not be reviewed. It is responsibility of the students to meet the requirements and it is not responsibility of the teacher to warn students and go after students when such requirements are not met. Exceptions will not be considered (except for those included in the examination regulation-"*normativa de examenes*").

Students that do not pass the practical part of the course (i.e. the lab) on the January call may be required to complete an additional assignment for the extraordinary call (June).

Important note: On these assignments only basic requirements are described. Students need to do additional assumptions and to make design decisions based on the given requirements. Students also need to decide on the input data and on the way in which that data is inputted into the system. Sample data needs to be provided to facilitate testing. Students are free to implement the solution in the way they prefer. Any decision will be reasonable providing that (1) it is explained on the written document and commented on the source code, and (2) it does not contradict blatantly the requirements stated here.

Assignment 2: Lists – *Palindrome problem*

For completing this assignment results from assignment 1 should be used.

The problem is described as follows:

From an input text (obtained from standard input or a text file[1]), we will filter the phrases to get those that are palindromes[2]. These palindromes will be stored in a list of queues (as element of the queues). List elements will be queues, one for every alphabet letter. Palindromes starting with the same letter will be stored on the same queue.

It means, each node in the list will be the first node of a queue where it will be all palindrome phrases which start for the same letter.

The operations needed, at least, are the next:

- Insert a new node in the list: when a palindrome is read and its first letter is missing in the list a new node has to be created with this phrase. This node has to be inserted in the list keeping the list sorted.
- Insert a palindrome in the list: this palindrome has to be inserted at the end of the queue assigned by its first letter.
- Remove all palindromes which start by a specific letter.
- Show in the screen the number of queues in the list, the total number of palindromes in each queue and their starting letter.

When the assignment is completed, the documentation should contain the sections of the following index:

Index

1. Implementation details
    - ADT specifications:Class name that contains the ADT
    - Types defined in the unit
    - ADT Operations definition (name, arguments and return)
    - Design of the relationship between the ADTs implemented, if any.

[1] Input text from keyboard the strings have to be inserted one by one and the input text from a text file each phrase has to be in one different line.

[2] One or several words with blanks.

        - Explanation of the highlight methods on the ADTs or their relationship

2. Solution adopted to implement specifications

3. Organization charts

    a. UML diagram or similar to get appropriate representation of every element designed

4. References (Bibliography)