1.Analysis

The used ADTs in this assignment are a stack and a queue. 2 queues will be used but its implementation is the same, so one ADT is enough for both.

-Stack specification:

Spec STACK[ITEM]

genre stack, ítem

operations

push: stack ítem -> stack

pop: stack -> item

top: stack -> item

empty: stack -> boolean

endspec

-Queue specification:

Spec QUEUE[ITEM]

genre queue, ítem

operations

enqueue: queue ítem -> queue

dequeue: queue -> ítem

front: queue -> item

empty: queue -> boolean

listQueue: void -> void

endspec

2.Design

ADT operations are the basic ones (pop, push, dequeue, enqueue, etc) but in queue ADT we have added an operation called “listQueue” that will be used as output, printing all elements in the queue at that moment. Also makenull will not be used so is not in the ADT.

In the program will be the clases:

* Cell class: Will be the ítems of the stack and the queue and because of that will be a separated class common between them. Contains a pointer and an integer as attributes. Because of they are private will be a method to set and to get the value.
* Queue class: This class is going to use the pointer implementation of the ADT because is easier to implement and to understand. The operations in the ADT will be the methods of the class and “front” and “rear” pointers will be the private attributes.
* Stack class: In this class will be used the pointer implementation of the ADT as seen in the Queue class. The attribute will be the “top” pointer and the ADT operations will be the methods.
* Menu class: This class is going to be used as a menu, which has the methods to print the menu, “Process Number”, “Query Stack”, “List ven queue”, “List negative queue” and “Exit”.
* IOFile class: Input and output class to manage the files I/O. Has methods to read and write a files.

We are implementing this number of clases because we think is better for the portability of the code, some of it can be used in future assignments to avoid wasting time implementing the same code.

The program works reading a .txt file, then its content is clasified in the stack and queues depending on the type of the number. Next, the menu will be showed to the user letting them choose between some options. If the user press the exit option the program will finish before saving the queues and the list in a new .txt file, then it finishes.