Laboratory practice No. 3: Linked Lists and Array Lists

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3) Practice for final project defense presentation

3.1

	ArrayList	LinkedList
1.1 Buscar por semestre y materia	O(n) Because ArrayList has an access complexity of O(1) and this procedure is done two times n times.	O(n^2) Because LinkedList s access complexity is of O(n), and in this code this operation is done 2 times n*n times.
1.1 Buscar por semestre y estudiante	O(n) Because while the ArrayList is being filled, the complexity if of O(3n), and when the registers are being searched the complexity is of O(n), since the ArrayList access complexity is O(1), hence, the total complexity of the code is O(n)	O(n^2) Because LinkedList s access complexity is of O(n), and in this code this operation is done n times, additionally it takes the complexity of reading the documents is O(3n) which means that the total complexity would be O(n^2) + O(3n), but due to the big-O notation axioms, it becomes O(n^2).

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3.2 The program Punto21.py is a utility that converts strings from "This_is_a_[Beiju]_text" to "BeijuThis_is_a__text". To do so, it reads each line from a file named "21pruebas.txt" and traverses it character by character. We realized that whenever we find a "[" we want to add the substring that has already been traversed at the end of the next substring. The next substring would we the substring starting at the next position of "[" and ending before "[", "]" or the end of the line.

We defined two states for the program. One on which the program adds the actual character to a double linked list named "First", and one on which the program adds the actual character to a "Second" double linked list. The program will start adding characters to First until it finds a "[" (in case we find a "]" we can just ignore it). Then it will change state to Second and keep traversing the string adding characters to Second until it finds a "[" or "]". When this happens (or when the string ends and state is on Second"), we will change the reference from the last element of Second to the first element of First, and from the first element of First to the last element of Second. When done, clear Second and if case we found a "[" keep state on Second. If we found a "]" set state to First.

The last thing to do is traverse First and print it's values.

3.3 $O(F(n)) = M \times S^2$

3.4 **M** in our problem would be the number of lines or program has to read from 21pruebas.txt. **S** would be the number of characters each string **M** has.

4) Practice for midterms

4.3)

```
1 public String hotPotato(Queue q, int num)
2  while (q.size() > 1)
3    for (int i = 1; i <= num; i++)   \\ for (int i = 1; i < num; i++) ???
4      q.add(q.remove());
5    q.remove();
6  return q.remove();
```

4.5)

4.5.1

12. auxiliar1.size() > 0
16. auxiliar2.size() > 0

4.5.2

18. auxiliar1.offer(edad)

4.6) c

4.7) a

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4.8) c

4.9)

4.9.1

a

4.9.2

c

4.9.3

c

4.10)

4.10.1

a

4.10.2

a

4.10.3

B

4.11)

4.11.1

c

4.11.2

b

4.12)

4.12.1

```
while( !s1.empty() )
```

4.12.2

```
s1.push( s1.pop() )
```

4.12.3

```
return s2.pop()
```

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