Pruebas JUnit

E3.1

```java
public class App {
    public static final int MAX_LOOPS = 100000;

    static final String ARRAY_LIST = "ArrayList";
    static final String LINKED_LIST = "LinkedList";
    static final String COLA_CUSTOM = "Cola custom";

    public static TreeMap<String, Long> times = new TreeMap<String, Long>();

    public static void main(String[] args) {
        checkList(ARRAY_LIST, new ArrayList<Integer>());
        checkList(LINKED_LIST, new LinkedList<Integer>());
        checkCustomList(COLA_CUSTOM, new ColaCustom(MAX_LOOPS));

        showResults();
    }

    private static void checkCustomList(String typeList, ColaCustom list) {
        long currentMiliseconds = System.currentTimeMillis();

        try {
            for (int i = 0; i < MAX_LOOPS; i++) {
                list.encuar(0);
            }

            for (int i = MAX_LOOPS - 1; i <= 0; i--) {
                list.desencuar();
            }
        } catch (Exception e) {
            e.printStackTrace();
        }

        times.put(typeList, System.currentTimeMillis() - currentMiliseconds);
    }

    private static void checkList(String typeList, List<Integer> list) {
        long currentMiliseconds = System.currentTimeMillis();

        for (int i = 0; i < MAX_LOOPS; i++) {
            list.add(i);
        }

        for (int i = MAX_LOOPS - 1; i <= 0; i--) {
            list.remove(i);
        }

        times.put(typeList, System.currentTimeMillis() - currentMiliseconds);
    }

    private static void showResults() {
        times.forEach((k, v) -> {
            System.out.println(k + " ha tardado " + v + " milisegundos.");
        });
    }
}
```
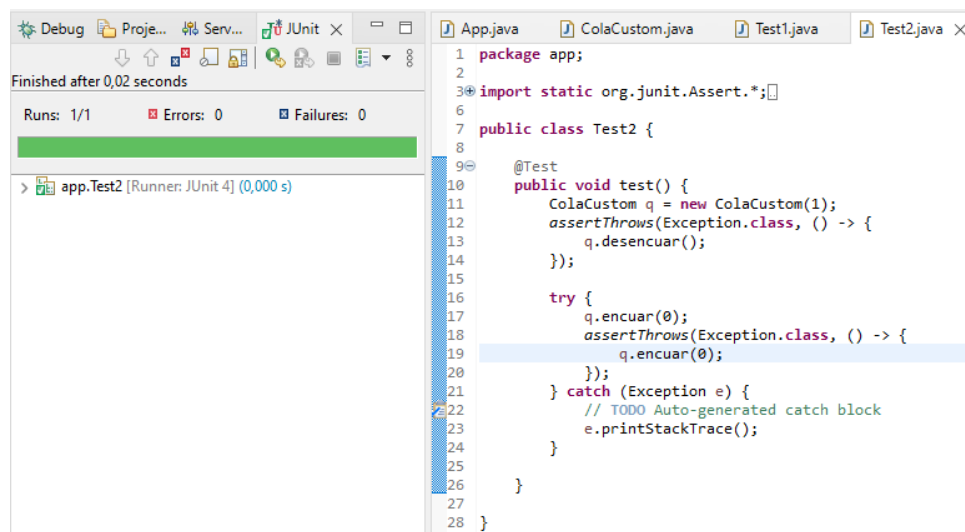
E3.2

```
ArrayList ha tardado 6 milisegundos.
Cola custom ha tardado 3 milisegundos.
LinkedList ha tardado 4 milisegundos.
```
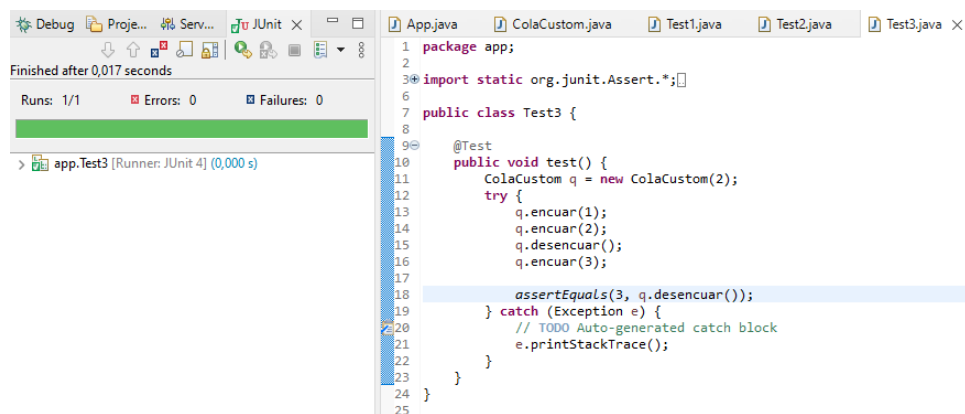
E4

Debug | Proje... | Serv... | JUnit ✕

Finished after 0,02 seconds

Runs: 1/1   Errors: 0   Failures: 0

> app.Test2 [Runner: JUnit 4] (0,000 s)

App.java | ColaCustom.java | Test1.java | Test2.java ✕

```java
1  package app;
2
3  import static org.junit.Assert.*;
6
7  public class Test2 {
8
9      @Test
10     public void test() {
11         ColaCustom q = new ColaCustom(1);
12         assertThrows(Exception.class, () -> {
13             q.desencuar();
14         });
15
16         try {
17             q.encuar(0);
18             assertThrows(Exception.class, () -> {
19                 q.encuar(0);
20             });
21         } catch (Exception e) {
22             // TODO Auto-generated catch block
23             e.printStackTrace();
24         }
25
26     }
27
28 }
```
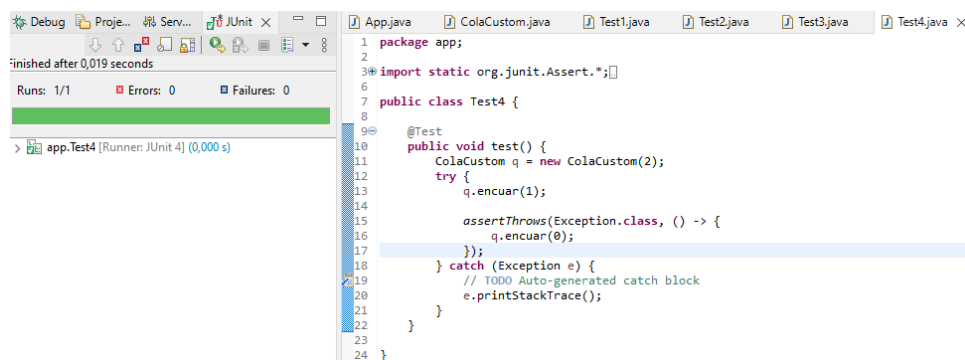
E5

Debug | Proje... | Serv... | JUnit ✕

Finished after 0,017 seconds

Runs: 1/1   Errors: 0   Failures: 0

> app.Test3 [Runner: JUnit 4] (0,000 s)

App.java | ColaCustom.java | Test1.java | Test2.java | Test3.java ✕

```java
1  package app;
2
3  import static org.junit.Assert.*;
6
7  public class Test3 {
8
9      @Test
10     public void test() {
11         ColaCustom q = new ColaCustom(2);
12         try {
13             q.encuar(1);
14             q.encuar(2);
15             q.desencuar();
16             q.encuar(3);
17
18             assertEquals(3, q.desencuar());
19         } catch (Exception e) {
20             // TODO Auto-generated catch block
21             e.printStackTrace();
22         }
23     }
24 }
25
```

E7

Debug | Proje... | Serv... | JUnit ✕

Finished after 0,019 seconds

Runs: 1/1   Errors: 0   Failures: 0

> app.Test4 [Runner: JUnit 4] (0,000 s)

App.java | ColaCustom.java | Test1.java | Test2.java | Test3.java | Test4.java ✕

```java
1  package app;
2
3  import static org.junit.Assert.*;
6
7  public class Test4 {
8
9      @Test
10     public void test() {
11         ColaCustom q = new ColaCustom(2);
12         try {
13             q.encuar(1);
14
15             assertThrows(Exception.class, () -> {
16                 q.encuar(0);
17             });
18         } catch (Exception e) {
19             // TODO Auto-generated catch block
20             e.printStackTrace();
21         }
22     }
23
24 }
```

E8

E9