CA2 Problem Descriptor

Course: DT265 **Module:** OOP2

Date Due: Tuesday 7th November 2017 @ 22:00

Instructions:
Please upload your project folder and any supporting documentation to WebCourses before 10pm.

Note: Late submissions will not be accepted.

Create a Java program based on the following requirements.

Create a multithreaded socket server program to allow a client to request html markup for a given url. The server will cache all of the pages that have been previously requested. The client will send two data variables to the server:

- Page URL variable eg. (http://www.dit.ie)
- No_Cache variable eg. (true or false)

If no_cache is true, the server will request the markup of the page using the URL class. If no_cache is false, the server will first check the cache to see if the page was requested previously. If it was not requested before, request the markup of the page. If the page was requested previously return the markup stored in the cache.

Provide programmatic control to ensure the threaded program can synchronize access to the cache.

Hints:
An ArrayList could be used to offer the cache functionality. (ie. An ArrayList that stores an object [url and markup])

Marks breakdown for code solutions for the described problem:

- Client Program: 10%
- Server Program: 20%
- Multithreaded: 10%
- Cache: 20%;
- Synchronization of Cache access: 10%
- Desired Functionality / Architecture / Implementation / Program Running: 30%

Grading Rubric

	> 70%	60 to 69%	50 to 59%	40 to 49%	< 40%
Client Program	No errors, program operates correctly and meets the functional specification.	Minor details of the program specification are violated, program functions incorrectly in certain aspects.	Minor details of the program specification are violated, program functions incorrectly in certain aspects and/or omissions have occurred	Major details of the program specification are violated, program functions to meet some parts of the problem brief.	The program doesn't function or there are major flaws with the code solution.
Server Program	No errors, program operates correctly and meets the functional specification.	Minor details of the program specification are violated, program functions incorrectly in certain aspects.	Minor details of the program specification are violated, program functions incorrectly in certain aspects and/or omissions have occurred	Major details of the program specification are violated, program functions to meet some parts of the problem brief.	The program doesn't function or there are major flaws with the code solution.
Multithreaded	No errors, program operates correctly and meets the functional specification.	Minor details of the program specification are violated, program functions incorrectly in certain aspects.	Minor details of the program specification are violated, program functions incorrectly in certain aspects and/or omissions have occurred	Major details of the program specification are violated, program functions to meet some parts of the problem brief.	The program doesn't function or there are major flaws with the code solution.
Cache	No errors, program operates correctly and meets the functional specification.	Minor details of the program specification are violated, program functions incorrectly in certain aspects.	Minor details of the program specification are violated, program functions incorrectly in certain aspects and/or omissions have occurred	Major details of the program specification are violated, program functions to meet some parts of the problem brief.	The program doesn't function or there are major flaws with the code solution.
Synchronization	No errors, program operates correctly and meets the functional specification.	Minor details of the program specification are violated, program functions incorrectly in certain aspects.	Minor details of the program specification are violated, program functions incorrectly in certain aspects and/or omissions have occurred	Major details of the program specification are violated, program functions to meet some parts of the problem brief.	The program doesn't function or there are major flaws with the code solution.
Functionality	No errors, program operates correctly and meets the functional specification.	Minor details of the program specification are violated, program functions incorrectly in certain aspects.	Minor details of the program specification are violated, program functions incorrectly in certain aspects and/or omissions have occurred	Major details of the program specification are violated, program functions to meet some parts of the problem brief.	The program doesn't function or there are major flaws with the code solution.

Helper Code

Method to get markup for a given page using the URL class:

```
public String getHTML() {
    String tmp_html = "";
    try {
      URL u = new URL(this.url_request);
      BufferedReader in = new BufferedReader(
      new InputStreamReader(u.openStream()));

      String inputLine;
      while ((inputLine = in.readLine()) != null)
          //System.out.println(inputLine);
          tmp_html = tmp_html + inputLine;
      in.close();
    } catch (Exception e) {
        System.out.println("Get HTML Page Error!!");
    }
    return tmp_html;
}
```

Object to sture URL and HTML for the cache:

```
public class URLObject {
    public String url;
    public String html;
}
```

ArrayList to store the URLObjects:

```
public ArrayList<URLObject> pages = new ArrayList<URLObject>();
```

Add a new object to the ArrayList cache:

```
URLObject uo = new URLObject();
uo.url = URLRequest;
uo.html = html;
pages.add(uo);
```

Search the cache for a given url:

```
String response = "";
for (int i=0; i<pages.size(); i++) {
    URLObject u = (URLObject)pages.get(i);
    if (u.url.equals(url)) {
        response = u.html;
        break;
    }
}
return response;
```