

Project #2 : Web Client Programming

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과제 설명 - Web Client를 만들고 이전 프로젝트에서 만든 Web Server를 통해 테스트해본다. 또한 자동 채점프로그램인 Auto Marking Program을 통해 Web Client를 만들 때 주어진 각 미션들을 잘 달성했는지 확인한다.

source Files :

```
public static String getWebContentByPost(String urlString,String data,final String charset,int timeout) {
    if(urlString == null || urlString.length() == 0) {
        return null;
    }
    urlString = (urlString.startsWith("http://") || urlString.startsWith("https://")) ? urlString : "http://" + urlString;
    URL url = new URL(urlString);
    HttpURLConnection connection = (HttpURLConnection) url.openConnection();

    connection.setDoOutput(true);
    connection.setDoInput(true);
    connection.setRequestMethod("POST");

    connection.setUseCaches(false);
    connection.setInstanceFollowRedirects(true);

    connection.setRequestProperty("Content-Type", "text/xml; charset=UTF-8");

    connection.setRequestProperty("User-Agent", "2018008559/SANGYOONSHIN/WebClient/ComputerNetwork");
}
```

mission1 : request header의 User-Agent를 Student#/Name/Program Name/Subject로 설정한다.

코드는 URL을 통해 서버와 연결 후 POST Method로 요청을 보내는 상황인데, setRequestProperty를 통해 User-Agent를 수정하였다.

mission2 : 서버에 Get Method를 보낸다. 응답이오면 몇 개의 그림 파일을 받았는지 대답한다.

```
try {
    if(conn.getResponseCode() != HttpURLConnection.HTTP_OK) {
        return null;
    }
} catch(IOException e) {
    e.printStackTrace();
    return null;
}
InputStream input = conn.getInputStream();
BufferedReader reader = new BufferedReader(new InputStreamReader(input, charset));
String line = null;
StringBuffer sb = new StringBuffer();
while((line = reader.readLine()) != null) {
    sb.append(line).append("\r\n");
}
if(reader != null) {
    reader.close();
}
if(conn != null) {
    conn.disconnect();
}
return sb.toString();
}
```

GET Method를 통해 URL의 정보를 가져오는 코드이다.
URL html 파일의 각 줄을 가져와 합쳐서 sb로 만들었다.

mission3 : 서버에 message를 POST하고, 응답을 받는다.

```
BufferedReader in = new BufferedReader(new InputStreamReader(connection.getInputStream(), charset));

String inputLine;
StringBuffer response = new StringBuffer();

while((inputLine = in.readLine()) != null) {
    response.append(inputLine).append("\r\n");
}

in.close();

System.out.println(response.toString());
return null;
```

GET Method와 마찬가지로 html을 나타내주는 부분을 추가해주었다.

Instructions:

cmd 창에서 컴파일러를 추가하고 "javac 이름.java"로 컴파일하여 "java 이름"으로 실행했다.

How the program works:

1. Web Client를 실행시킨다.
2. Web Server의 URL을 입력받는다.
3. Web Server에 GET, POST등을 요청한다.

Results:

1. Client에서 Get Method를 요청한 후

Client

```
C:\Windows\system32\cmd.exe - java WebClient
C:\Users\kas12\OneDrive\바탕 화면\2학년 2학기\컴네\과제\project2>java WebClient
192.168.0.3:8888
```

Server

```
C:\Windows\system32\cmd.exe - java WebServer
C:\Users\kas12\OneDrive\바탕 화면\2학년 2학기\컴네\과제\project1>java WebServer

Received HTTP request:
GET / HTTP/1.1
file name: /
User-Agent: Mozilla/4.0 (compatible: MSIE 6.0; Windows NT 5.2; Trident/4.0; .NET CLR 1.1.4322; .NET CLR 2.0.50727)
Accept: text/html
Host: 192.168.0.3:8888
Connection: keep-alive

OK
StatusLine : HTTP/1.1 200 OK
entityBody :
<HTML>
  <HEAD><TITLE>?</TITLE></HEAD>
  <BODY>?</BODY>

code OK
sending request file to Client...
java.lang.NullPointerException
```

2. Client에서 POST Method를 요청한 후(파일 有)

Client

```
192.168.0.3:8888  
index.html
```

Server

```
Received HTTP request:  
POST / HTTP/1.1  
file name: /  
Content-Type: text/xml;charset=UTF-8  
User-Agent: 2018008559/SANGYOONSHIN/WebClient/ComputerNetwork  
Accept: text/xml  
Cache-Control: no-cache  
Pragma: no-cache  
Host: 192.168.0.3:8888  
Connection: keep-alive  
Content-Length: 10  
  
OK  
StatusLine : HTTP/1.1 200 OK  
entityBody :  
<HTML>  
  <HEAD><TITLE>?</TITLE></HEAD>  
  <BODY>?</BODY>  
  
code OK  
sending request file to Client...  
java.lang.NullPointerException
```

3. Client에서 POST Method를 요청한 후(파일 無)

Client

```
192.168.0.3:8888  
index.html  
Exception in thread "main" java.io.FileNotFoundException: http://192.168.0.3:8888  
    at sun.net.www.protocol.http.HttpURLConnection.getInputStream0(HttpURLConnection.java:1896)  
    at sun.net.www.protocol.http.HttpURLConnection.getInputStream(HttpURLConnection.java:1498)  
    at WebClient.getWebContentByPost(WebClient.java:39)  
    at WebClient.main(WebClient.java:100)
```

Server

Received HTTP request:

POST / HTTP/1.1

file name: /

Content-Type: text/xml;charset=UTF-8

User-Agent: 2018008559/SANGYOONSHIN/WebClient/ComputerNetwork

Accept: text/xml

Cache-Control: no-cache

Pragma: no-cache

Host: 192.168.0.3:8888

Connection: keep-alive

Content-Length: 10

File not FOUND

StatusLine : HTTP/1.1 404 NOT_FOUND

entityBody :

<HTML>

<HEAD><TITLE>NOT_FOUND - sent by Student's Webserver</TITLE></HEAD>

<BODY>NOT_FOUND - sent by Student's Webserver</BODY>

code NOT_FOUND

sending error message to Client...

<자동 채점 프로그램을 통한 웹 클라이언트 테스트>

```
C:\Users\kas12\OneDrive\바탕 화면\2학년 2학기\컴네\과제\project2>java WebClient
http://34.64.159.33:60291/test/index.html
<html>
<head>
<title>Sub Testing Server</title>
</head>
<body>
<table>
<tbody>
<tr>
<th>*Student Number&nbsp;&nbsp;&nbsp;&nbsp;</th>
<th>*Access Web Client IP Address&nbsp;&nbsp;&nbsp;&nbsp;</th>
<th>*Access Web Client Port&nbsp;&nbsp;&nbsp;&nbsp;</th>
</tr>
<tr>
<td id="sno">2018008559</td>
<td id="sip">/218.147.198.72</td>
<td id="sport">54353</td>
</tr>
</tbody>
</table>
<br>
<br>
















<br>
<br>
<p></p>
<form action="result.html" method="Post">
<div>
<label>How many Picture did you receive?? without "src = null"</label>
<input type="text" name="stuAnswer">
<input type="Submit" value="submit">
</div>
<div>
<h3>*****Notice*****</h3>
<h3>If you are only using Command Line, send your answer(Format: Student Number/Answer number, e.g 2017102889/14) to use the Post method to "Server Address:Port(that you assigned)/test/picResult"</h3>
<input type="hidden" name="sno1" id="hiddenfield" value="2018008559">
</div>
<p></p>
</body>
</html>
```

이미지가 9개임을 확인할 수 있다.

따라서 다음과 같이 POST 요청해준다.

```
http://34.64.159.33:60291/test/picResult
2018008559/9
```

```

<html>
<head>
</head>
<body>
<table>
<tbody>
<tr>
<th>*Student Number&nbsp;&nbsp;&nbsp;&nbsp;</th>
<th>*Access Web Client IP Address&nbsp;&nbsp;&nbsp;&nbsp;</th>
<th>*Access Web Client Port&nbsp;&nbsp;&nbsp;&nbsp;</th>
</tr>
<tr>
<td id="sno">2018008559</td>
<td id="sip">/218.147.198.72</td>
<td id="sport">54364</td>
</tr>
</tbody>
</table>
<div>
<h2 id="sentPic" style="color:blue">Correct: I sent you 9 pictures</h2>
</div>
<div>
<h2 id="ansPic">You answered that you received 9 pictures</h2>
</div>
<br>
<br>
<br>
<div>
<h1>About your header</h1>
</div>
<div id="headerTest"> Accept=[text/xml]
<br>Connection=[keep-alive]
<br>Host=[34.64.159.33:60291]
<br>Pragma=[no-cache]
<br>User-agent=[2018008559/SANGYOONSHIN/WebClient/ComputerNetwork]
<br>Content-type=[text/xml; charset=UTF-8]
<br>Content-length=[12]
<br>Cache-control=[no-cache]
<br>
</div>
<div>
</div>
<div>
<h2 id="warning"></h2>
</div>
</body>
</html>

```

그러면 서버에서 맞았다고 해주고, header도 User-agent가 2018008559/SANGYOONSHIN/WebClient/CompterNetwork로 바뀐 것을 확인할 수 있다.

```
http://34.64.159.33:60291/test/postHandleTest
2018008559
8068411555
```

Mission 3도, POST 요청을 해주면 서버에서의 응답을 출력한다.

결과는 다음과 같다.

***Your Information**

Student Name	Student Number	Web Client IP	Web Client Port	Access Time	Score
sang+yoona+shin	2018008559	192.168.0.3	8888	2021-11-20 08:08:14	75/100

From Mission1 to Mission3 is essential Requirements

Mission Index	Result	Comment
Mission 1: Set header-Useragent(HEADER)	true	
Mission2: Answer Number of Pictures(GET)	true	
Mission3: Select Correct Number(POST)	true	
Optional: Select Correct Picture(GET, DataStructure, UI)	false	To check the image, you have to implement your client with GUI OR save it as .jpg file after receive

something Else:

Student Number/Name/Program Name/Subject 같은 것에 대한 예제를 간단하게 들어주셨으면 좋겠습니다.