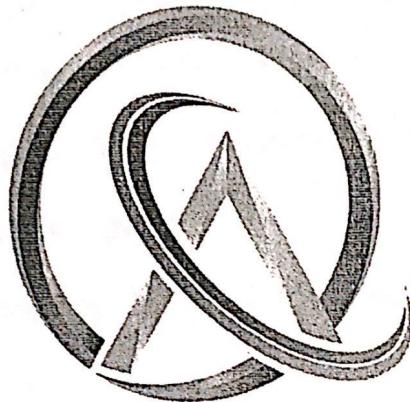


INSTITUTE OF ENGINEERING
ADVANCED COLLEGE OF ENGINEERING AND MANAGEMENT
KALANKI, KATHMANDU
(AFFILIATED TO TRIBHUVAN UNIVERSITY)



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LAB REPORT

SUBJECT : Network Programming
LAB NO : 4

SUBMITTED BY:

NAME : Arish Shrestha
ROLL NO: 1
DATE : 2082/09/30

SUBMITTED TO:

BCA Department

Q

TITLE : URL CONNECTIONS

OBJECTIVES:

- To understand the URLConnection class and how it facilitates communication with URL.
- To learn to inspect HTTP headers and retrieve metadata from a server response.
- To practice handling HTTP status codes and request methods.

THEORY:

URLConnection

- The `java.net.URLConnection` is an abstract class that represents an active connection to a resource specified by a URL.
- It has two distinct state: connected and not connected.
- Once connected, data can be read from and written to the resource.

HTTP Headers

- HTTP Headers are key-value pairs sent between the client and server during a request or response.
- It contains metadata like `Content-Type`, `Content-Length`, `Server` info etc.

HTTP Response Code

→ It is a 3-digit integer that indicates the result of the server's attempt to satisfy the request. Common code includes:

- 200 OK:
- 301/302 : Redirection
- 404 NOT FOUND
- 500 INTERNAL SERVER ERROR

SOURCE CODE:

```
package lab4;  
import java.*;  
  
public class Solution {  
    public static void main (String [] args){  
        question1();  
        question2();  
        question3();  
        question4();  
        question5();  
    }  
}
```

111. To download webpage using URLConnection

```
private static void question1(){
    try {
        URL url = new URL ("https://iacem.edu.ng/pages/1");
        URLConnection uc = url.openConnection();
        try (InputStream is = uc.getInputStream()) {
            BufferedReader r = new BufferedReader (new InputStreamReader (is));
            int c;
            int count=0;
            while ((c = r.read()) != -1 && count<5) {
                System.out.println((char)c);
                if (c == 'S') {
                    System.out.println();
                    count++;
                }
            }
            r.close();
        } catch (IOException e) {
            System.out.println ("e.getMessage()");
        }
    }
}
```

```
"C:\Program Files\Java\jdk-23\bin\java.exe" "-javaagent:D:\downloadssss\Int
<!DOCTYPE html>

<html lang="en">
<head>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0">
Process finished with exit code 0.
```

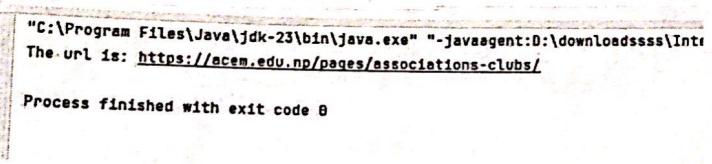
112 to print entire Header Field.

```
private static void question2(){
    try {
        URL url = new URL("https://acem-edu.pnppl.pages/");
        URLConnection uc = url.openConnection();
        Map<String, List<String>> headerFields = uc.getHeaderFields();
        headerFields.forEach((k, v) -> {
            System.out.println(k + ":");
            if (v.size() > 1) {
                v.forEach(val -> System.out.print(val + ","));
            } else {
                v.forEach(val -> System.out.print(val));
            }
        });
    } catch (IOException e) {
        System.out.println(e.getMessage());
    }
}
```

```
"C:\Program Files\Java\jdk-23\bin\java.exe" "-javaagent:D:\downloadssss\IntelliJ IDEA
null : HTTP/1.1 200 OK
Server : nginx
X-Content-Type-Options : nosniff
Connection : keep-alive
X-Mod-Pagespeed : 1.13.35.2-0
Pragma : no-cache
Date : Sun, 11 Jan 2026 12:48:46 GMT
X-Frame-Options : SAMEORIGIN
X-Cache-Status : MISS
Cache-Control : no-store, no-cache, must-revalidate, max-age=0, no-cache,
Vary : Accept-Encoding, Accept-Encoding, User-Agent,
Set-Cookie : PHPSESSID=okoghfrt1411369etcf213hnmb; path=/
Expires : Thu, 19 Nov 1981 08:52:00 GMT
Content-Length : 15268
X-XSS-Protection : 1; mode=block
Content-Type : text/html; charset=UTF-8
X-Powered-By : PHP/8.2.30 ; PleskLin
Process finished with exit code 0
```

113 To print URL of URLConnection

```
private static void question3() {
    try {
        URL url = new URL("https://acem.edu.np/pages/associations-
                           clubs/");
        URLConnection uc = url.openConnection();
        System.out.println("The url is :" + uc.getURL());
    } catch (IOException e) {
        System.out.println(e.getMessage());
    }
}
```



```
"C:\Program Files\Java\jdk-23\bin\java.exe" "-javasagent:D:\downloadssss\IntelliJ IDEA 2023.2.1\lib\idea_rt.jar" "question3"
The url is: https://acem.edu.np/pages/associations-clubs/
Process finished with exit code 0
```

114 To retrieve HTTP response code

```
private static void question4() {
    try {
        URL url = new URL("https://acem.edu.np/pages/");
        HttpURLConnection httpConn = (HttpURLConnection) url.openConnection();
        httpConn.setRequestMethod("POST");
        System.out.println("The response code is : " +
                           httpConn.getResponseCode());
    }
}
```

```
        catch (IOException e) {
            System.out.println(e.getMessage());
        }
    }
```

The screenshot shows a terminal window with the following text:
"C:\Program Files\Java\jdk-23\bin\java.exe" "-javaagent:D:\downloadssss
The response code is: 403
Process finished with exit code 0"

115 to get last changed date

```
private static void question5() {
    try {
        URL url = new URL("https://example.com");
        HttpURLConnection httpConn =
            (HttpURLConnection) url.openConnection();
        httpConn.setRequestMethod("HEAD");
        Date lastModified = new Date(httpConn.getLastModified());
        System.out.println('The last changed time is:' + lastModified);
    } catch (IOException e) {
        System.out.println(e.getMessage());
    }
}
```

The screenshot shows a terminal window with the following text:
"C:\Program Files\Java\jdk-23\bin\java.exe" "-javaagent:D:\downloadssss
The last changed time is: Sat Jan 03 11:28:21 GMT+05:45 2026
Process finished with exit code 0"

CONCLUSION:

In this lab, we successfully utilized the `URLConnection` and `HttpURLConnection` classes to interact with web resources. We learned to extract metadata, check response codes etc.