練習
Java Servlet 技術

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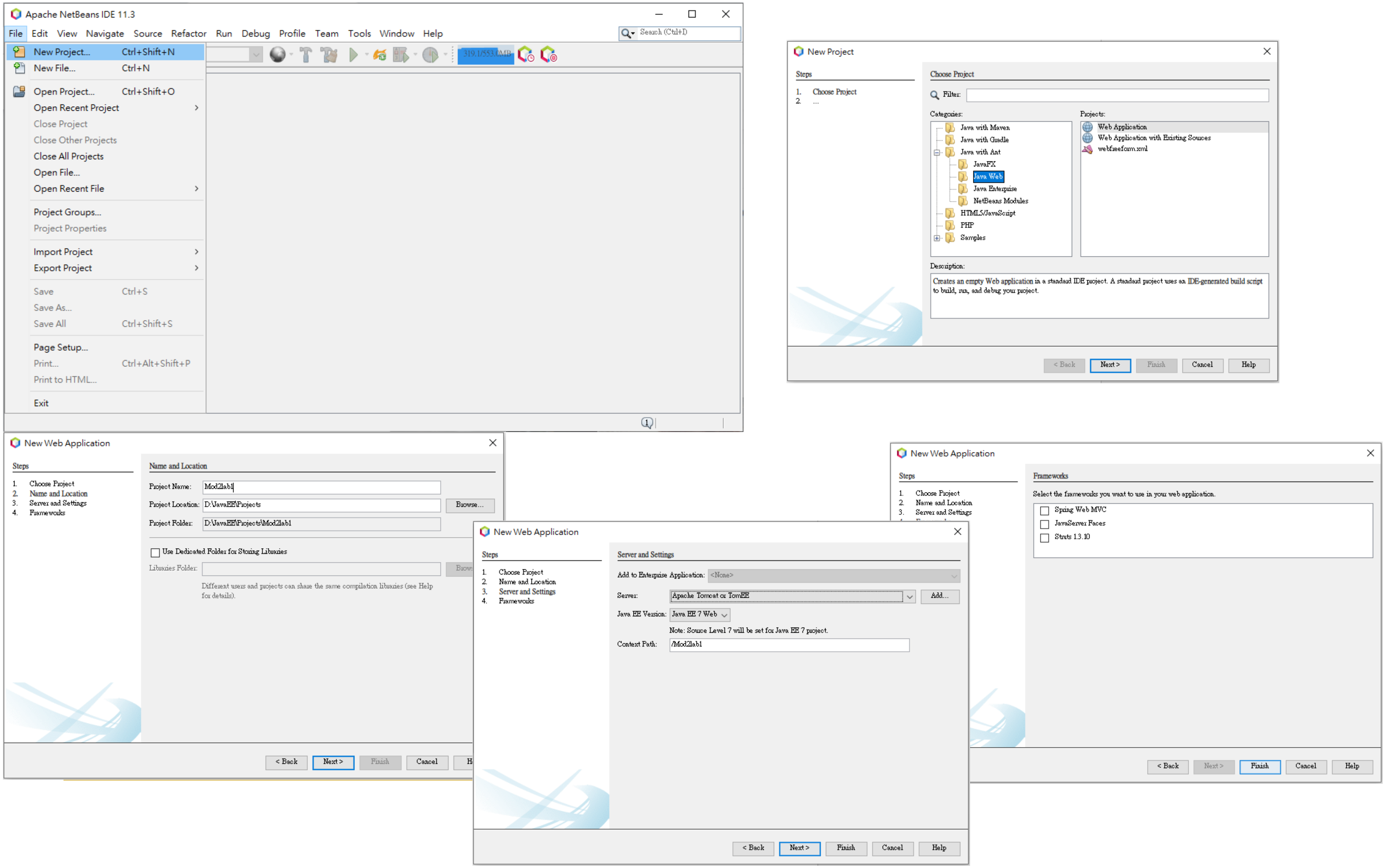
Lab 1

- 使用NetBeans IDE，建立Mod2lab1 網路應用專案
- 建立一個Servlet
  - 刪除index.html
  - 新增com.gjun.Lab1Servlet
- 檢視NetBean建立的Servlet程式
  - doGet() / doPost() / processRequest()
- 撰寫Servlet程式碼
  - 自行撰寫
- 執行Servlet
- 使用瀏覽器檢視動態網頁

建立Mod2lab1專案



New Project — Choose Project

1. Choose Project
2. ...

Categories: Java with Ant > Java Web

Projects: Web Application

Description: Creates an empty Web application in a standard IDE project. A standard project uses an IDE-generated build script to build, run, and debug your project.

New Web Application — Name and Location

Project Name: Mod2lab1

Project Location: D:\JavaEE\Projects

Project Folder: D:\JavaEE\Projects\Mod2lab1

□ Use Dedicated Folder for Storing Libraries

Libraries Folder:

Different users and projects can share the same compilation libraries (see Help for details).

New Web Application — Server and Settings

Add to Enterprise Application: <None>

Server: Apache Tomcat or TomEE

Java EE Version: Java EE 7 Web

Note: Source Level 7 will be set for Java EE 7 project.

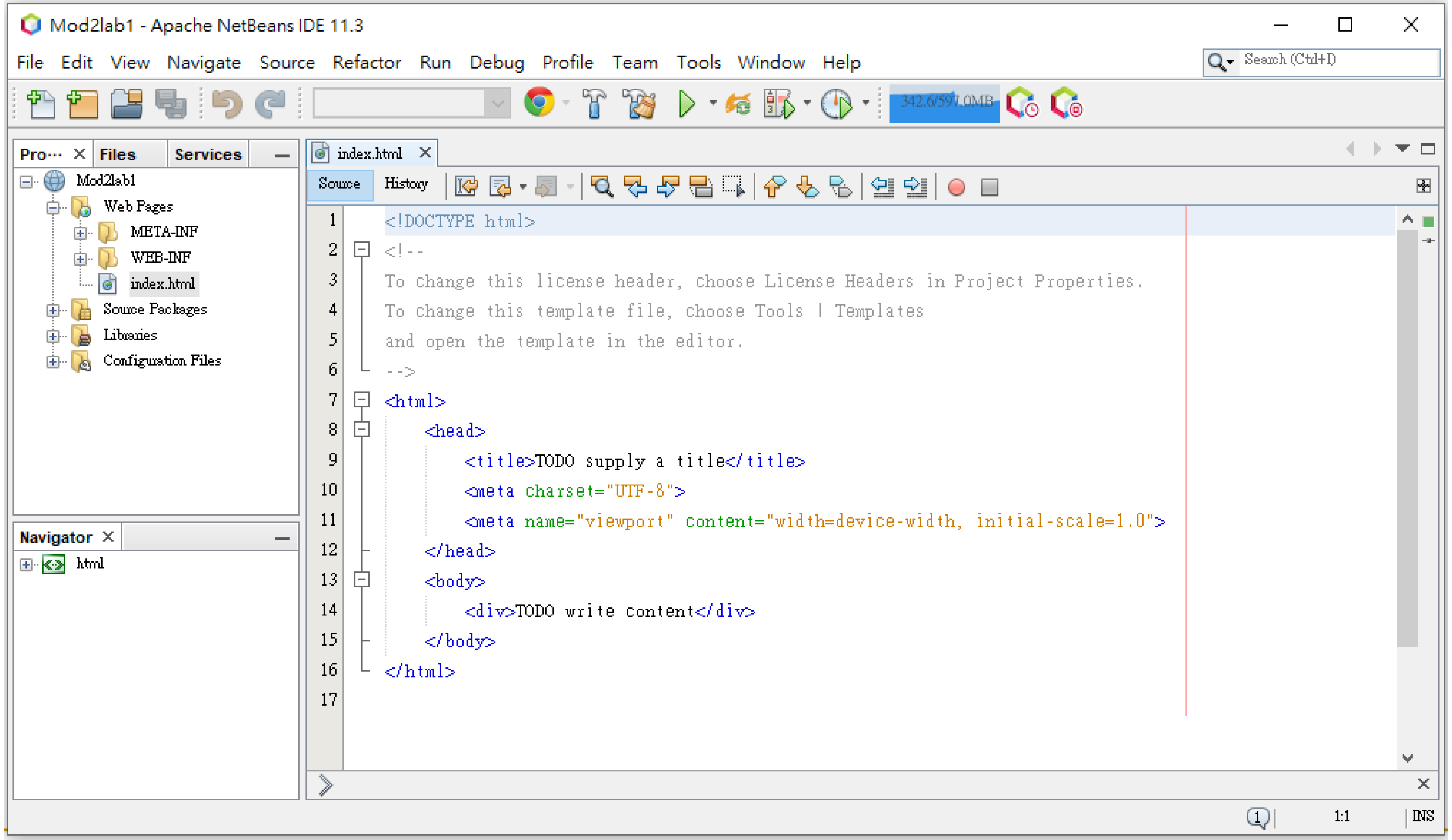
Context Path: /Mod2lab1

New Web Application — Frameworks

Select the frameworks you want to use in your web application.

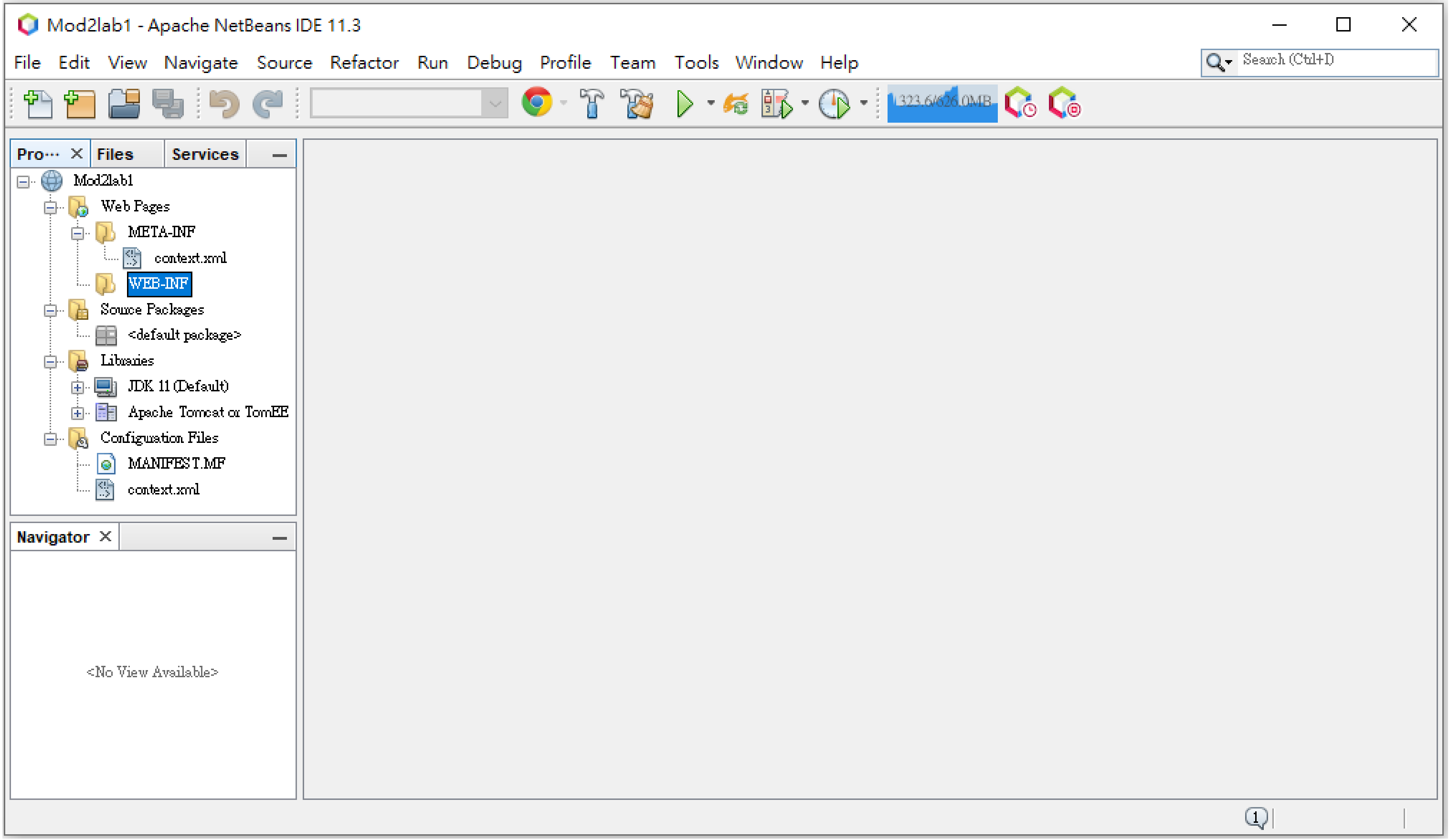
□ Spring Web MVC
□ JavaServer Faces
□ Struts 1.3.10

建立Mod2lab1專案

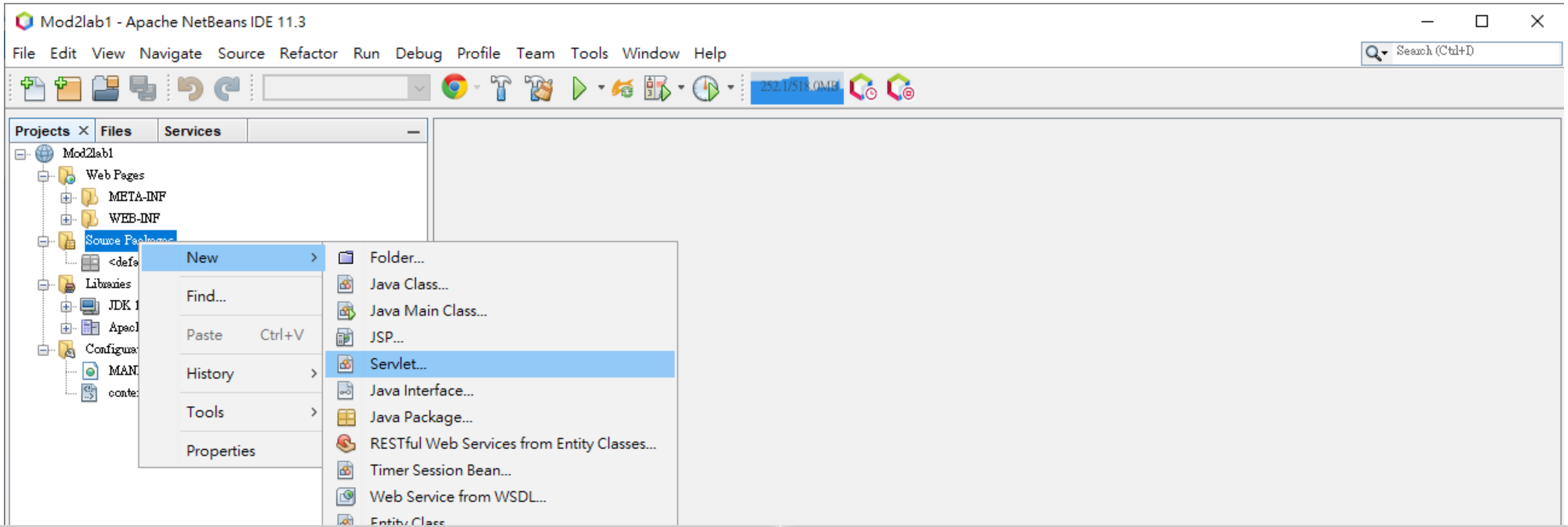


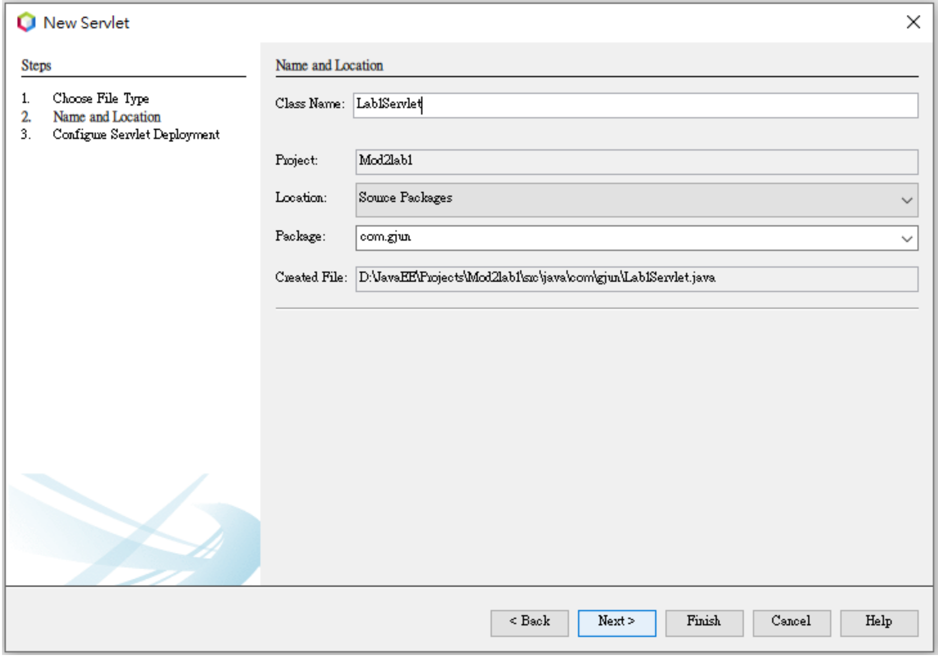
```
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->
<html>
    <head>
        <title>TODO supply a title</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <div>TODO write content</div>
    </body>
</html>
```

刪除index.html



建立 com.gjun.Lab1Servlet





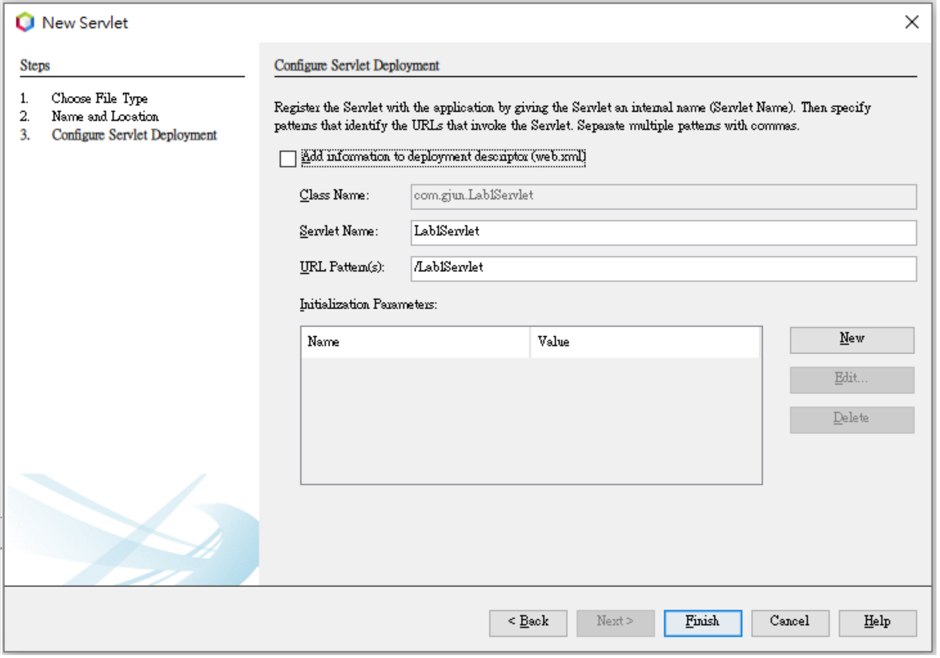
Class Name: Lab1Servlet

Project: Mod2lab1

Location: Source Packages

Package: com.gjun

Created File: D:\JavaEE\Projects\Mod2lab1\src\java\com\gjun\Lab1Servlet.java



Register the Servlet with the application by giving the Servlet an internal name (Servlet Name). Then specify patterns that identify the URLs that invoke the Servlet. Separate multiple patterns with commas.

☐ Add information to deployment descriptor (web.xml)

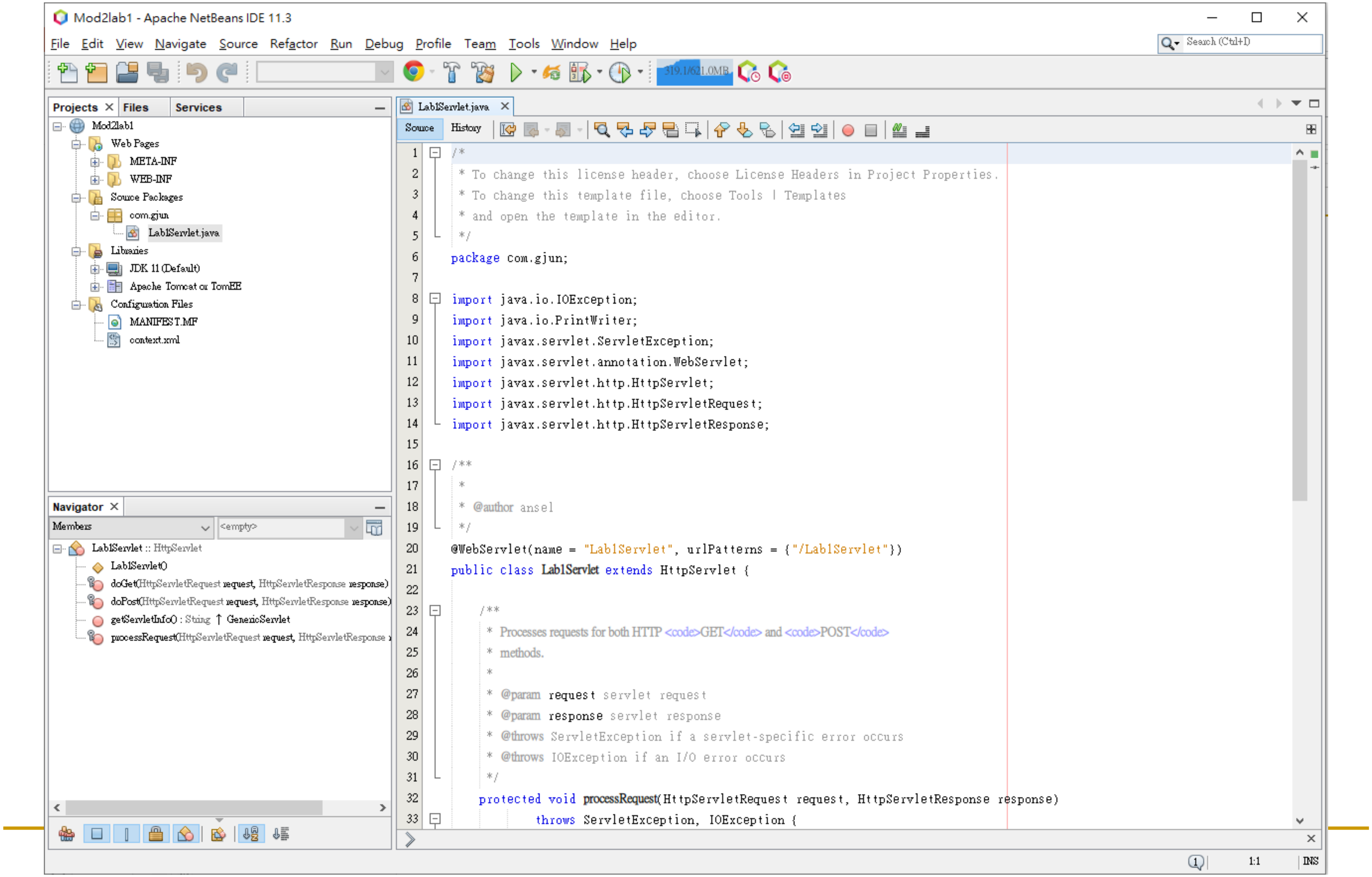
Class Name: com.gjun.Lab1Servlet

Servlet Name: Lab1Servlet

URL Pattern(s): /Lab1Servlet

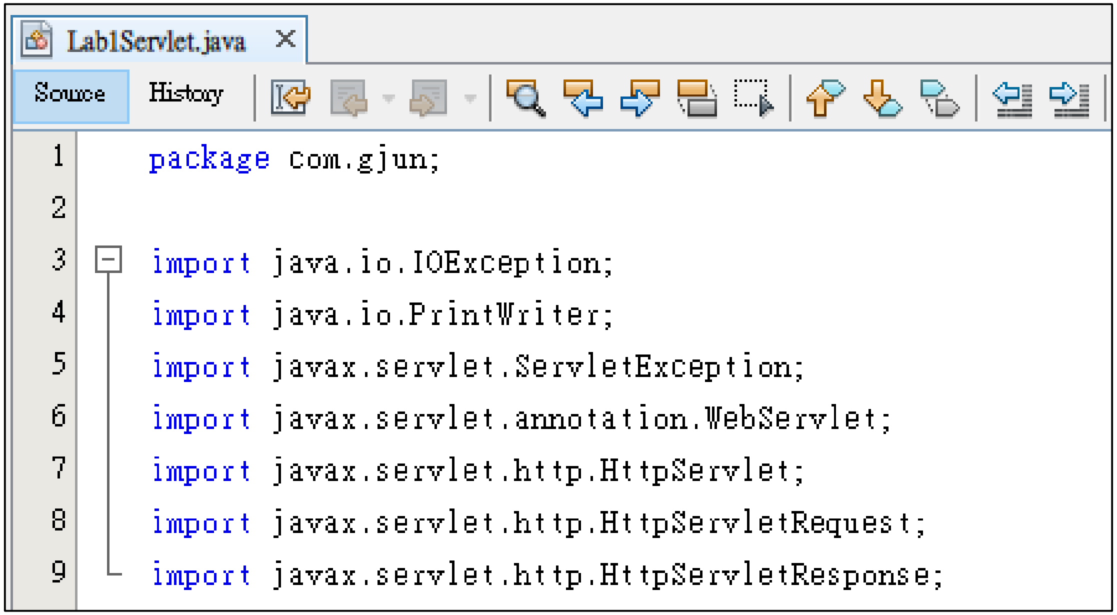
Initialization Parameters:

建立 com.gjun.Lab1Servlet


Mod2lab1 - Apache NetBeans IDE 11.3
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Search (Ctrl+I)
319.1/621.0MB
Projects Files Services
Mod2lab1
Web Pages
META-INF
WEB-INF
Source Packages
com.gjun
Lab1Servlet.java
Libraries
JDK 11 (Default)
Apache Tomcat or TomEE
Configuration Files
MANIFEST.MF
context.xml
Navigator
Members
<empty>
Lab1Servlet :: HttpServlet
Lab1Servlet()
doGet(HttpServletRequest request, HttpServletResponse response)
doPost(HttpServletRequest request, HttpServletResponse response)
getServletInfo() : String ↑ GenericServlet
processRequest(HttpServletRequest request, HttpServletResponse r
Lab1Servlet.java
Source History
1:1
INS

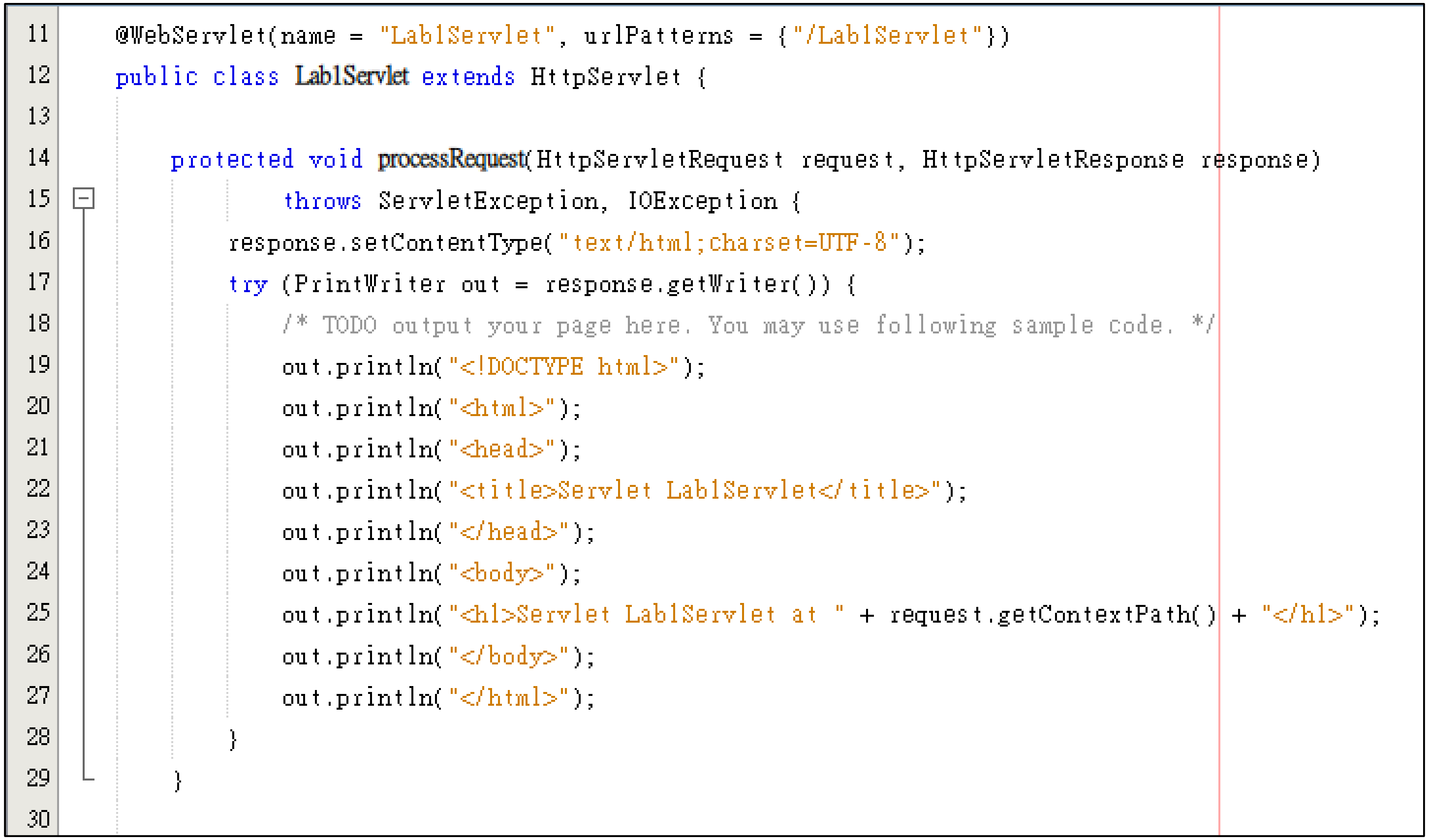
```java
/*
 * To change this license header, choose License Headers in Project Properties.
 * To change this template file, choose Tools | Templates
 * and open the template in the editor.
 */
package com.gjun;

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

/**
 *
 * @author ansel
 */
@WebServlet(name = "Lab1Servlet", urlPatterns = {"/Lab1Servlet"})
public class Lab1Servlet extends HttpServlet {

    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
```

檢視NetBean建立的Servlet程式



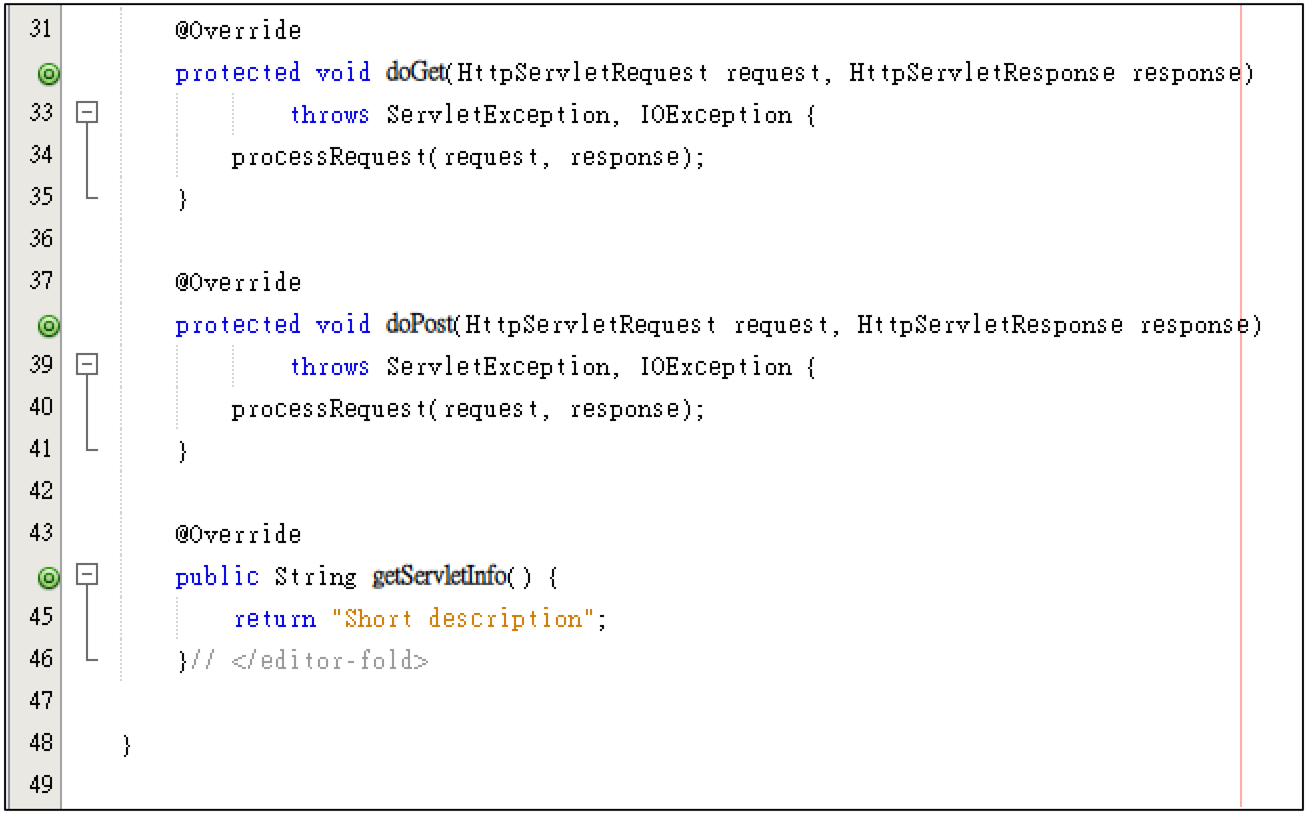
```
package com.gjun;

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
```

processRequest()



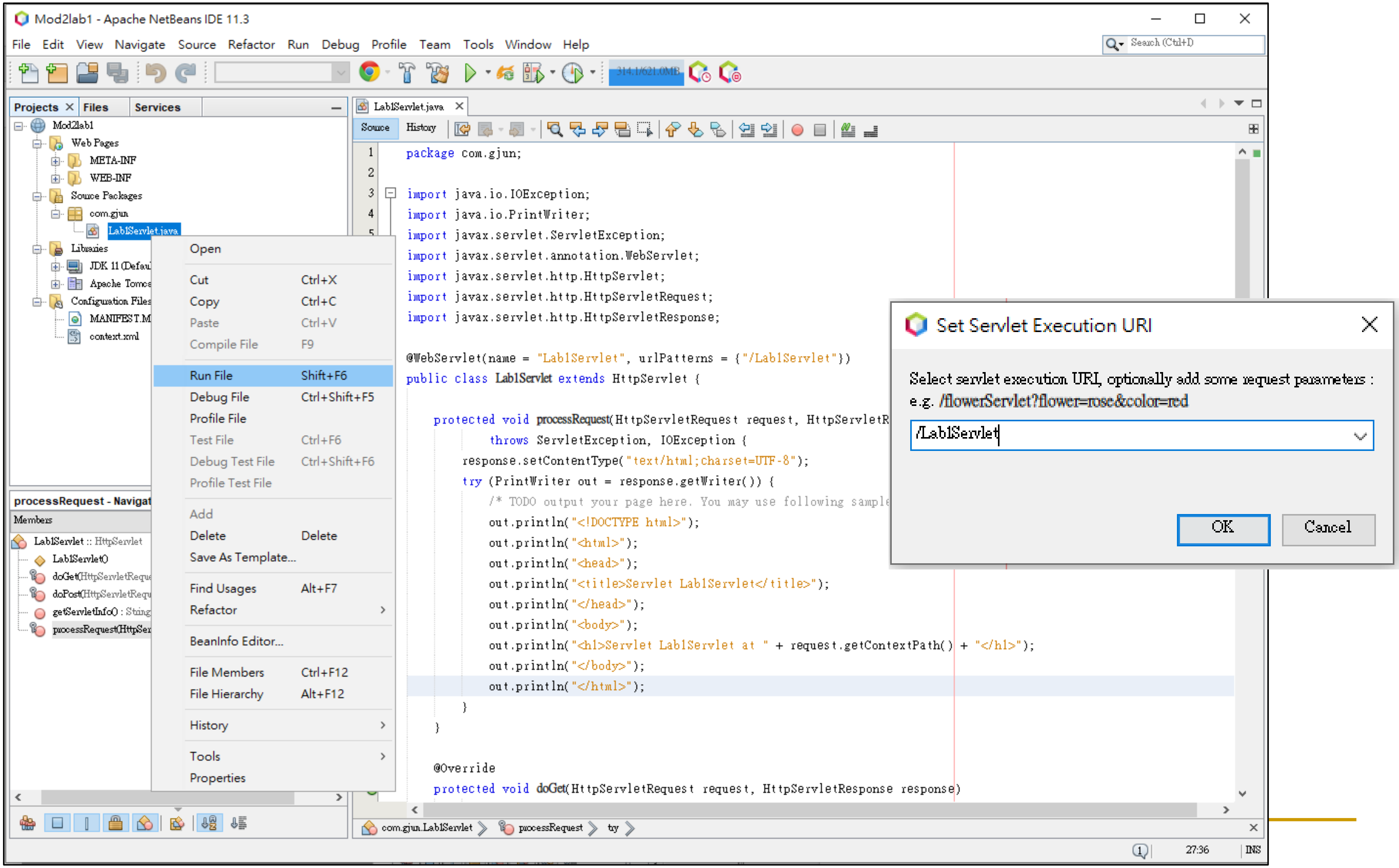
```java
@WebServlet(name = "Lab1Servlet", urlPatterns = {"/Lab1Servlet"})
public class Lab1Servlet extends HttpServlet {

    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {
            /* TODO output your page here. You may use following sample code. */
            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Servlet Lab1Servlet</title>");
            out.println("</head>");
            out.println("<body>");
            out.println("<h1>Servlet Lab1Servlet at " + request.getContextPath() + "</h1>");
            out.println("</body>");
            out.println("</html>");
        }
    }

```

doGet() / doPost()



```
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        processRequest(request, response);
    }

    @Override
    protected void doPost(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        processRequest(request, response);
    }

    @Override
    public String getServletInfo() {
        return "Short description";
    }// </editor-fold>

}
```

執行Servlet

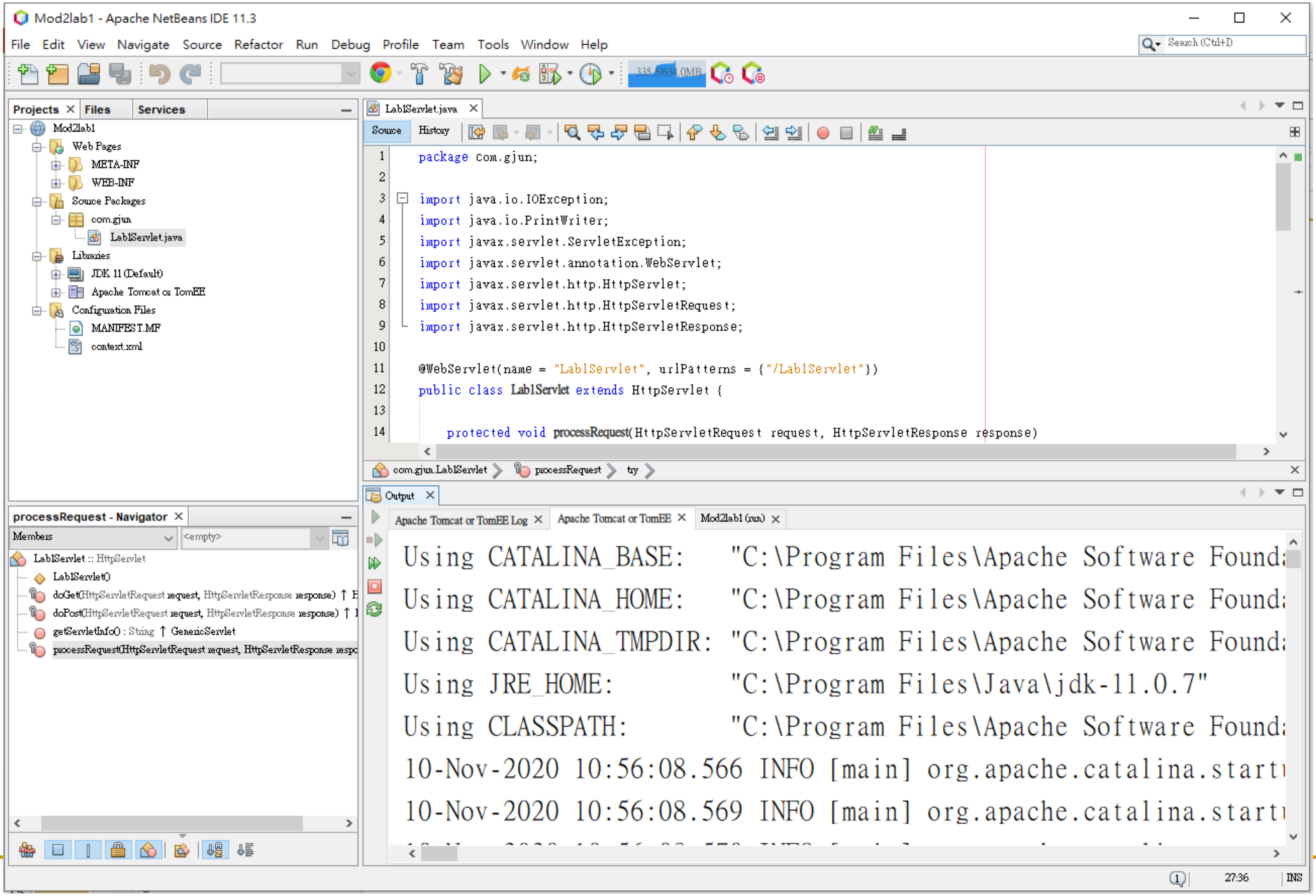


```
package com.gjun;

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

@WebServlet(name = "Lab1Servlet", urlPatterns = {"/Lab1Servlet"})
public class Lab1Servlet extends HttpServlet {

    protected void processRequest(HttpServletRequest request, HttpServletR
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {
            /* TODO output your page here. You may use following sample
            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Servlet Lab1Servlet</title>");
            out.println("</head>");
            out.println("<body>");
            out.println("<h1>Servlet Lab1Servlet at " + request.getContextPath() + "</h1>");
            out.println("</body>");
            out.println("</html>");
        }
    }

    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
```

Select servlet execution URI, optionally add some request parameters :
e.g. /flowerServlet?flower=rose&color=red

/Lab1Servlet

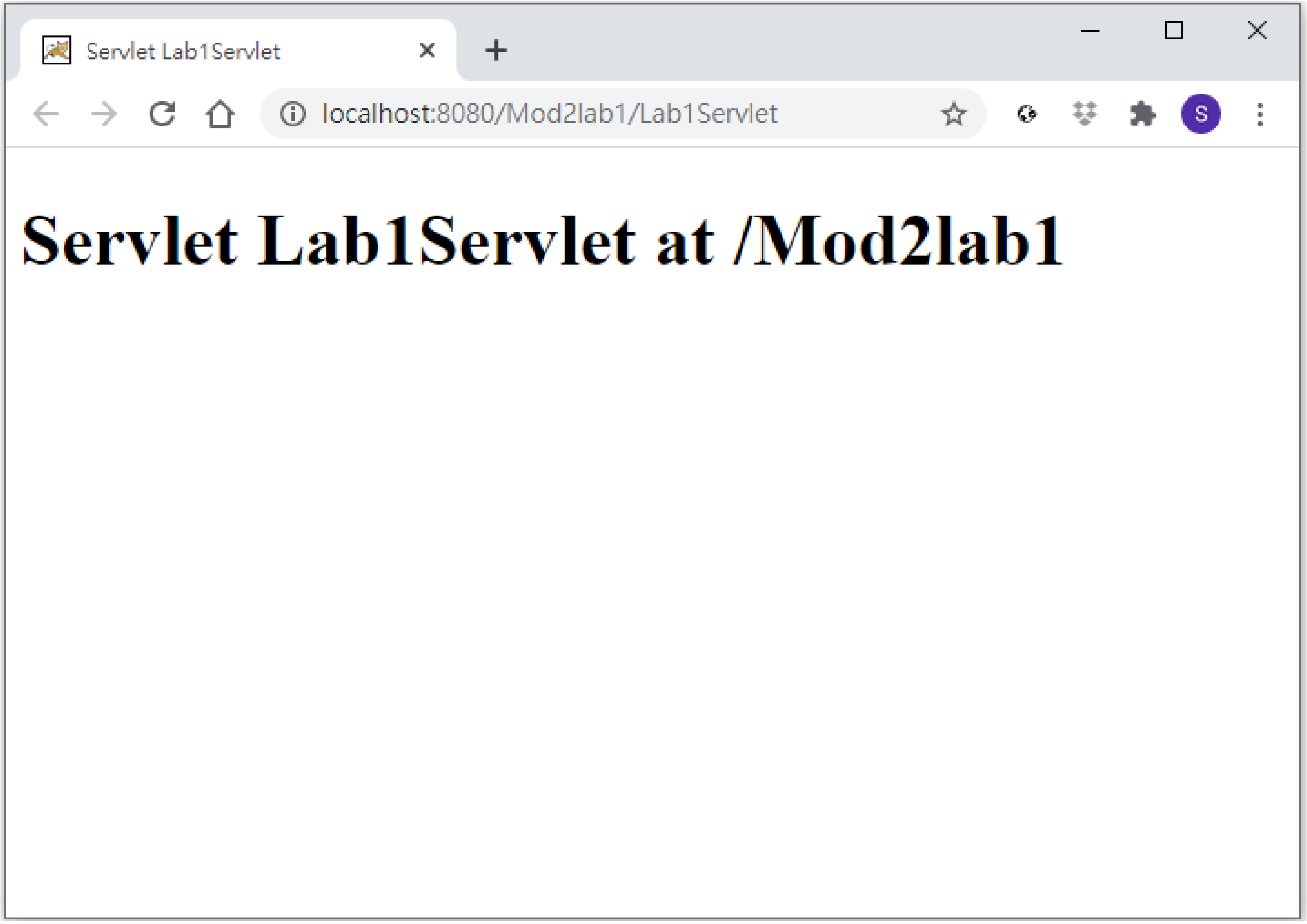
執行Servlet


Mod2lab1 - Apache NetBeans IDE 11.3
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Search (Ctrl+I)
335.5/634.0MB
Projects Files Services
Mod2lab1
Web Pages
META-INF
WEB-INF
Source Packages
com.gjun
LablServlet.java
Libraries
JDK 11 (Default)
Apache Tomcat or TomEE
Configuration Files
MANIFEST.MF
context.xml
processRequest - Navigator
Members
<empty>
LablServlet :: HttpServlet
LablServlet()
doGet(HttpServletRequest request, HttpServletResponse response) ↑ H
doPost(HttpServletRequest request, HttpServletResponse response) ↑ H
getServletInfo() : String ↑ GenericServlet
processRequest(HttpServletRequest request, HttpServletResponse resp
LablServlet.java
Source History
com.gjun.LablServlet
processRequest
try
Output
Apache Tomcat or TomEE Log
Apache Tomcat or TomEE
Mod2lab1 (run)
27:36
INS

```java
package com.gjun;

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

@WebServlet(name = "LablServlet", urlPatterns = {"/LablServlet"})
public class LablServlet extends HttpServlet {

    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
```

```
Using CATALINA_BASE:   "C:\Program Files\Apache Software Founda
Using CATALINA_HOME:   "C:\Program Files\Apache Software Founda
Using CATALINA_TMPDIR: "C:\Program Files\Apache Software Founda
Using JRE_HOME:        "C:\Program Files\Java\jdk-11.0.7"
Using CLASSPATH:       "C:\Program Files\Apache Software Founda
10-Nov-2020 10:56:08.566 INFO [main] org.apache.catalina.startu
10-Nov-2020 10:56:08.569 INFO [main] org.apache.catalina.startu
```

使用瀏覽器檢視動態網頁



Servlet Lab1Servlet at /Mod2lab1

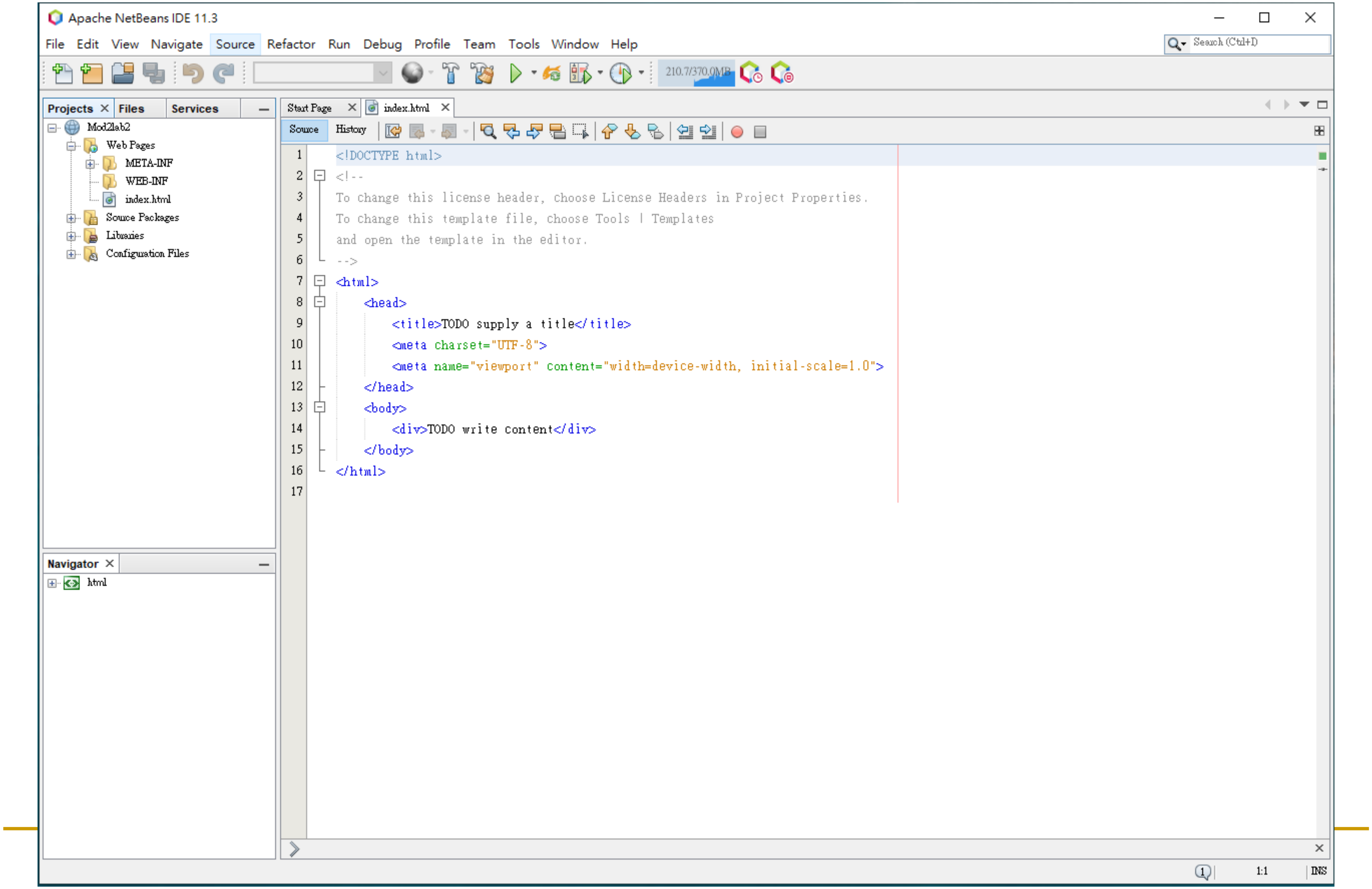
Lab 2

- 使用NetBeans IDE，建立Mod2lab2 網路應用專案
- 建立index.html檔案
  - ❑ 修改 index.html檔案,檔案中包含下面的表單Form

```
<form action="AnimalServlet">
    Please enter your favorite animal:&nbsp;
    <input type="text" name="favoriteAnimal" value="Gnu" />
    <input type="submit" />
</form>
```

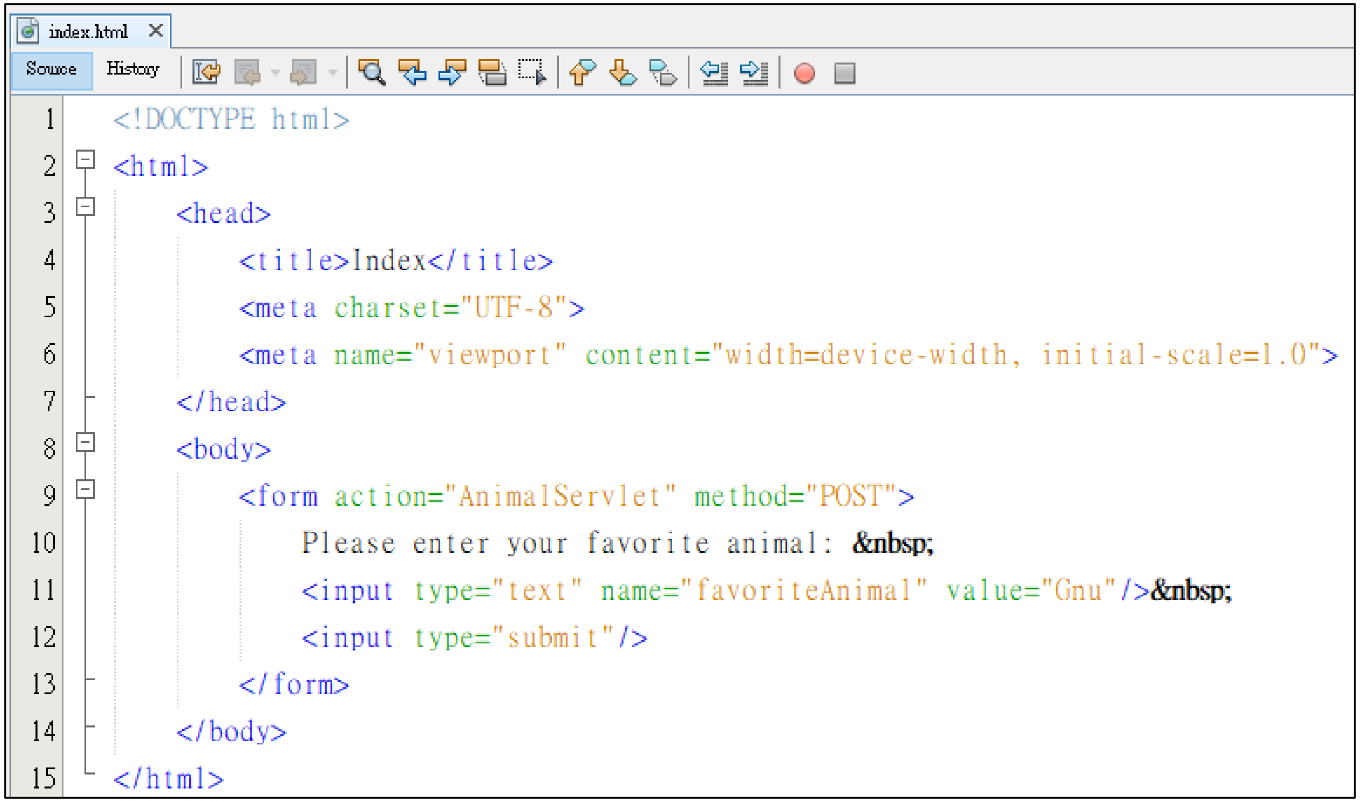
- 建立AnimalServlet.java程式
  - ❑ title 設為Animal Lover’s page
  - ❑ <h1>標籤中顯示 Hello Animal Lover
  - ❑ 使用內建request物件取得表格中傳來的favoriteAnimal參數,並顯示在頁面中
- 執行專案
  - ❑ 送出表單並檢視執行結果

建立 Mod2lab2 專案



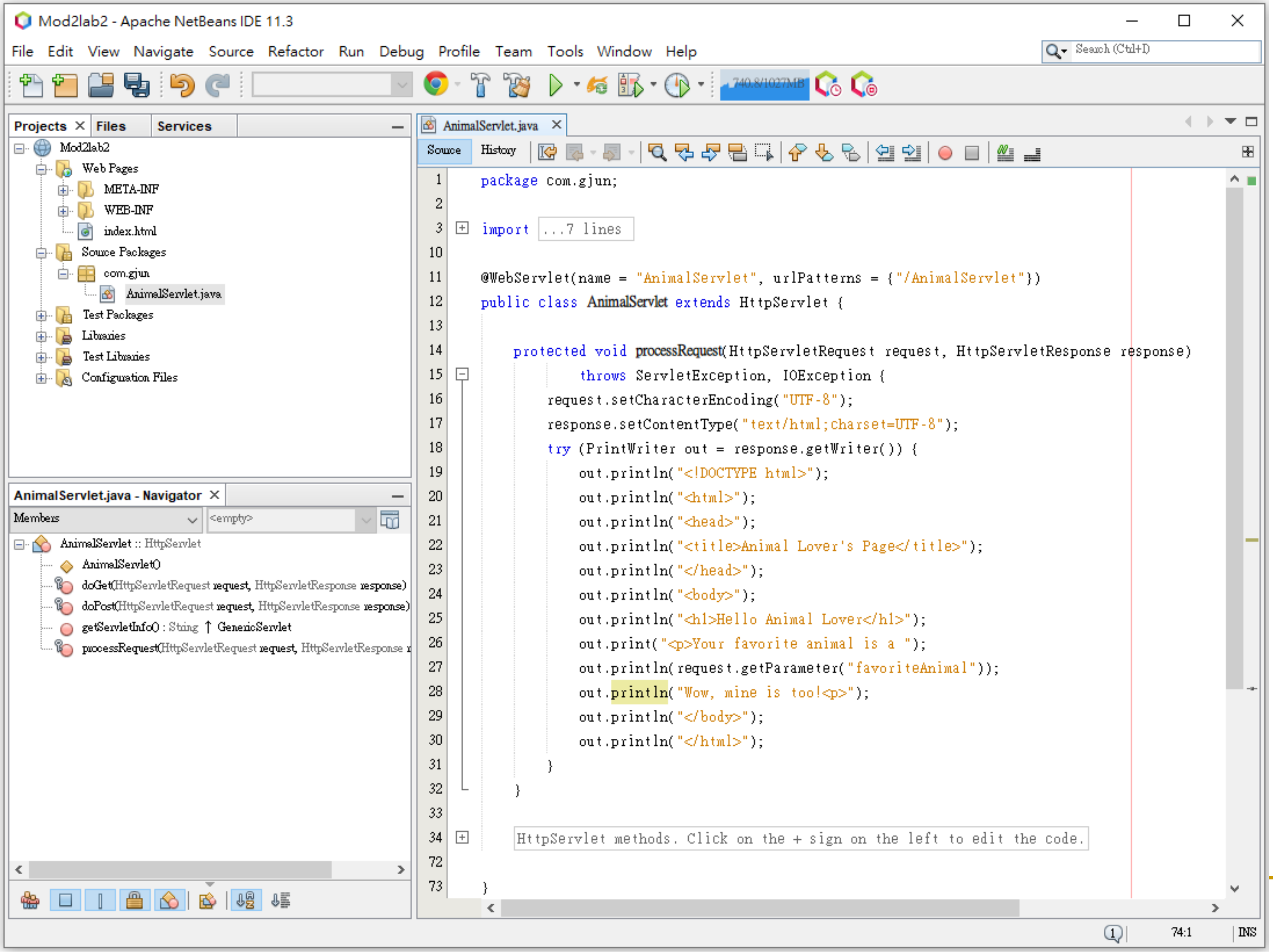
```html
<!DOCTYPE html>
<!--
To change this license header, choose License Headers in Project Properties.
To change this template file, choose Tools | Templates
and open the template in the editor.
-->
<html>
    <head>
        <title>TODO supply a title</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <div>TODO write content</div>
    </body>
</html>
```

修改index.html檔案



```
<!DOCTYPE html>
<html>
    <head>
        <title>Index</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <form action="AnimalServlet" method="POST">
            Please enter your favorite animal: &nbsp;
            <input type="text" name="favoriteAnimal" value="Gnu"/>&nbsp;
            <input type="submit"/>
        </form>
    </body>
</html>
```

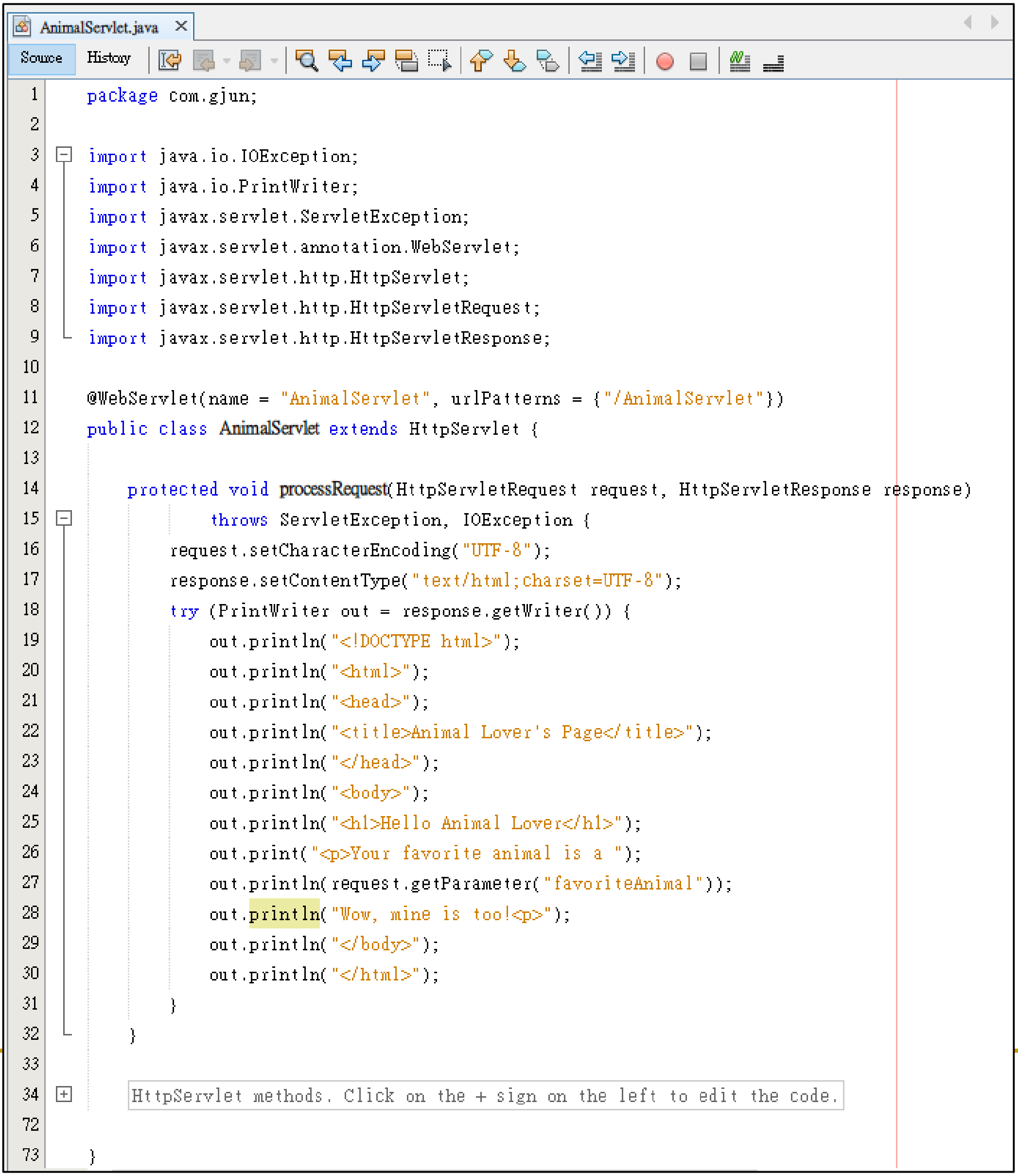
建立com.gjun.AnimalServlet



Mod2lab2 - Apache NetBeans IDE 11.3
File
Edit
View
Navigate
Source
Refactor
Run
Debug
Profile
Team
Tools
Window
Help
Search (Ctrl+I)
740.8/1027MB
Projects
Files
Services
Mod2lab2
Web Pages
META-INF
WEB-INF
index.html
Source Packages
com.gjun
AnimalServlet.java
Test Packages
Libraries
Test Libraries
Configuration Files
AnimalServlet.java - Navigator
Members
<empty>
AnimalServlet :: HttpServlet
AnimalServlet()
doGet(HttpServletRequest request, HttpServletResponse response)
doPost(HttpServletRequest request, HttpServletResponse response)
getServletInfo() : String ↑ GenericServlet
processRequest(HttpServletRequest request, HttpServletResponse r
AnimalServlet.java
Source
History
74:1
INS

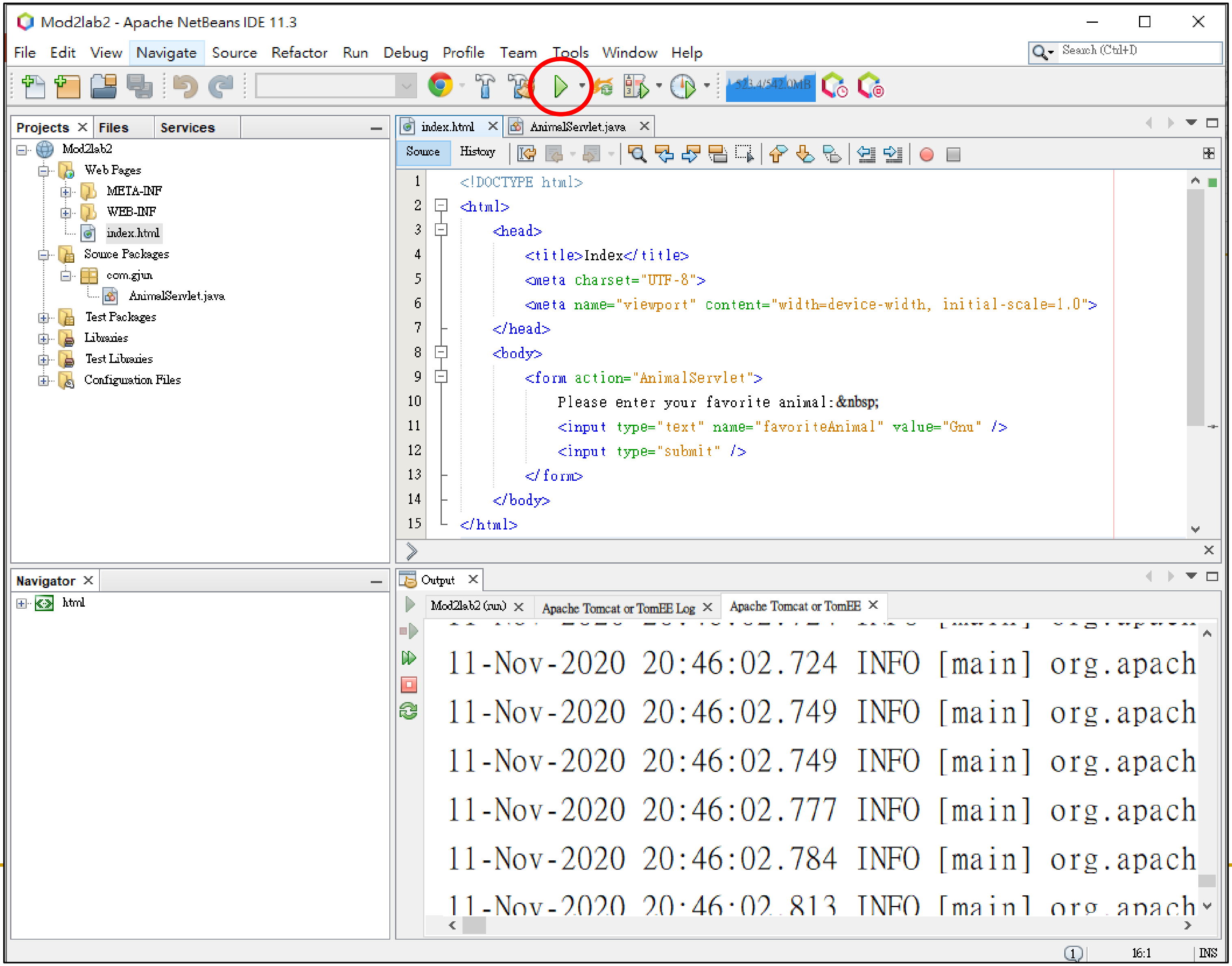
```
package com.gjun;

import ...7 lines

@WebServlet(name = "AnimalServlet", urlPatterns = {"/AnimalServlet"})
public class AnimalServlet extends HttpServlet {

    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        request.setCharacterEncoding("UTF-8");
        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {
            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Animal Lover's Page</title>");
            out.println("</head>");
            out.println("<body>");
            out.println("<h1>Hello Animal Lover</h1>");
            out.print("<p>Your favorite animal is a ");
            out.println(request.getParameter("favoriteAnimal"));
            out.println("Wow, mine is too!<p>");
            out.println("</body>");
            out.println("</html>");
        }
    }

    HttpServlet methods. Click on the + sign on the left to edit the code.

}
```

com.gjun.AnimalServlet



```java
package com.gjun;

import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

@WebServlet(name = "AnimalServlet", urlPatterns = {"/AnimalServlet"})
public class AnimalServlet extends HttpServlet {

    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        request.setCharacterEncoding("UTF-8");
        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {
            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Animal Lover's Page</title>");
            out.println("</head>");
            out.println("<body>");
            out.println("<h1>Hello Animal Lover</h1>");
            out.print("<p>Your favorite animal is a ");
            out.println(request.getParameter("favoriteAnimal"));
            out.println("Wow, mine is too!<p>");
            out.println("</body>");
            out.println("</html>");
        }
    }

    HttpServlet methods. Click on the + sign on the left to edit the code.

}
```

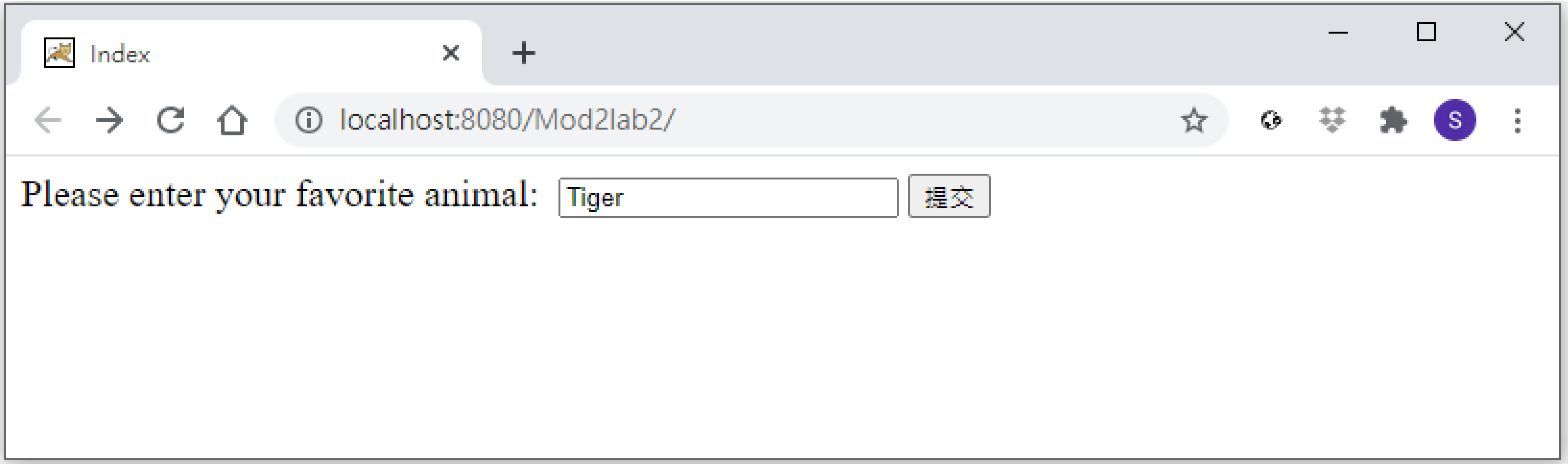
執行專案



```
<!DOCTYPE html>
<html>
    <head>
        <title>Index</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <form action="AnimalServlet">
            Please enter your favorite animal:&nbsp;
            <input type="text" name="favoriteAnimal" value="Gnu" />
            <input type="submit" />
        </form>
    </body>
</html>
```

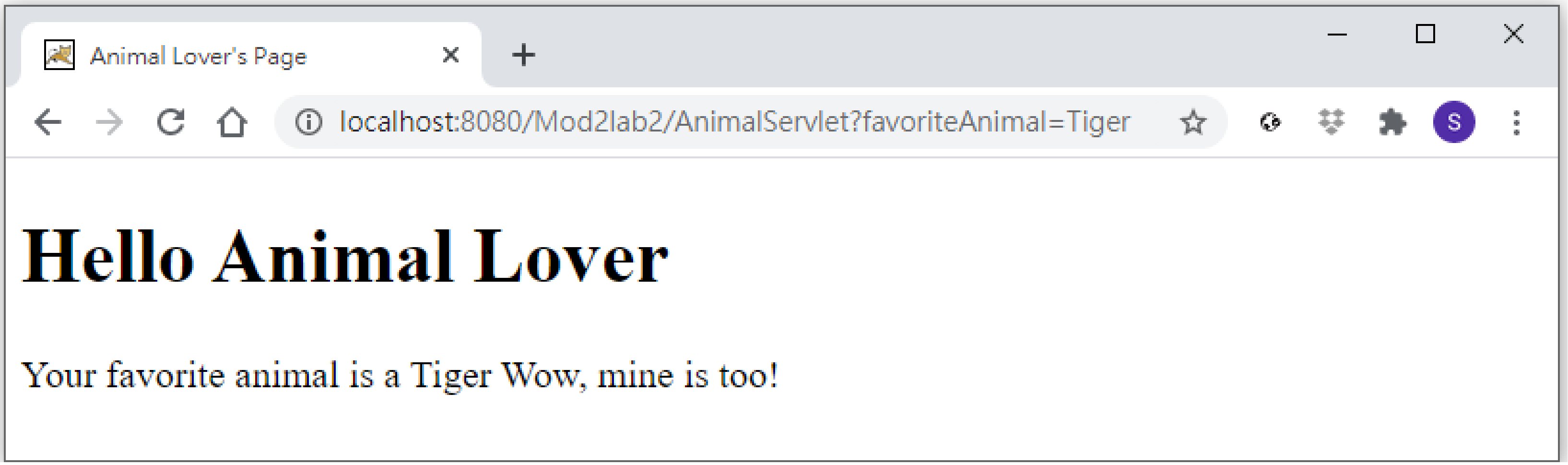
```
11-Nov-2020 20:46:02.724 INFO [main] org.apach
11-Nov-2020 20:46:02.749 INFO [main] org.apach
11-Nov-2020 20:46:02.749 INFO [main] org.apach
11-Nov-2020 20:46:02.777 INFO [main] org.apach
11-Nov-2020 20:46:02.784 INFO [main] org.apach
11-Nov-2020 20:46:02.813 INFO [main] org.apach
```

送出表單並檢視執行結果



localhost:8080/Mod2lab2/

Please enter your favorite animal: Tiger 提交



localhost:8080/Mod2lab2/AnimalServlet?favoriteAnimal=Tiger

Hello Animal Lover

Your favorite animal is a Tiger Wow, mine is too!

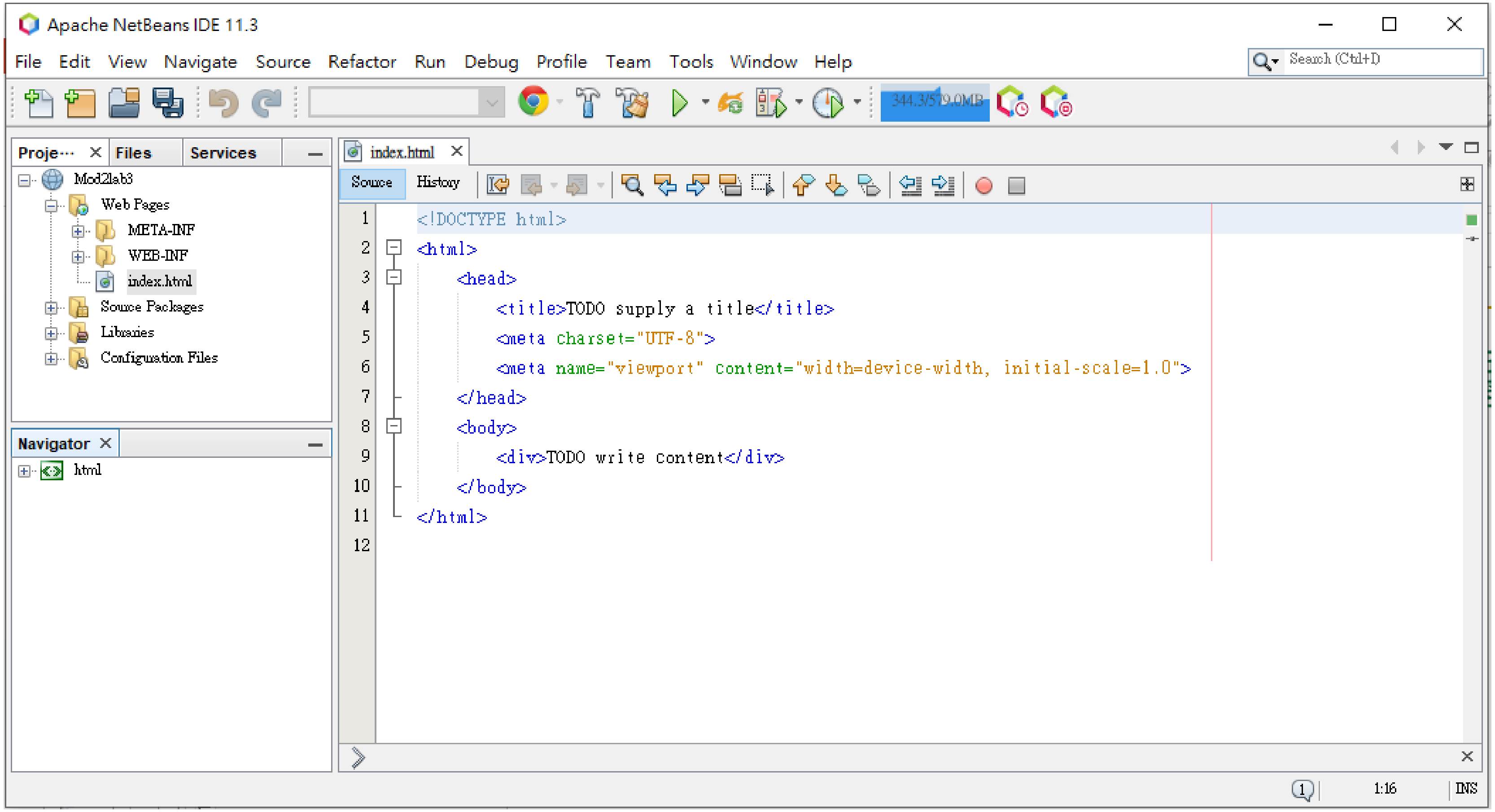
Lab 3

- 使用NetBeans IDE，建立Mod2lab3 網路應用專案
- 編輯index.html
  - 提供一個連結,連結至ListHeaders
- 建立 com.gjun.HeaderServlet.java
  - Servlet URL 為 ListHeaders
  - 取得所有 headers 鍵值對，以下列格式顯示於網頁

```
<UL>
    <LI>key = value</LI>
    ....
    ....
</UL>
```

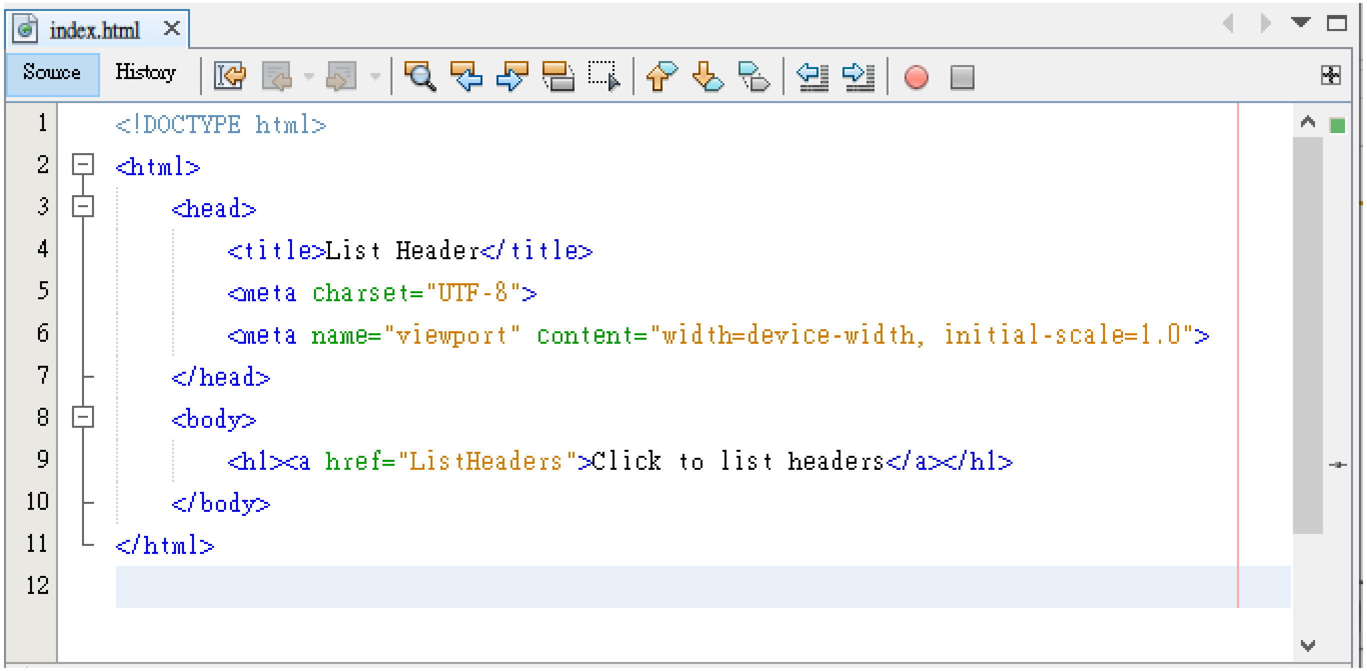
- 測試、執行

建立Mod2lab3專案



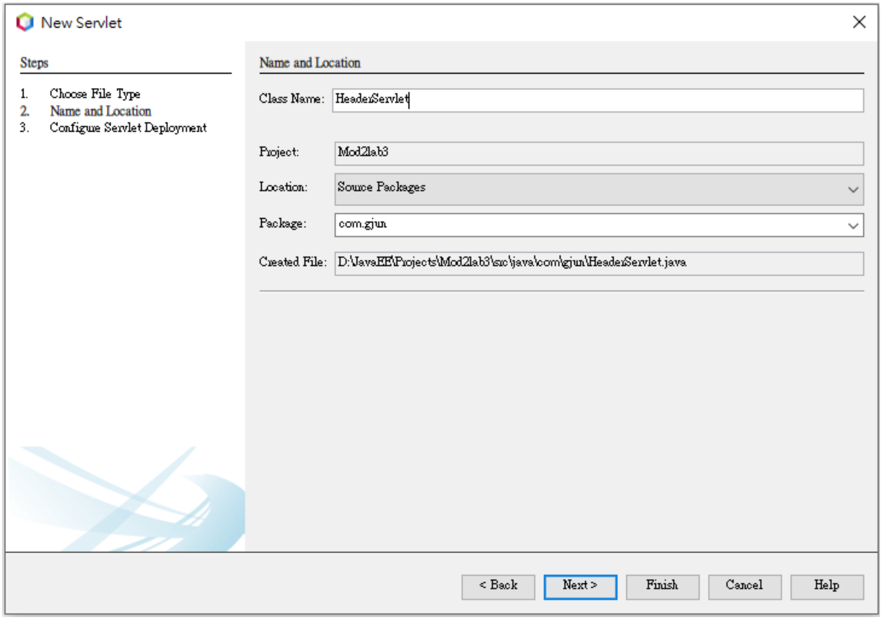
```html
<!DOCTYPE html>
<html>
    <head>
        <title>TODO supply a title</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <div>TODO write content</div>
    </body>
</html>
```

修改 index.html



```
<!DOCTYPE html>
<html>
    <head>
        <title>List Header</title>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1.0">
    </head>
    <body>
        <h1><a href="ListHeaders">Click to list headers</a></h1>
    </body>
</html>
```

建立 com.gjun.HeaderServlet.java



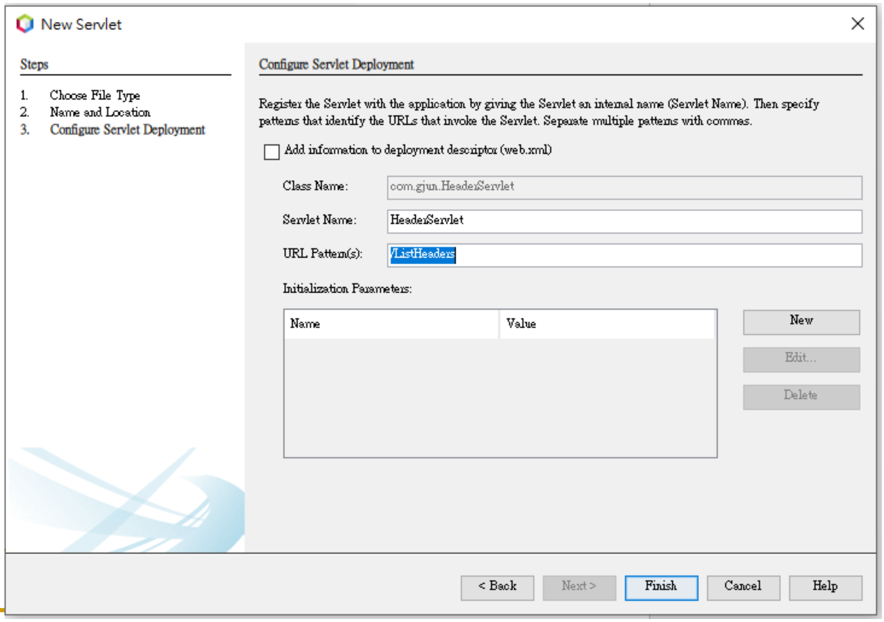
Class Name: HeaderServlet

Project: Mod2lab3

Location: Source Packages

Package: com.gjun

Created File: D:\JavaEE\Projects\Mod2lab3\src\java\com\gjun\HeaderServlet.java



Register the Servlet with the application by giving the Servlet an internal name (Servlet Name). Then specify patterns that identify the URLs that invoke the Servlet. Separate multiple patterns with commas.

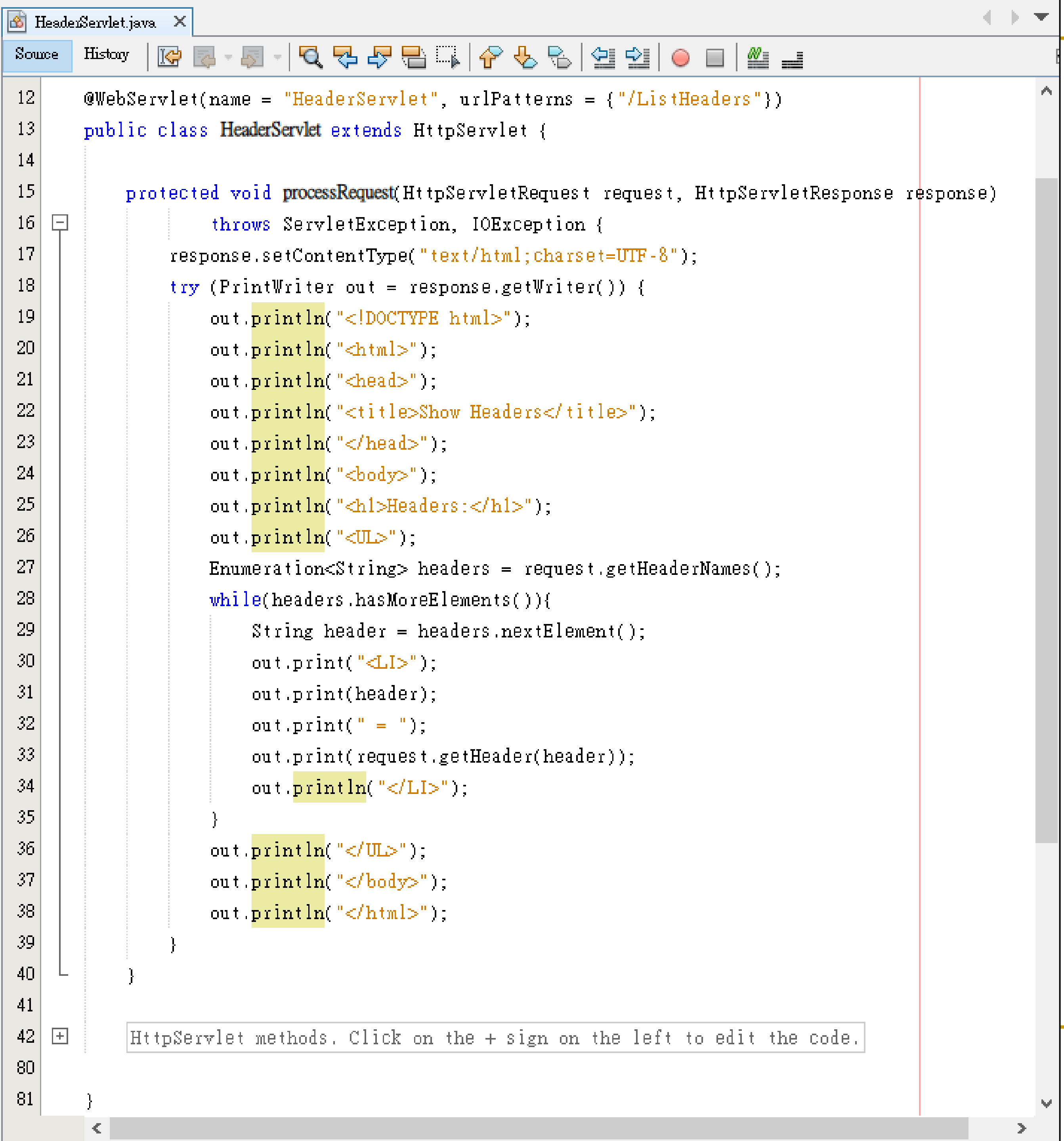
☐ Add information to deployment descriptor (web.xml)

Class Name: com.gjun.HeaderServlet

Servlet Name: HeaderServlet

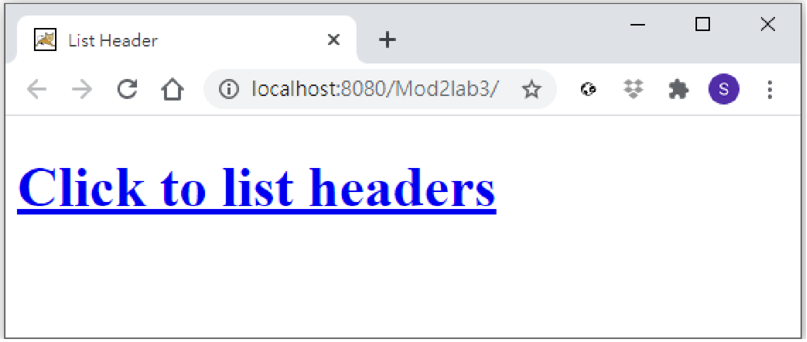
URL Pattern(s): /ListHeaders

Initialization Parameters:

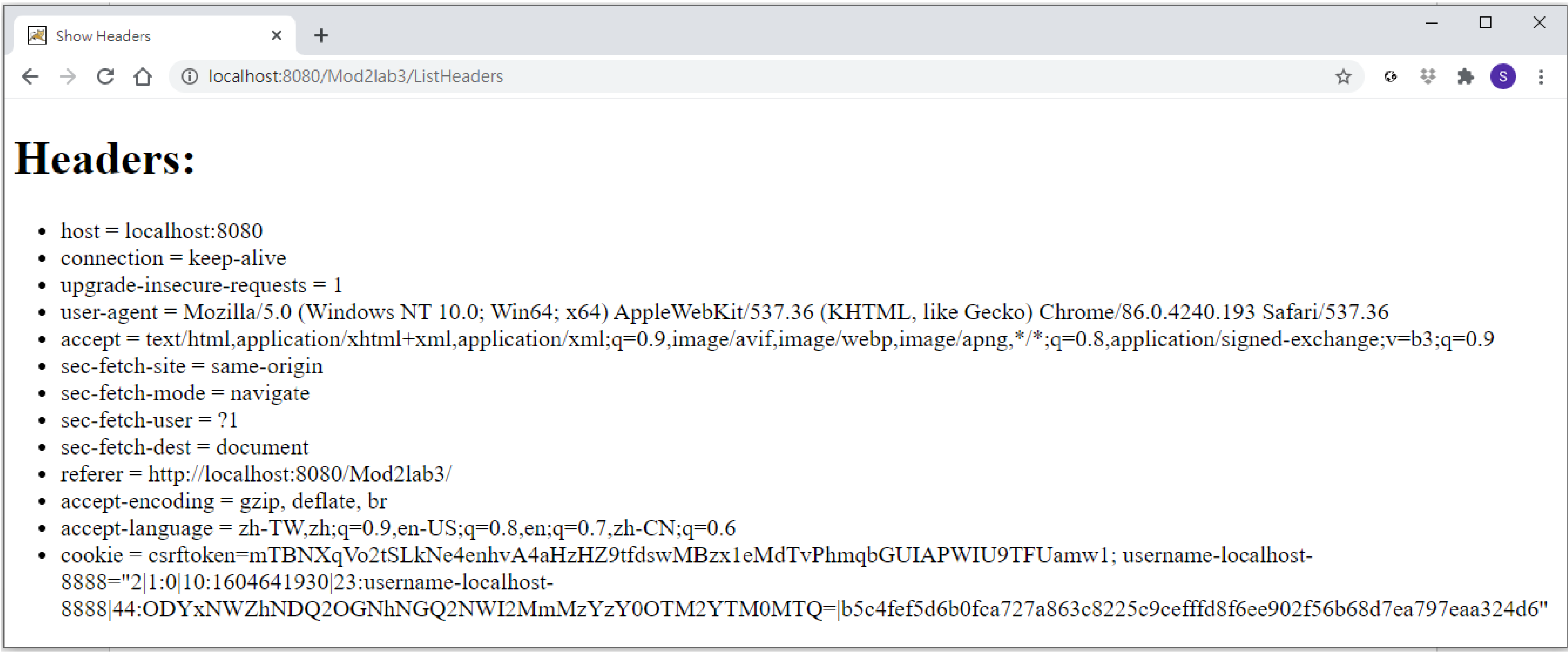


```java
@WebServlet(name = "HeaderServlet", urlPatterns = {"/ListHeaders"})
public class HeaderServlet extends HttpServlet {

    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {
            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Show Headers</title>");
            out.println("</head>");
            out.println("<body>");
            out.println("<h1>Headers:</h1>");
            out.println("<UL>");
            Enumeration<String> headers = request.getHeaderNames();
            while(headers.hasMoreElements()){
                String header = headers.nextElement();
                out.print("<LI>");
                out.print(header);
                out.print(" = ");
                out.print(request.getHeader(header));
                out.println("</LI>");
            }
            out.println("</UL>");
            out.println("</body>");
            out.println("</html>");
        }
    }

    HttpServlet methods. Click on the + sign on the left to edit the code.

}
```

測試、執行



Click to list headers



Headers:

- host = localhost:8080
- connection = keep-alive
- upgrade-insecure-requests = 1
- user-agent = Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/86.0.4240.193 Safari/537.36
- accept = text/html,application/xhtml+xml,application/xml;q=0.9,image/avif,image/webp,image/apng,*/*;q=0.8,application/signed-exchange;v=b3;q=0.9
- sec-fetch-site = same-origin
- sec-fetch-mode = navigate
- sec-fetch-user = ?1
- sec-fetch-dest = document
- referer = http://localhost:8080/Mod2lab3/
- accept-encoding = gzip, deflate, br
- accept-language = zh-TW,zh;q=0.9,en-US;q=0.8,en;q=0.7,zh-CN;q=0.6
- cookie = csrftoken=mTBNXqVo2tSLkNe4enhvA4aHzHZ9tfdswMBzx1eMdTvPhmqbGUIAPWIU9TFUamw1; username-localhost-8888="2|1:0|10:1604641930|23:username-localhost-8888|44:ODYxNWZhNDQ2OGNhNGQ2NWI2MmMzYzY0OTM2YTM0MTQ=|b5c4fef5d6b0fca727a863c8225c9cefffd8f6ee902f56b68d7ea797eaa324d6"