ĐẠI HỌC TÔN ĐỨC THẮNG
TON DUC THANG UNIVERSITY

503073

WEB PROGRAMMING & APPLICATIONS

CHAPTER 1: INTRODUCTION

Instructor: Mai Van Manh

OUTLINE

1. Client – Server Model
2. Domain & URL
3. Static web vs Dynamic web
4. HTTP Protocol
    1. HTTP Basics
    2. HTTP Messages
    3. HTTP Request
    4. HTTP Response
    5. HTTP Method
    6. HTTP Status codes
    7. HTTP Headers

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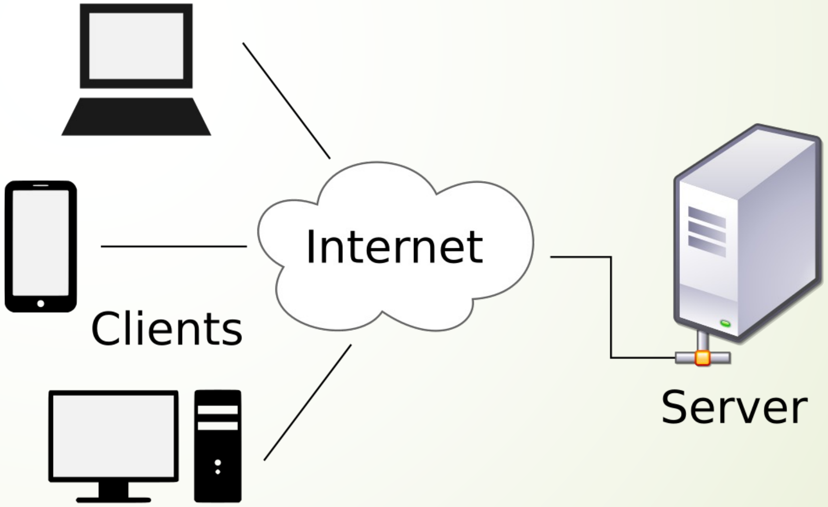
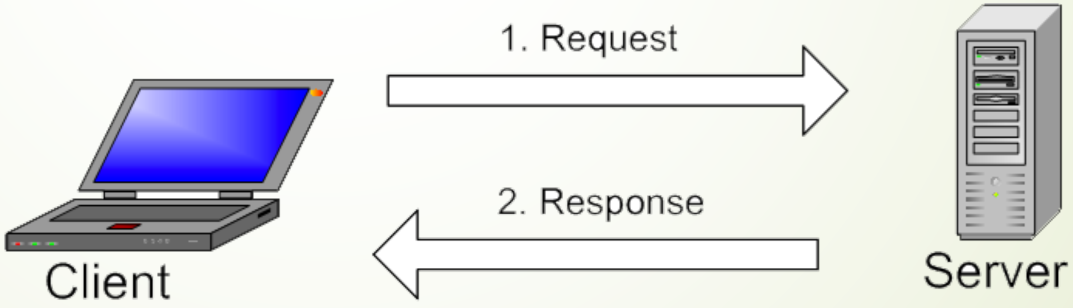
CLIENT – SERVER MODEL

- The relationship between two computer programs that communicates with each other.
- This client-server model often happened over a network of computers.



CLIENT – SERVER MODEL

- The clients initiate the communication by sending service requests to the servers.
- Servers are usually devices with files and databases stored inside, including complex applications like web sites.
- The server will fulfil the request of the client by sharing resources with the clients.



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Domain

- Domain name is the address of your website that people type in the browser URL bar to visit your website.
- In simple terms, if your website is a house, then your domain name will be its address.

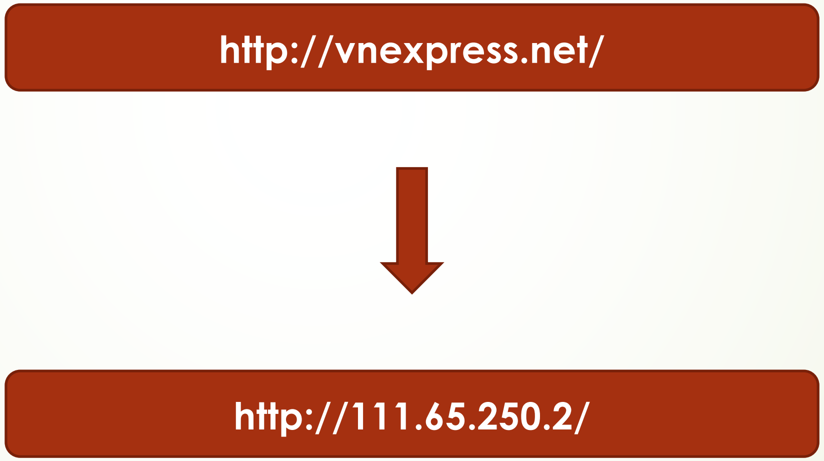
https://tdtu.edu.vn/gioi-thieu

https://it.tdtu.edu.vn/gioi-thieu

https://vnexpress.net/lien-he-toa-soan

Domain

- Without a domain name, anyone who wanted to visit your website would have to enter the full IP address.



http://vnexpress.net/

http://111.65.250.2/

URL

- Every document on the Web has a unique address. This address is known as Uniform Resource Locator.
- There are three key parts in a URL: the scheme, the host address, and the file path.

https://tdtu.edu.vn/gioi-thieu

- Scheme: https://
- Host Address: tdtu.edu.vn
- Path: /gioi-thieu

Schema

- The scheme identifies the protocol to be used to access the resource on the Internet.
- The scheme names followed by the three characters ://
- The most commonly used protocols are:
  - http://
  - https://
  - ftp://
  - file://
  - mailto://

Host Address

- The host address is where a website can be found, either the IP address (e.g. http://68.178.157.132/) or more commonly the domain name (http://www.tutorialspoint.com).
- Note that "www" is not actually part of the domain name although it is often used in the host address.

Path

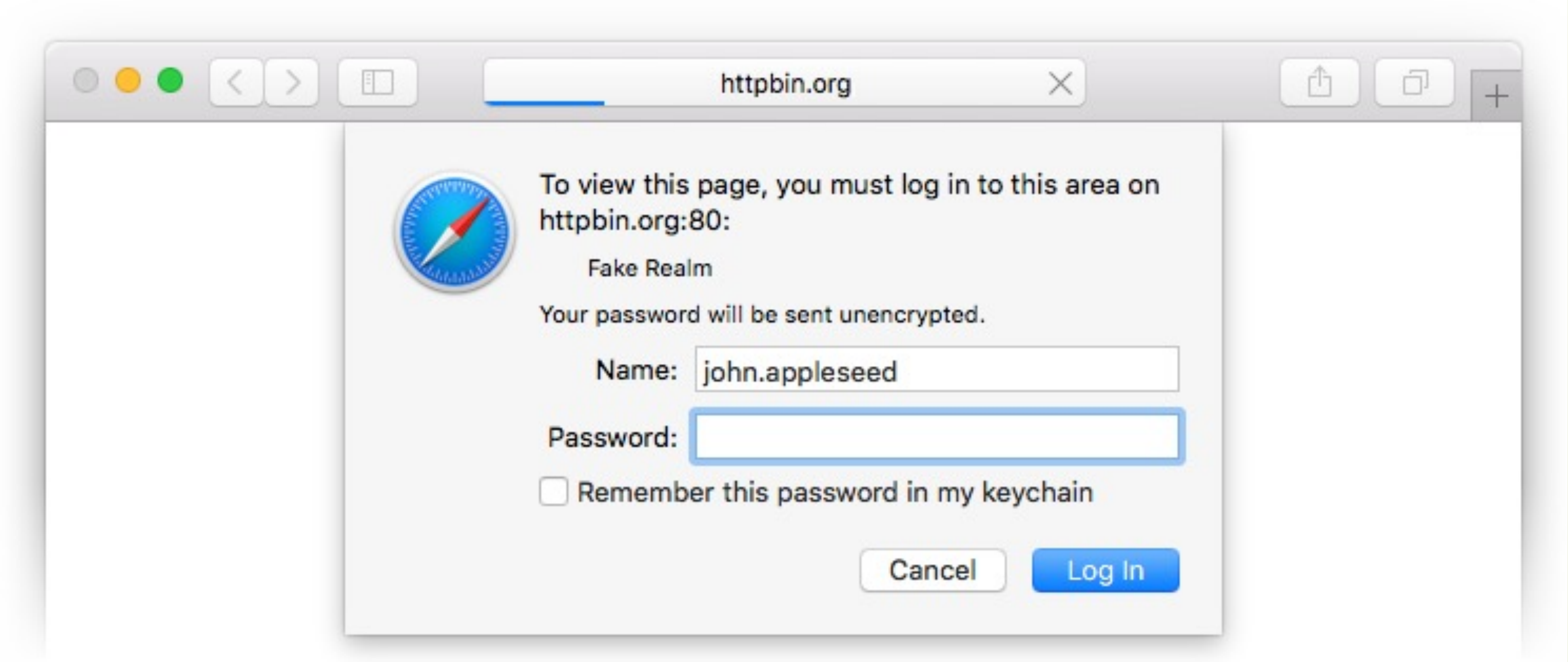
- The file path identifies the specific resource within the host that the user wants to access.
- The file path always begins with a forward slash character, and may consist of one or more directory or folder names.
- Each directory name is separated by forward slash characters and the filepath may end with a filename at the end.

https://www.tutorialrepublic.com/html-tutorial/html-url.php

https://tdtu.edu.vn/gioi-thieu/lich-su-hinh-thanh-va-muc-tieu

Other Parts of the URL

- Credentials: a way of specifying a username and password for a password-protected part of a site.



To view this page, you must log in to this area on httpbin.org:80:

Fake Realm

Your password will be sent unencrypted.

Name: john.appleseed

Password:

□ Remember this password in my keychain

Other Parts of the URL

- Port number: Ports are identified with positive 16-bit unsigned integers, ranging from 0 to 65535. To put it simply, a port number is the means through which a specific message is identified when it's forwarded to a server.

https://tdtu.edu.vn:443/gioi-thieu

http://tracuunnt.gdt.gov.vn:80/tcnnt/mstdn.jsp

Other Parts of the URL

- Query String: The data to be passed to server-side scripts, running on the web server. For example, parameters for a search.

https://www.computer.vn/laptop-dell?**p=25trieu-30trieu**&**cpu-laptop=intel-core-i5-1-1-1-1**&**o-cung-laptop=chi-co-ssd**

Variable	Value
p	25trieu-30trieu
cpu-laptop	intel-core-i5-1-1-1-1
o-cung-laptop	chi-co-ssd

Other Parts of the URL

- Fragment identifier: Specifies a location within the page.
- The fragment identifier introduced by a hash character (#) is the optional last part of a URL for a document.

https://developer.android.com/hardware/camera#section8

URL

- Scheme and host components of a URL are not case-sensitive, but path and query string are case-sensitive.
- Absolute URL:
  - An absolute URL is the complete address of a resource
  - Ex: http://www.tutorialspoint.com/html/html_text_links.htm
- Relative URL:
  - A relative URL indicates where the resource is in relation to the current page.
  - Ex: html_lists.htm corresponding to https://www.tutorialspoint.com/html/html_lists.htm in this case.

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Static Web & Dynamic Web

- Basic:
  - Static web pages will remain same for the time until and unless someone changes it manually.
  - Dynamic web pages have the ability to change content automatically from time to time or based on visitors.

Static Web & Dynamic Web

- Information change:
  - Static web pages rarely change information.
  - Dynamic web pages frequently change information based on many different factors.

Static Web & Dynamic Web

- Complexity:
  - Static Web Pages are simple in terms of complexity.
  - Dynamic web pages are complicated.

Static Web & Dynamic Web

- Database requirement:
  - In Static Web Pages, database is not used.
  - In dynamic web pages, database is used.

Static Web & Dynamic Web

- Programming languages:
  - Static web pages are written in languages such as: HTML, JavaScript, CSS, etc.
  - Dynamic web pages are written in languages such as: PHP, Java, ASP, ASP.NET, etc.

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HTTP Protocol - Overview

- A protocol is a set of rules and guidelines for communicating data between two devices.
- These rules include what type of data may be transmitted, what commands are used to send and receive data, and how data transfers are confirmed.
- A protocol defines:
  - Message format
  - Order of messages sent and received.
  - Actions take on message transmission and receipt

HTTP Protocol - Overview

- HTTP stands for **H**yper**T**ext **T**ransfer **P**rotocol.
- It's a stateless, application-layer protocol for communicating between distributed systems, and is the foundation of the modern web.
- The default port for TCP/IP is 80, but other ports can also be used.
- HTTP is a TCP/IP based communication protocol, that is used to deliver data (HTML files, image files, query results, etc.) on the World Wide Web.

HTTP Message

- HTTP is based on the client-server architecture model and a stateless request/response protocol that operates by exchanging messages across a reliable TCP/IP connection.
- An HTTP client is a program like a web browser that establishes a connection to a server for the purpose of sending one or more HTTP request messages
- An HTTP server is a program that accepts connections in order to serve HTTP requests by sending HTTP response messages.

HTTP Message

- A generic message format consists of the following four items.
  1. Initial line
  2. List of headers
  3. An empty line
  4. Message body

HTTP Message

- Examples of Request Message

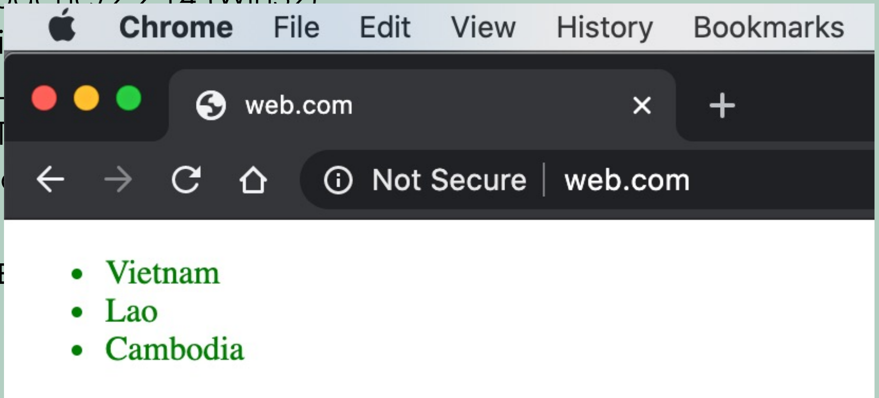
```
GET / HTTP/1.1
User-Agent: Mozilla/4.0 (compatible; MSIE5.01; Windows NT)
Host: web.com
Accept-Language: en-us
Accept-Encoding: gzip, deflate
Connection: Keep-Alive
```

HTTP Message

- Examples of Response Message

```
HTTP/1.1 200 OK
Date: Mon, 27 Jul 2009 12:28:53 GMT
Server: Apache/2.2.14 (Win32)
Last-Modi
Content-L
Content-T
Connecti

<!DOCTYPE
<html>
<body>
<ul style="color:green"><li>Vietnam</li><li>Lao</li><li>Cambodia</li></ul>
</body>
</html>
```



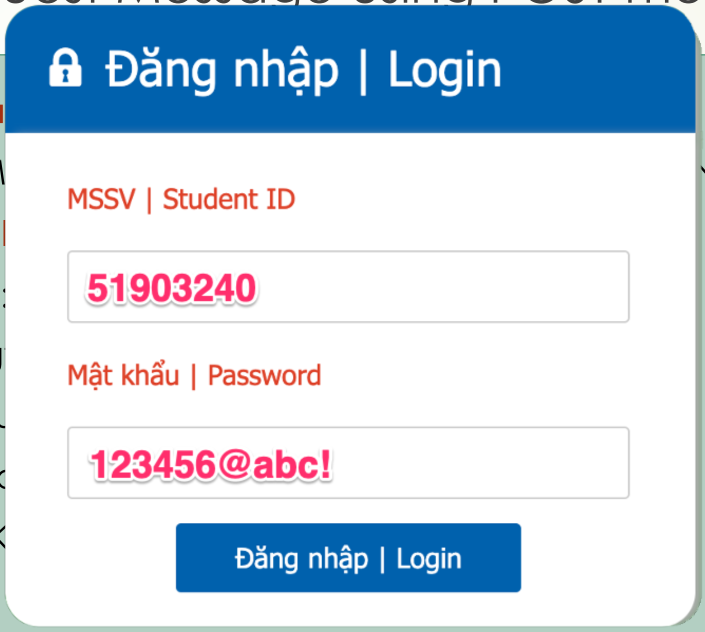
- Vietnam
- Lao
- Cambodia

HTTP Message

- Examples of Request Message using POST method

```
POST /taikhoa
User-Agent: M                                         NT)
Host: stdportal
Content-Type:
Content-Leng
Accept-Langu
Accept-Encod
Connection: K

MSSV=51903240&Password=123456%40abc%21
```



🔒 Đăng nhập | Login

MSSV | Student ID

51903240

Mật khẩu | Password

123456@abc!

HTTP Request

- An HTTP client sends an HTTP request to a server in the form of a request message which includes following format:
  1. A Request-line
  2. Zero or more header
  3. An empty line
  4. Optionally a message-body

HTTP Response

- After receiving and interpreting a request message, a server responds with an HTTP response message:
  1. A Status-line
  2. Zero or more header
  3. An empty line
  4. Optionally a message-body

HTTP Method

- HTTP defines a set of request methods to indicate the desired action to be performed for a given resource.
- These as HTTP verbs
- These DELTE, PATC

```
POST /taikhoan/dangnhap HTTP/1.1
User-Agent: Mozilla/4.0 (compatible; MSIE5.01; Windows NT)
Host: stdportal.tdtu.edu.vn
Content-Type: application/x-www-form-urlencoded
Content-Length: length
Accept-Language: en-us
Accept-Encoding: gzip, deflate
Connection: Keep-Alive

MSSV=51903240&Password=123456%40abc%21
```

HTTP Method

- GET is the most common method. It usually is used to ask a server to send a resource. Requests using GET should only retrieve data.
- POST method was designed to send input data to the server. In practice, it is often used to support HTML forms.
- PUT method replaces all current representations of the target resource with the request payload.
- DELETE method deletes the specified resource.

HTTP Method Example

- http://web.com/resources/
- http://web.com/resources/id
- http://web.com/resources/id?*filter*=*criterial*

Method	URL	Explanation
GET	http://web.com/students	Get a list of all student
GET	http://web.com/students/125	Get detail information of student whose id is 125
POST	http://web.com/students	Asked server to create a new student with the provided data.
PUT	http://web.com/students/125	Update information of student whose id is 125
DELETE	http://web.com/students/125	Remove a student whose id is 125

HTTP Status Code

- The Status Code is a 3-digit integer.
- The first digit of the Status-Code defines the class of response.
- the last two digits represent a specific result.
- There are 5 values for the first digit:
  - 1xx: Informational Messages
  - 2xx: Success
  - 3xx: Redirection Messages
  - 4xx: Client Error
  - 5xx: Server Error

HTTP Status Code – 1xx

- 100 Continue: Only a part of the request has been received by the server, but as long as it has not been rejected, the client should continue with the request.
- 101 Switching Protocols: The server switches protocol.
- 102 Processing: This status code is an interim response used to inform the client that the server has received and is still processing the request, but there is no final response available yet.

HTTP Status Code – 2xx

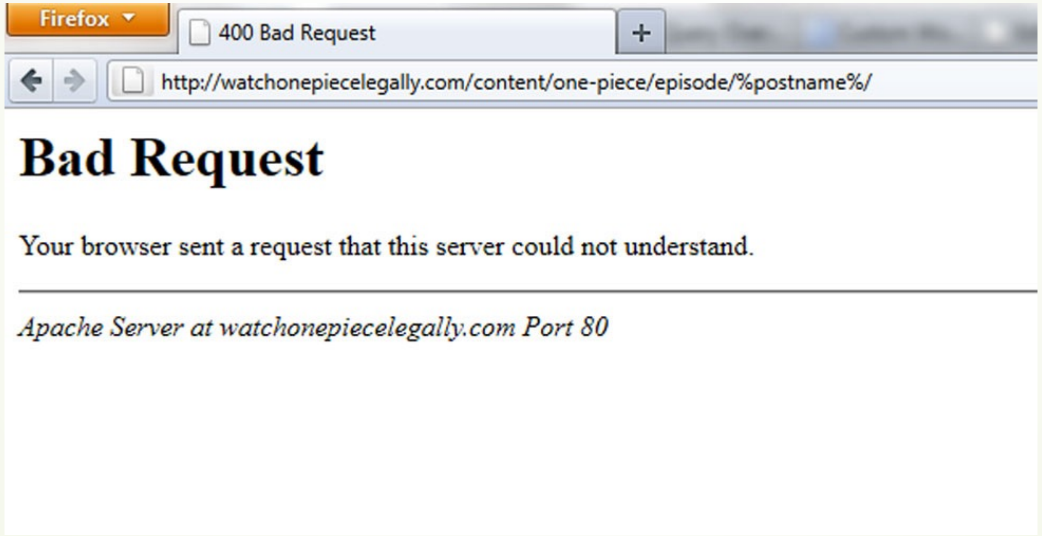
- 200 OK: The request is OK
- 201 Created: The request is complete, and a new resource is created.
- 202 Accepted: The request is accepted for processing, but the processing is not complete.
- 204 No Content: A status code and a header are given in the response, but there is no entity-body in the reply.

HTTP Status Code – 3xx

- 300 Multiple Choices: A link list. The user can select a link and go to that location. Maximum five addresses.
- 301 Moved Permanently: The requested page has moved to a new url. New url will also be given.
- 302 Found: The requested page has moved temporarily to a new url.

HTTP Status Code – 4xx

- 400 Bad Request: The server did not understand the request.



http://watchonepiecelegally.com/content/one-piece/episode/%postname%/

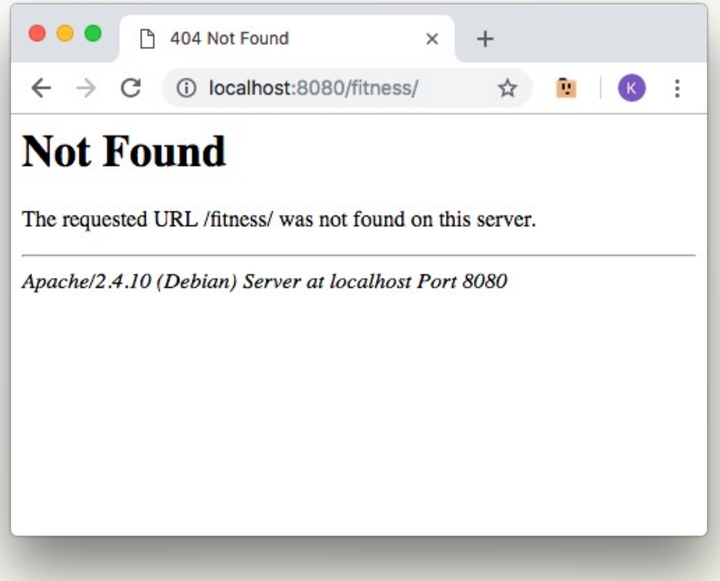
Bad Request

Your browser sent a request that this server could not understand.

Apache Server at watchonepiecelegally.com Port 80

HTTP Status Code – 4xx

- 404 Not Found: The server can not find the requested page.



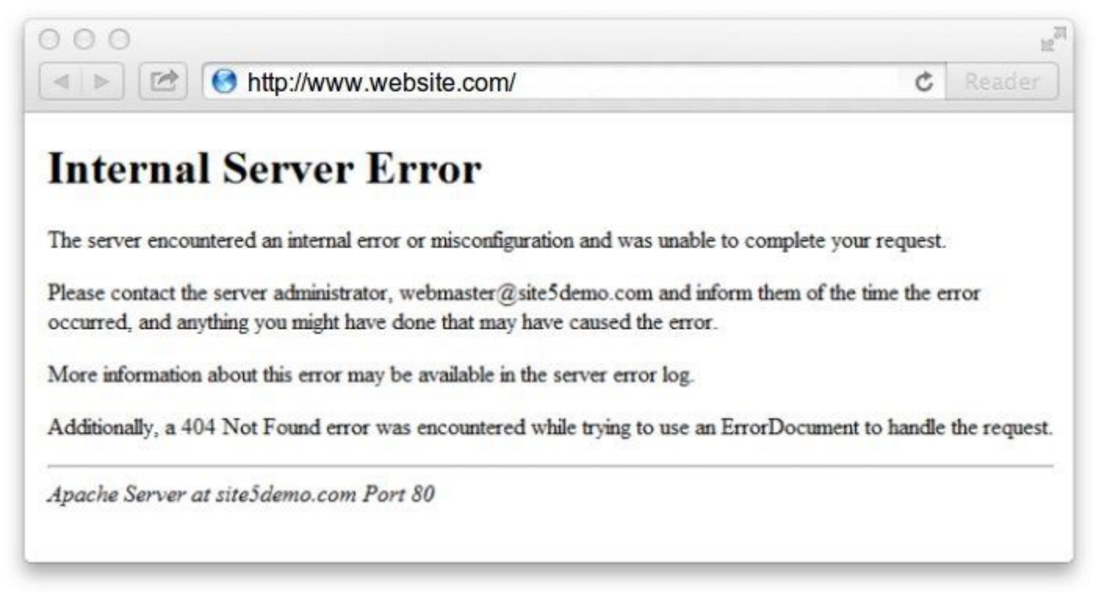
Not Found

The requested URL /fitness/ was not found on this server.

Apache/2.4.10 (Debian) Server at localhost Port 8080

HTTP Status Code – 5xx

- 500 Internal Server Error: The request was not completed. The server met an unexpected condition.



Internal Server Error

The server encountered an internal error or misconfiguration and was unable to complete your request.

Please contact the server administrator, webmaster@site5demo.com and inform them of the time the error occurred, and anything you might have done that may have caused the error.

More information about this error may be available in the server error log.

Additionally, a 404 Not Found error was encountered while trying to use an ErrorDocument to handle the request.

Apache Server at site5demo.com Port 80

HTTP Headers

- HTTP header fields provide required information about the request or response, or about the object sent in the message body.
- There are four types of HTTP message headers:
  1. Client Request-header
  2. Server Response-header
  3. General-header
  4. Entity-header

Common HTTP Headers

- Host: www.w3.org
- Connection: keep-alive
- Referer: https://stdportal.tdtu.edu.vn/taikhoan/dangnhap
- Set-Cookie: theme=dark-mode,reading-mode=true; Expires=Wed, 09 Jun 2021 10:18:14 GMT
- Content-Encoding: gzip
- Allow: GET, HEAD, PUT
- Content-Type: text/html; charset=ISO-8859-4