

# **Web Programming III (420-C30-HR)**

## **Lab 2 – Web Servers**

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Date assigned: Wednesday, Sept. 2, 2015

Date due: **Wednesday, Sept 2, 2015, 6:00 p.m.**

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### **Learning Objectives**

Upon successful completion of this lab exercise, the student will have:

- ☐ Understand Web servers
- ☐ Understand HTTP Protocol
- ☐ Understand URLs

### **To do:**

1. For Part B and C you **MUST** complete this lab while sitting at a computer in Room B-221 or B-219. You cannot complete it from a laptop or from a computer in another room.
2. Save this file in your labs folder as yourfirstinitialyourlastname\_C30L02\_WebServers.docx (e.g. jsmith\_C30L02\_WebServers.docx)
3. You will be using the Windows 7 snipping tool extensively in this lab. If you are not familiar with it, play with it first to get the hang of it. When you are capturing the images for the lab, capture the minimum required to prove that you completed the step. Do not capture the entire screen or massive areas of the screen. I am looking for proof that you did what was required and not that you can do a print screen. Keep the files as small as possible. To access the Windows snipping tool, select Windows » All Programs » Accessories » Snipping Tool.

### **To do:**

Today you are going to explore a couple of popular web servers. You are going to look at Internet Information Services (IIS) which is Microsoft's web server and you will be starting and setting up the node.js web server to return from requests.

### **Part A – Moodle Quiz**

1. Complete the Lab 2 Quiz in Moodle.

### **Part B – Web servers – IIS**

IIS is the Web server which was developed by Microsoft. It is used extensively in the industry, and is required at any business using .NET. The .NET framework and “pools” are closely integrated with IIS. Today we will look at the IIS portion and not the ASP.NET portion.

## Starting/Stopping IIS

1. Start Internet Explorer, Firefox or Chrome. Enter the word localhost in the address bar. Make sure you just enter localhost and NOTHING ELSE. What is the name of the page (title) that is displayed? What is the URL of the page displayed? Use the snipping tool to capture the screen from any browser showing what was displayed and paste the result here.



2. Start Internet Information Services (IIS) Manager from the start menu (Press start and type IIS) and expand the arrows on the **machine name** and the **sites** until the **Default Web Site** is displayed.

3. Right click on the **Default Web Site** icon and choose **Manage Web Site** and **Stop** the web server. Restart Internet Explorer and enter localhost as the URL. What is displayed? (Note, the display should be different; however, you may have to empty your cache to see this. To empty your cache, select the **gear icon** on the right of the screen, **Internet Options**, **Delete...** to delete your cache). Use the snipping tool to capture the screen showing what was displayed and paste the result here.



4. Start Firefox and enter localhost as the URL. What does Firefox display? (Once again, the display should be different than the first time. You may have to empty your cache by selecting the drop down from the Firefox menu (top left), Options, Privacy, Clear Recent History (unless do not Never Remember History is already selected)). Use the snipping tool to capture the screen showing what was displayed and paste the result here.

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## News & Announcements

Consult the [Latest News](#) section for all the news and *communiqués*.

### Meet the Olympian at Heritage!

Former coach of Heritage Women's Rugby team, Natasha Watcham-Roy helped Canada win gold at the 2015 Pan Am Games in Toronto and recently won bronze at the 2016 Olympics in Rio. Come and meet her at the Heritage rugby field on Thursday, September 1 at 5:30pm

### Continuing Education Information Session

For the following programs leading to an AEC (Attestation of College Education)

- Microsoft Network and Security Administrator (full day program)
- Bilingual Office Administration (full day program)
- Early Childhood Care and Education (full day program)
- Project Management Technician (part-time, evenings)
- Applied Business Development (part-time, evenings)

Date: August 31, 2016  
Time: 7:00 p.m. - 8:00 p.m.  
Location: Heritage College, Room C-200

### New Student Handbook:

Understand how cégep works and get off to a good start at Heritage.

The 2016-2017 Heritage Student Handbook is available online [here](#).

## Student Life

[Overview of student activities at Heritage](#)

### Fitness Centre

Please note that due to construction work, the fitness centre and the studio will be closed until September

### Drama Club

The Bacchus Players a student-centred, faculty-assisted drama club that is at the centre of cultural life at Heritage.

Visit our [Drama Club section](#).

### Athletics

Throughout the school year, tournaments, games and trips are organized in cooperation with Student Services and the Student Association.

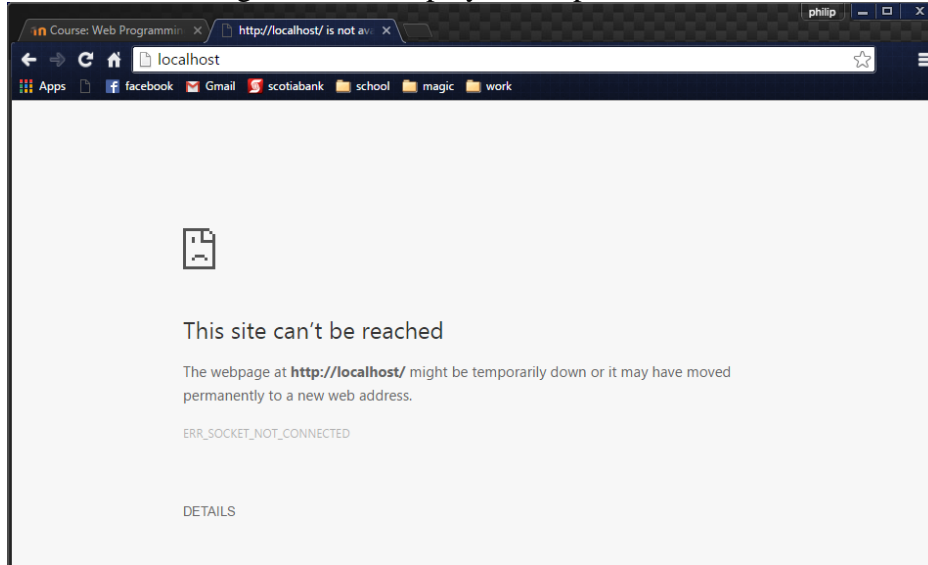
Visit our [Heritage Athletics section](#).

www.cegep-heritage.qc.ca/Programs/Program\_Career.htm

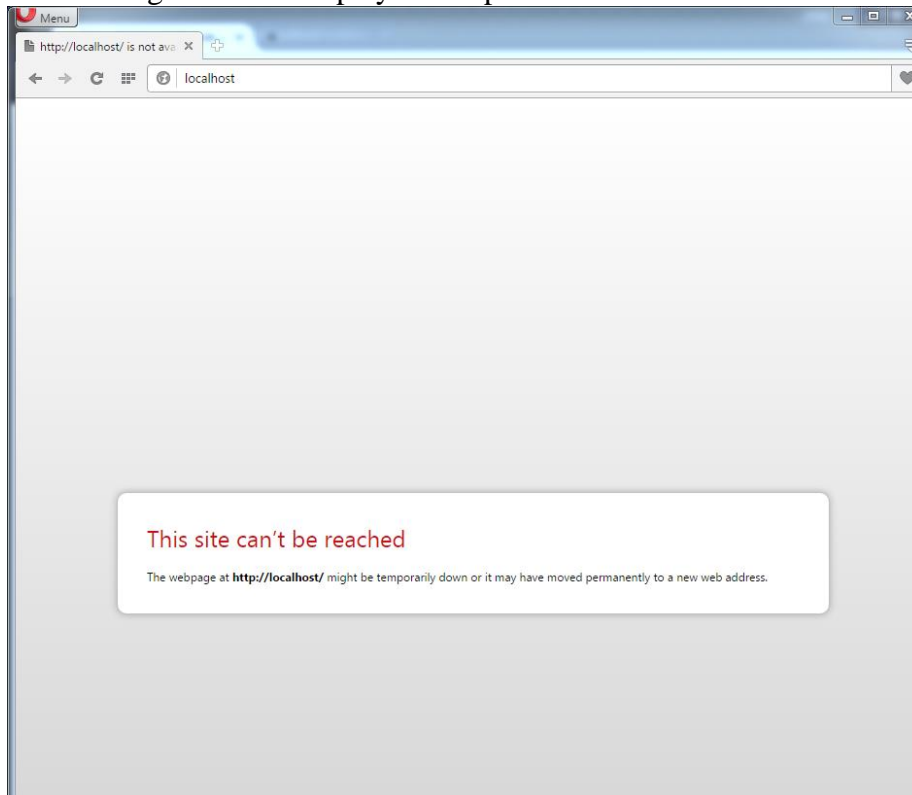
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5. Do the same in Chrome. What does Chrome display? Use the snipping tool to capture the screen showing what was displayed and paste the result here.



6. Do the same in Opera. What does Opera display? Use the snipping tool to capture the screen showing what was displayed and paste the result here.



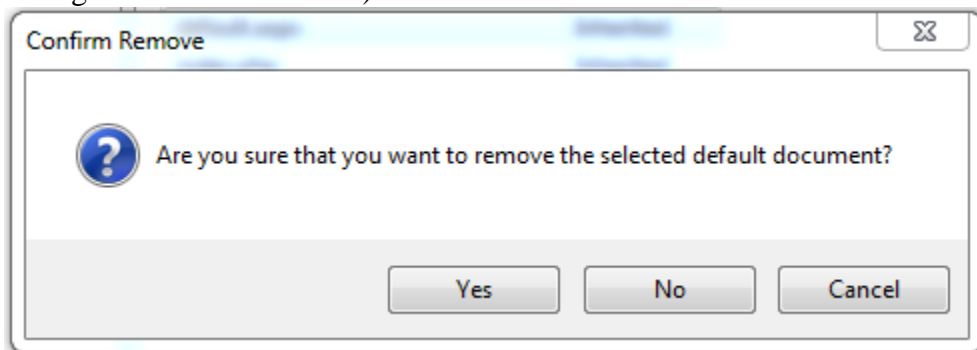
7. In your opinion, which browser handles it best and why?  
When doing it in chrome it brings me straight to the “site can’t be reached” page, in other browsers it just refreshes the page I was currently on. Chrome also specified the error.
8. Restart IIS by right clicking on the **Default Web Site** icon and choose **Manage Web Site** and **Start**. Double check that IIS has restarted by checking localhost in a browser.

### IIS Manager Groupings

9. Make sure that the Default Web Site is selected. How are the various items grouped? What are the three different major parts of this grouping?  
The items are grouped by ASP.NET, IIS and Management

### Default Documents

10. Double click on the **Default Document** icon. What is the default document for your webserver?  
Default.htm
11. Select the **iisstart.htm** option and select **Remove** from the **Actions** on the right. Use the snipping tool to capture the screen showing what was displayed in the IIS manager and paste the result here. Restart a browser and enter localhost for the URL. What is the resulting page? What is the error returned and what does it mean (don’t just quote the error, read it and figure out what it means)?



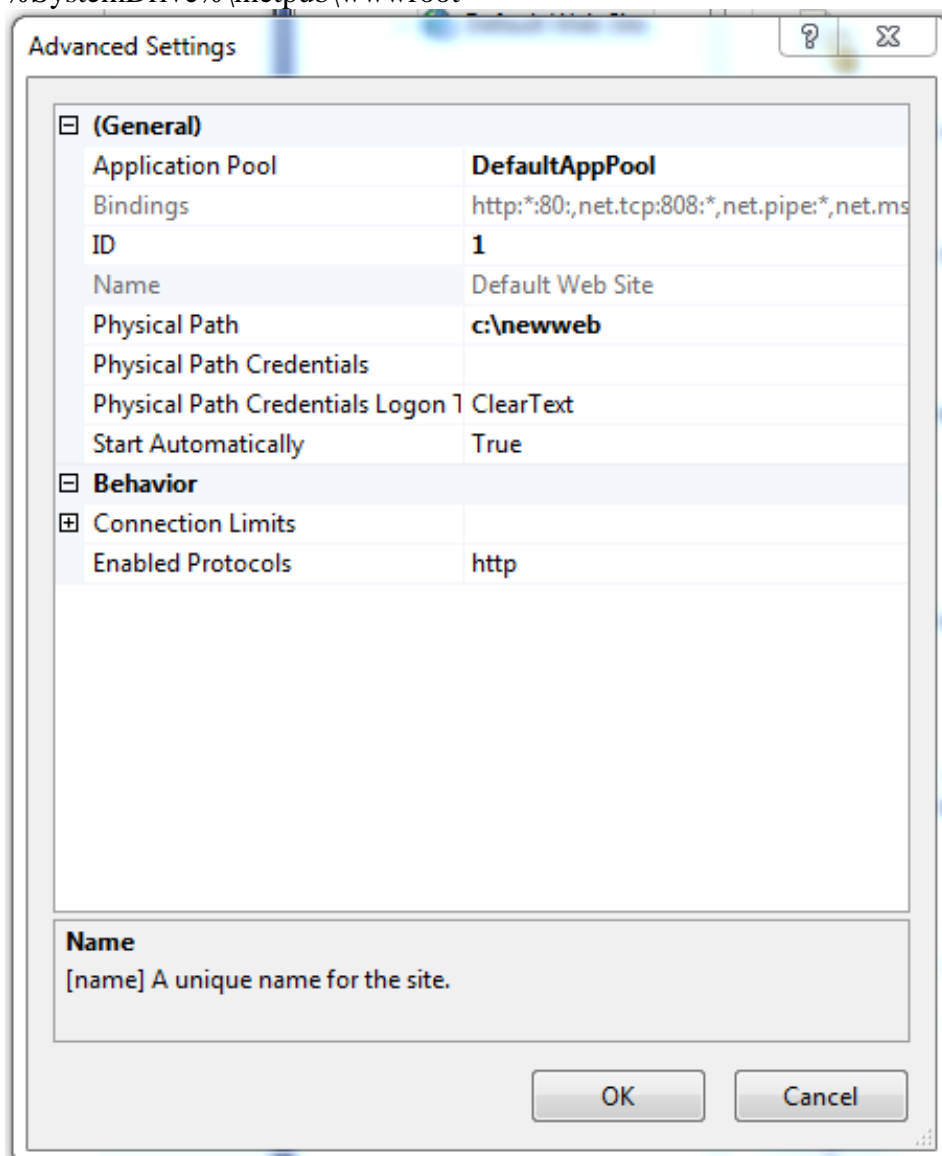
The resulting page is an error page, giving me the 403.14 Forbidden code. That means I guess that the only page it was allowed to show was the iisstart.htm page and I deleted it so there’s no other page that the user is allowed to.

12. Double click on the **Directory Browsing** icon. Enable browsing by clicking on the Enable link on the right hand side. Restart a browser and enter localhost for the URL. What does the resulting page show? Where is this page from?  
This page is the file directory in the web server I think.



13. Return to IIS Manager and Disable Directory Browsing and then go to the Default Document and add the file iisstart.htm to the list of Documents. Access localhost to make sure you got the same results as step 1 above.
14. Create a new folder at the root of the c: drive called newweb. Copy the files index.html and default.htm from file you downloaded at the start of the lab to this new folder. View both files in the browser to see what they look like and how they are different.
15. Go back to the IIS manager right click and select **Manage Web Site** of the **Default Web Site** and choose the Advanced Settings option. Select the current Physical Path and copy the current value to this document. Change the Physical Path to c:\newweb and select OK. Use the snipping tool to capture the screen showing the changed value for the physical path and paste the result here. Stop and Start the Default Web Site by Right clicking on the Default Web Site icon and selecting Manage Web Site, Restart.

%SystemDrive%\inetpub\wwwroot



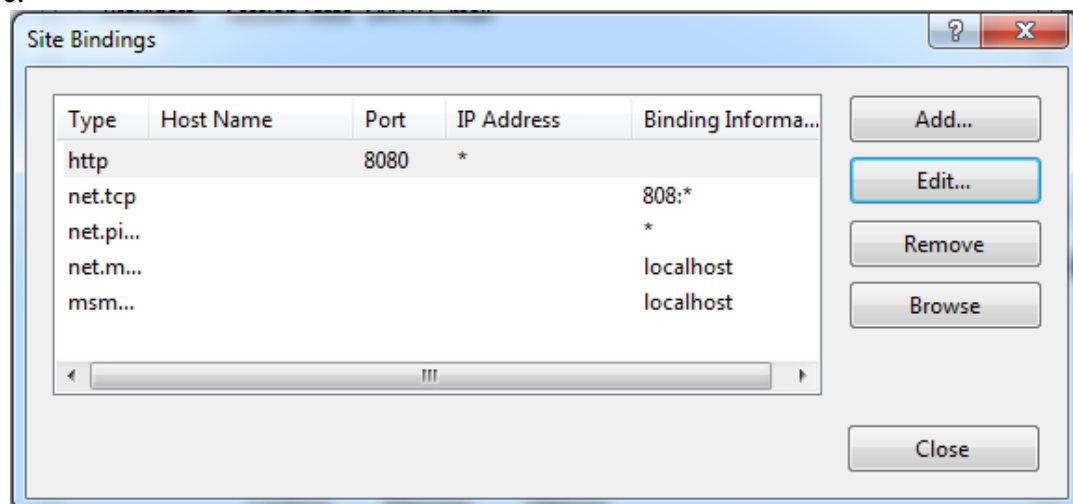
16. Start a browser and enter localhost for the URL. What page is displayed?

Same one as before

17. Go back to the properties of the Default Web and, in the Default Documents tab, move the document name index.html to the top of the list. Use the snipping tool to capture the screen showing the changed value and paste the result here. Start and then stop the web server as above and refresh the page displayed in the browser. What page is displayed this time?

The index.html page in the C:/newweb folder

18. Click on the Default Web Site icon and choose the Bindings action from the right side. On the Site Bindings screen select http and Edit the values. Change the port from 80 to 8080. Use the snipping tool to capture the screen showing the changed value and paste the result here.



19. Restart the web site and the browser. Enter localhost for the URL (remember you may need to clear cache). What is displayed? Why?

The site can't be reached because the socket isn't connected

20. In the browser and enter localhost:8080 for the URL. What is displayed? Why?

The index.html page in the c:/newweb folder. The default port is 80, so specifying that it's using a different port is going to force it to that one

21. Change the properties of the server back to using TCP Port 80, and the home directory back to what it was originally (%SystemDrive%\inetpub\wwwroot). Re-check localhost to make sure that the IIS start page comes up.

## Error Pages

22. With the Default Web Site selected double-click on the Error Pages icon. What category of errors are listed?

400 and 500 errors



23. Open the folder C:\inetpub\custerr\en-US. What do the errors 401 and 403 mean (double-click to see them in the browser and think about what the messages mean).

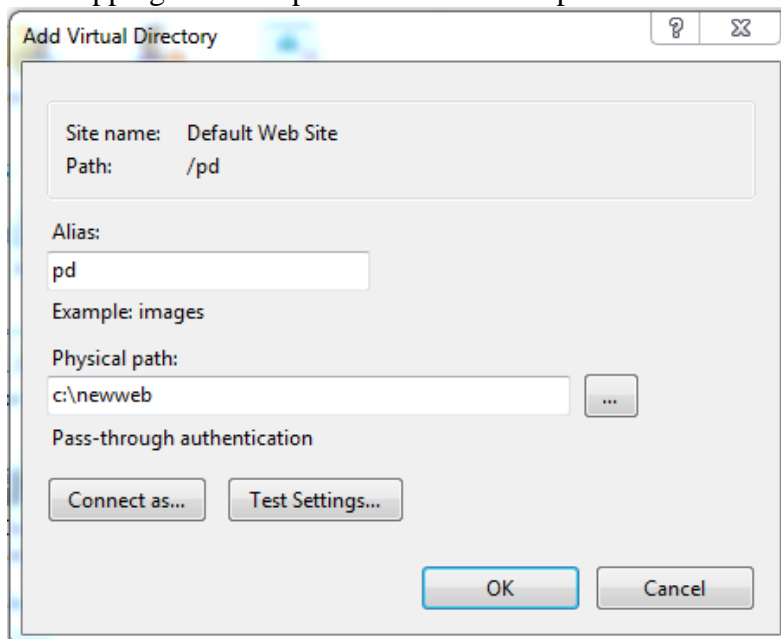
401 is an authorization error, you're using invalid credentials

403 is a forbidden error, access is denied.

401 is the credentials don't exist, 403 is your credentials aren't permitted?

## Redirection

24. We are now going to add a virtual directory. Virtual directories are used in the address resolution module to determine where the requested files are located. With the default website selected, right-click and choose Add Virtual Directory... Enter your initials for the alias and end c:\newweb for the Physical Path (the folder you created above). Use the snipping tool to capture the screen and paste the result.

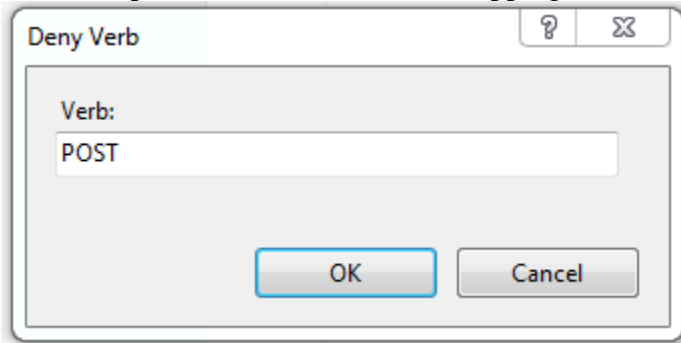


25. Start a browser and enter localhost/yourinitials as the URL. What page is displayed? Explain what the web server did to return this page to you.

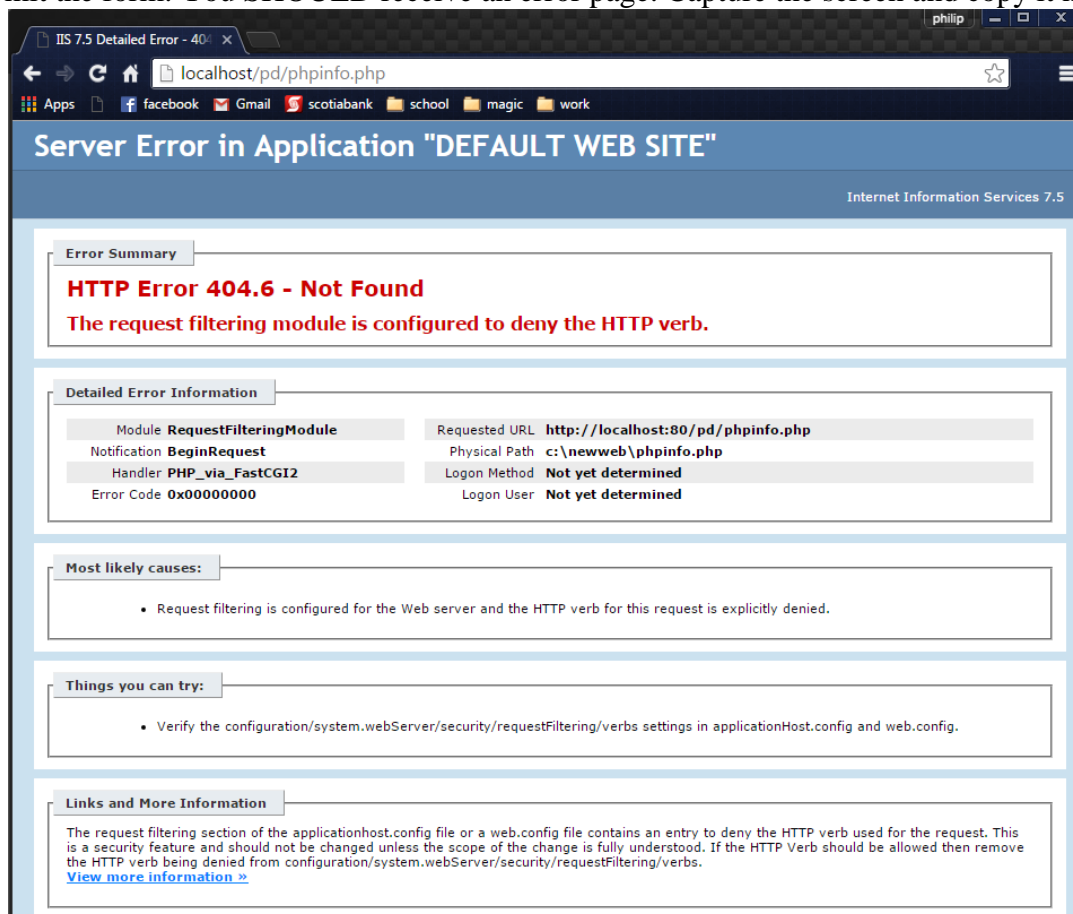
The index.html page from the c:/newweb folder is displayed. It's doing that because I've made the /pd redirect to the newweb folder and there it's site's default page will display, in this case the index.html

## Other Controls

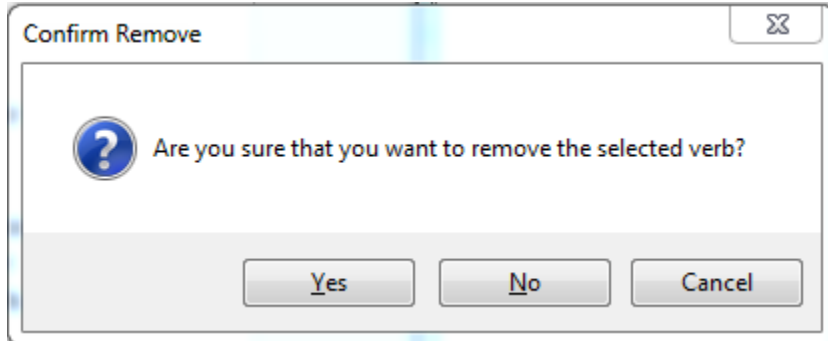
26. With IIS Manager you can control almost everything about the behaviour of the web server. For example, you can prevent certain types of requests or elements in your request. In IIS Manager select the Request Filtering option. Select the HTTP Verbs tab and “Deny verb...” POST. Capture the screen with the snipping tool and copy here.



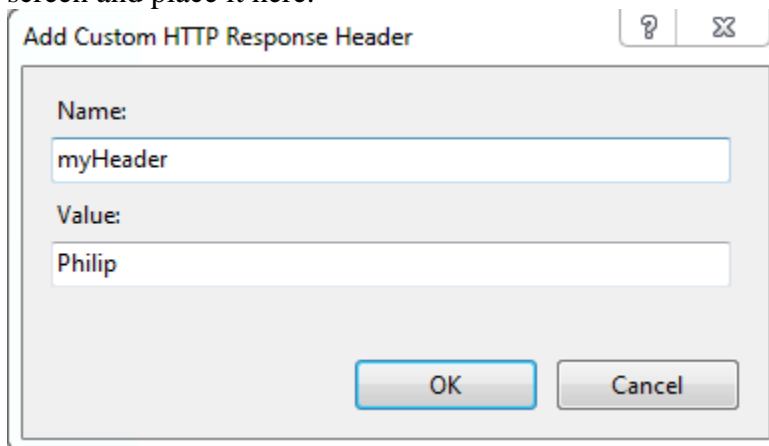
27. Copy the file formPage.html to c:\inetpub\wwwroot. Start a browser and use the HTTP method to display formPage.html (http://localhost/formPage.html). Enter some values and submit the form. You SHOULD receive an error page. Capture the screen and copy it here.



28. Go back and Remove the HTTP verb request filter for POST. Capture the screen and copy here.



29. IIS can also be set up to always return certain headers. In IIS Manager, select HTTP Response Headers and add the header myHeader with the value of your name. Capture the screen and place it here.



30. In Chrome, Firefox or IE you can look at the network traffic to see the request and response headers and messages. To do this, press F12 to bring up the developer window. Select the Network tab wherever it is displayed. Redisplay formPage.html from the web browser. On the Network page formPage.html should be listed. Select the file and you will see the response command and headers. Check that the header you added is there. Capture the browser screen that shows the header and copy it here.

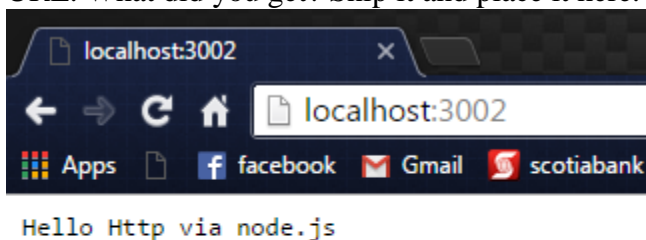
31. Go back to IIS Manager and remove the HTTP Response Header you added.

32. We will be using PHP in the second half of the course. Since PHP runs as part of IIS, it can be managed by the IIS Manager. Do this now by double clicking on the PHP Manager icon in the Default Web Site page under the IIS section. What version of PHP is currently running? How many extensions are enabled?

PHP 7.007 with 14 extensions enabled, but 38 installed.

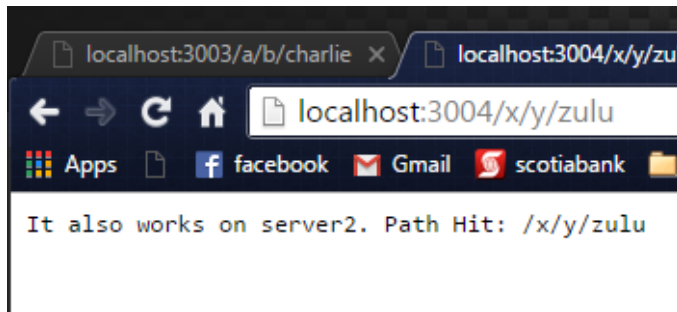
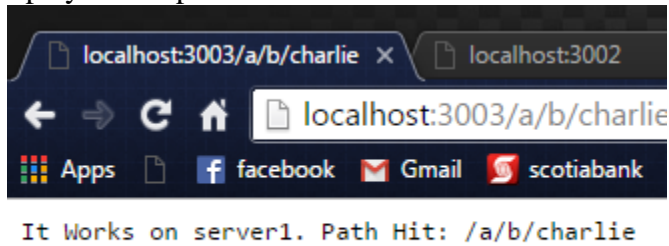
## Part C – node.js

1. Look at the file `http_node1.js` in an editor such as Notepad++ (the file is in the folder you downloaded at the start of the lab). You don't need to understand the code at this point, but it's pretty straightforward.
2. Start the node.js command prompt. A command window should be displayed with the `H:\>` prompt. Change the directory to your `420-C30\Labs\C30_L02\C30_L02_Files`.
3. Start node.js with the file above by entering `node http_node1.js`. You should see a message saying that the server was started on port 3002.
4. Go to CHROME (it can be done in Firefox too I believe) and enter `localhost:3002` as the URL. What did you get? Snip it and place it here.



5. What is node.js doing at this point? What is happening when you enter the URL?  
It's telling the server that it wants it to display for port 3002 in the line `server.listen(3002);`
6. In Chrome, Firefox or IE you can look at the network traffic to see the request and response headers and messages. To do this, press F12 to bring up the developer window. Select the Network tab wherever it is displayed. Refresh the page (Ctrl-F5). On the Network page localhost should be listed. Select localhost and you will see the response command. Select the Headers tab and toggle the view source for the request and response headers. Notice the status code. Notice that it is not exactly what it was set to be in your header. What has been added to the header sent back?  
Added the word OK
7. In the code, change the `res.writeHead` line to return 404 instead of 200. Stop node.js using Ctrl-C and restart it the same way again. Refresh the chrome browser again. What does the browser display? What is put in the header? Is this "correct" functionality?  
Browser displays the web page either way, but in the network page it says that the page wasn't found with a 404 error.

8. Stop node.js and restart it using node http\_node2.js. Go to Chrome (with developer window open to Network) and enter localhost:3003/a/b/charlie. What is displayed? Now enter. What is displayed? Snip BOTH results and save them here.



9. What is node doing now? You may want to look at the code to help you. Why would you want node to be listening on two ports?  
Listen in on two ports in case on port is getting too much traffic

10. In the developer window on Chrome, next to the Request Headers is a link to view source. Click the link and look at the source of the request header. What headers are the only required ones? What are the extra ones for (they are pretty straightforward).? \

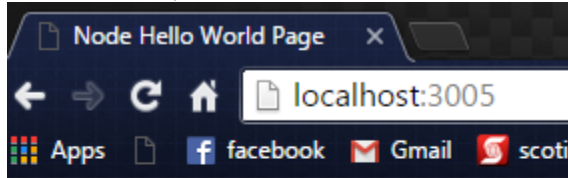
The required ones are:

```
GET /x/y/zulu HTTP/1.1
Host: localhost:3004
```

The extra ones are:

```
Connection: keep-alive
Cache-Control: max-age=0
Upgrade-Insecure-Requests: 1
User-Agent: Mozilla/5.0 (Windows NT 6.1; Win64; x64) AppleWebKit/537.36 (KHTML, like
Gecko) Chrome/52.0.2743.116 Safari/537.36
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,*/*;q=0.8
Accept-Encoding: gzip, deflate, sdch
Accept-Language: en-US,en;q=0.8
```

11. Stop node.js and restart it using node http\_node3.js. Go to Chrome (with developer window open to Network) and enter localhost:3005. What is displayed?



## Header from Node!

Hello World from node!

12. Look at the source of the Response Header. What headers have been added? What does this tell you about what an HTTP server can be made to do with headers?

Added headers:

HeaderStuff: Fuzzy Caterpillar  
Date: Wed, 31 Aug 2016 20:49:25 GMT  
Connection: keep-alive  
Transfer-Encoding: chunked

Judging by the HeaderStuff header, you can add whatever you want to an HTTP request header.

### Part D – HTTP commands

1. What are the http requests/returns, in order, that will be sent/received given the following page resides on an IIS server/

At URL: www.mysite.ca

```
<!DOCTYPE html>
<html>
<head>
<title>Images</title>
<link rel="stylesheet" href="images.css" type="text/css" />
</head>
<body>
<h1>Images of various Types</h1>
<p>
<a href="http://www.google.ca">

</a>
</p>
</body>
</html>
```

File: images.html in root folder

### Request

GET /images.html HTTP/1.1

Host: [www.mysite.ca](http://www.mysite.ca)

### Response

HTTP/1.1 200 OK

Content-type: text/html

Content-length: ###

<html></html>

2. A web page called myForm.html contains a form which has the action attribute doIt.php. The form has two fields with the names theName and pinCode. The user enters the theName Allan and the pinCode 5555.

a) What would the HTTP request look like if the form used a get method?

GET doIt.php?theName=Allan&pinCode=5555 HTTP/1.1

Host: localhost

b) What would the HTTP request look like if the form used a post method?

POST doIt.php HTTP/1.1

Host: localhost

theName=Allan;

pinCode=5555;

### **To submit**

When you have completed the lab exercise, save this file as a PDF document and load the file to Moodle. You MAY have to zip the file if it is too big. This is a lab that cannot really be demonstrated to me, so just hand it in when you complete it.