Note: This lab does NOT use the Core Files

Obtain a copy of the Network Stack

Download version 5.1 of the tuxgraphics AVR network stack from

http://tuxgraphics.org/common/src2/article09051/

If for some reason there's a problem with this page, or the server, I've placed a copy at

http://www.laswick.net/mohawk/ELEC_10053

Prepare the Network Stack

As discussed in the lecture, minor modifications need to be made to the stack before we can use it

Extract the compressed archive

Use WinZip, gunzip, tar, etc.

Enter the directory

```
cd eth_tcp_client_server-dhcp-5.1
```

Modify Makevars.mk

Change the `MCU` variable to `atmega16`

Modify enc28j60.c

Near the top of the file, add SPI port configuration support for **our** processor

Modify the `F_CPU` define to reflect **our** clock

Enter the directory for the *simple* example project

```
cd server-www-simple
```

Modify basic_web_server.c

Change the IP Address to `192.168.0.55`

Remove (or comment out) all references to `CLKPR`

Modify Makefile

Add `-Wno-deprecated-declarations` to `CFLAGS`

Modify the Makefile to **only** build `basic_web_server`

Build the basic_web_server example project

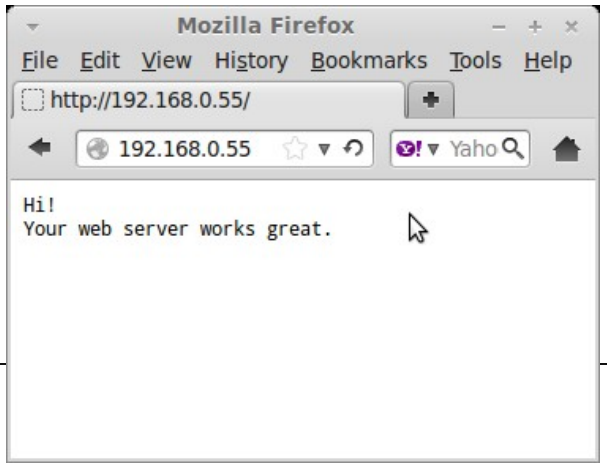
```
make
```

Verify the Network Stack and Web Server example project

Load the image (`hex` or `elf`) into your board, and connect the board to your computer (either directly or via a router or switch)

Open a web browser and navigate to `192.168.0.55`

You should see the following



Backup the example project

Copy `basic_web_server.c` to `basic_web_server.c.orig`

Continue to add the changes below to `basic_web_server.c`, and test your changes as you go

Add a Banner

Using an H1 heading, replace the default message with

Mohawk College ELEC 10053 Web Server

Fix the Tag Structure

Fix the code to generate a proper HTML tag structure (i.e DOCTYPE, html, head, body, etc.). Use your browser's "view page source" feature to verify what you're generating

Access Counter

Add a counter to the page that displays the number of times the page has been accessed/refreshed

Auto Refresh

Have the page automatically refresh every 3 seconds

Relay Toggler: Part 1

Add a hyperlink that **toggles** the state of a relay when clicked

Ensure the relay only toggles when the link is clicked, and not when the page automatically refreshes

Relay Toggler: Part 2

Make the displayed name of the hyperlink more intuitive by displaying what the link will do to the relay. i.e. rather than just displaying toggle relay, the link should display either turn_relay_on or turn_relay_off accordingly

Relay Toggler: Part 3

Add support to control all 4 relays

Relay Toggler: Part 4

Replace 2 of the hyperlinks with buttons