# UMass Boston CS 240
# Homework 1
# Due 2/7/2019 17:00

The purpose of this assignment is to familiarize you with the basic tools you will be using throughout the semester. Upon completing this assignment you will have used the basic Linux commands we covered in class, used a text editor, written/executed your first C program, and copied files from your laptop to a remote server.

As part of this assignment, you should be reading K&R Chapter 1. Open a terminal and try the Linux commands as you read about them.

## 1   Try Some Linux Commands

When you log on the MIC server, the initial prompt looks like this:

```
user60@mic:~>
```

Now enter these commands:

```
user60@mic:~>pwd
user60@mic:~>ls -al
user60@mic:~>man ls
user60@mic:~>mkdir hw1
user60@mic:~>cd hw1
user60@mic:~/hw1>pwd
user60@mic:~>cd ..
user60@mic:~>pwd
user60@mic:~>cd hw1
user60@mic:~/hw1>pwd
```

## 2   Text Editors

Learn to use a Linux text editor. The two standard choices are vi and emacs. There are numerous online tutorials. You can download vi and emacs cheat sheets from Blackboard. This part of the homework is a little exercise to tell the editors to display line numbers.

### 2.1   vi

There are two modes in vi: command and insert. When vi starts, it is in the command mode. Press i to switch to the insert mode. Then you can enter text. When you are done, press ESC to return to the command mode. Then press : (colon) followed by x to save the text and exit vi.

```
//create a hidden file .exrc in your home directory
user60@mic:~>cd
user60@mic:~>vi .exrc
//vi is in the command mode
//press i to enter the insert mode
//type the following line of text
set nu
//press ESC to return to the command mode
//type : x to save and exit
:x
```

Now do `vi .exrc` to see the difference.

For emacs, you need to memorize its commands. The cheat sheet should help.

```
user60@mic:~>cd
//this cd command takes you back to your home directory
//no matter where you are
user60@mic:~>ls -al
//there is already a hidden file .emacs in your home directory
//edit it as follows:
user60@mic:~>emacs .emacs
//these two key strokes (escape >) will take you to the end of the file
ESC >
//type the following line of text
(global-linum-mode t)
//ctrl-x ctrl-s to save a file
ctrl-x ctrl-s
//ctrl-x ctrl-c to exit emacs
ctrl-x ctrl-c
```

Now do `emacs .emacs` to see the difference.

If you don't like to see line numbers, just reverse the above.

## 3   Write and Run a C Program

In your home directory, create a folder called hw1 (`/home/user60/hw1`). Make sure it is exactly hw1, not HW1, not homework1, not Hw1. Write the program `hello.c` and save it in there. Make sure you follow the style guidelines – the file is posted on Blackboard.

Compile `hello.c` into an executable named `hello` using gcc and icc. Run the program. After you have tried both compilers, compile it one last time with icc and leave the executable there.

Write a file named `readMe.txt` – use the camelCase convention in file names. The file has three lines:

```
Your Name
UMS 8-digit ID number
user60
```

## 4   Upload and Download Files to the MIC Server

Because the MIC server is behind the firewall, you cannot copy files directly from your laptop to MIC. We have to do it in two steps, using the CS server as the intermediate.

You can use FileZilla `https://filezilla-project.org/` to copy files between your laptop and the CS server. It has a nice GUI interface. Install FileZilla on your laptop and try it.

The issue is how to move files between the CS server and the MIC server. The Linux command to copy files within the local file system is `cp`. The command to copy files between two servers is `scp` (secure `cp`).

In this part of the homework, you copy *this file* (`hw1.pdf`) to MIC. There are three steps. First, download this file from Blackboard to your laptop. Second, use FileZilla to copy it from your laptop to the CS server. Third, copy it from the CS server to MIC, using the following command:

```
itserver6>ls
//make sure you see hw1.pdf
itserver6>scp hw1.pdf user60@mic.umb.edu:~/hw1
```

If you want to copy a file from MIC back to your laptop, reverse the above process. From MIC to the CS server:

```
itserver6>scp user60@mic.umb.edu:~/theFileYouWant .
```

Then use FileZilla to copy from the CS server to your laptop.

# 5   SSH Tunneling

If you use a Linux or a Mac laptop, you are in luck. You can use SSH tunneling (SSH port forwarding) that saves you a lot of trouble.

```
//port 22 is the default ssh port

laptop>ssh -L 2200:mic.umb.edu:22 userName@users.cs.umb.edu

//-L 2200:mic.umb.edu:22 tells the CS server to forward SSH traffic
//at port 2200 of your laptop to port 22 of mic.umb.edu
//after you log on the CS server, leave this SSH session connected

//open a new terminal (SSH session)
laptop>ls
//make sure you see hw1.pdf

//the following command copies hw1.pdf from your laptop to port 2200
//which is forwarded to port 22 of MIC
laptop>scp -P 2200 hw1.pdf user60@localhost:~/hw1

//the following command copies a file back to your laptop
laptop>scp -P 2200 user60@localhost:~/theFileYouWant .
```

Do not touch the files in your hw1 directory on MIC after the deadline.