EECS 10: Computational Methods in Electrical and Computer Engineering

Lecture 1

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Lecture 1: Overview

- Course overview
- Introduction to Computers
- Course administration
  - Course web pages
- Getting started
  - Obtain your UCInetID
  - Obtain an account on the EECS servers
  - Log into the server
- Linux system environment
  - System commands
  - Text editing

Introduction

- Course Contents
  - Introduction to computers
  - Introduction to structured programming
    - C, a high-level structured programming language
  - Binary data representation
  - Introduction to algorithm efficiency
  - Solving engineering problems
    - Applications of structured programming
  - Hands-on experience
    - Laboratory and discussion sessions

Introduction to Computers

- What is a computer?
  - Digital device capable of executing programs
    - performing computations
    - making logical decisions
- What is a program?
  - Set of instructions which process data
    - input data (e.g. from keyboard, mouse, disk)
    - output data (e.g. to monitor, printer, disk)
- What is programming?
  - Creation of computer programs by use of a programming language

Introduction to Programming

- Categories of programming languages
  - Machine languages (stream of 1's and 0's)
  - Assembly languages (low-level CPU instructions)
  - High-level languages (high-level instructions)
- Translation of high-level languages
  - Interpreter (translation for each instruction)
  - Compiler (translation once for all code)
  - Hybrid (combination of the above)
- Types of programming languages
  - Functional (e.g. Lisp)
  - Structured (e.g. Pascal, C, Ada)
  - Object-oriented (e.g. C++, Java, Python)

Course Administration

- Course web pages online at
  `http://newport.eecs.uci.edu/~doemer/f19_eecs10/`
  - Instructor information
  - Course description and contents
  - Course policies and resources
  - Course schedule
  - Homework assignments
  - Course communication
    - Message board (announcements and technical discussion)
    - Email (administrative issues)

Getting Started

- Log into the server
  - Use a terminal with SSH protocol (secure shell)
  - Connect to the EECS Linux server
    - **`crystalcove.eecs.uci.edu`**
    - **`bondi.eecs.uci.edu`**
  - Authorize yourself with your UCInetID credentials
- Work in the Linux system environment
  - Linux shell prints command prompt, awaiting input
  - Type in system commands
    `echo`, **`date`**, **`ls`**, **`cat`**, **`man`**, **`more`**,
    `pwd`, **`mkdir`**, **`cd`**, **`cp`**, **`mv`**, **`rm`**, **`rmdir`**
  - Refer to manual pages for help on commands

Linux System Environment

- Linux system commands
  - **`echo`** print a message
  - **`date`** print the current date and time
  - **`ls`** list the contents of the current directory
  - **`cat`** list the contents of files
  - **`more`** list the contents of files page by page
  - **`pwd`** print the path to the current working directory
  - **`mkdir`** create a new directory
  - **`cd`** change the current directory
  - **`cp`** copy a file
  - **`mv`** rename and/or move a file
  - **`rm`** remove (delete) a file
  - **`rmdir`** remove (delete) a directory
  - **`man`** view manual pages for system commands

Linux System Environment

- Text editing
  - **`vi`** standard Unix editor
  - **`vim`** vi-improved (supports syntax highlighting)
  - **`nano`** easy-to-use text editor (formerly **`pico`**)
  - **`emacs`** very powerful editor
  - many others...
- Pick one editor and make yourself comfortable with it!

Linux System Environment

- Example session (1/4):

```
login as: doemer
Password:
Last login: Mon Sep  1 20:20:09 2019 from pi.eecs.uci.edu
...
If this system is busy, consider a less loaded one below:
bondi.eecs.uci.e  up 30 days, 18:00,   load average: 0.00, 0.00, 0.01
crystalcove.eecs  up 2826 days, 21:06, load average: 0.00, 0.00, 0.01
laguna.eecs.uci.  up 23 days, 23:29,   load average: 0.00, 0.00, 0.02
zuma.eecs.uci.ed  up 12 days,  4:56,   load average: 1.46, 1.41, 1.68
% date
Mon Sep  1 20:24:47 PDT 2019
% echo "Hello EECS10!"
Hello EECS10!
% ls
eecs10/            Mail/              tmp/
% pwd
/users/faculty/doemer
% mkdir homework
% ls
eecs10/            homework/          Mail/            tmp/
...
```

Linux System Environment

- Example session (2/4):

```
...
% cd homework
% pwd
/users/faculty/doemer/homework
% ls
% mkdir hw1
% ls
hw1/
% cd hw1
% ls
% vi program.c
% ls
program.c
% ls -l
total 2
-rw-------   1 doemer   faculty     51 Sep  1 20:32 program.c
% more program.c
This is my new program file.
I don't know C yet...
...
```


Linux System Environment

- Example session (3/4):

```
...
% cp program.c mybackup.c
% ls
mybackup.c   program.c
% ls -l
-rw-------   1 doemer   faculty       51 Sep  1 20:34 mybackup.c
-rw-------   1 doemer   faculty       51 Sep  1 20:32 program.c
% cd ..
% pwd
/users/faculty/doemer/homework
% ls
hw1/
% ~eecs10/bin/turnin.sh
========================================
EECS 10 Fall 2019:
Assignment "hw1" submission for doemer
Due date: Mon Oct  9 12:00:00 2019
========================================
...
```

Linux System Environment

- Example session (4/4):

```
...
Submit program.c [yes, no]? y
Cannot read file program.c
Submit mybackup.c [yes, no]? n
========================================
  Summary:
========================================
You just submitted file(s):
   program.c
You have not submitted file(s):
   mybackup.c
% ~eecs10/bin/listfiles.py
========================================
EECS 10 Fall 2019: "hw1" listing for doemer
========================================
Files submitted for assignment "hw1":
program.c
% logout
```