



ECE12: Introduction to Programming

Lecture 2

Rainer Dömer

doemer@uci.edu

The Henry Samueli School of Engineering
Electrical Engineering and Computer Science
University of California, Irvine

Lecture 2: Overview

- Introduction to Computers
 - What is a computer?
 - What is programming?
- Unix system environment
 - System commands
 - Text editing
- Introduction to Python Programming
 - Python interpreter
 - Basic data types, arithmetic
 - Python programming, I/O

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)

Unix System Environment

- Unix 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

Unix System Environment

- Text editing
 - `vi` standard Unix editor
 - `vim` vi-improved (supports syntax highlighting)
 - `pico` simple text editor
 - `emacs` very powerful editor
 - others may be available as well...
- Pick one editor and make yourself comfortable with it!

Introduction to Python

- What is Python?
 - programming language
 - run-time environment (libraries)
- Why Python?
 - clean, well-structured
 - interactive, easy to learn
 - simple, yet powerful
 - supports structured programming
 - supports functional programming
 - supports object-oriented programming
 - freely available for most platforms

History of Python

- Created in 1989 by Guido van Rossum
 - created as scripting language for administrative tasks
 - based on *All Basic Code (ABC)* and *Modula-3*
 - named after comic troupe Monty Python
- Released publicly in 1991
 - growing community of Python developers
 - evolved into well-supported programming language

Source: *Python: How to Program*, (c) 2002 Prentice Hall

Introduction to Python Programming

- Python interpreter
 - interactive mode
 - like an advanced calculator
 - batch mode
 - program execution
- Basic data types
 - string “This is a string”, ‘This one, too!’
 - integer ..., -3, -2, -1, 0, 1, 2, 3, ...
 - floating point 12.34, 3.1415, 4.5e+8

Introduction to Python Programming

- Arithmetic operations
 - shift left, shift right <<, >>
 - addition, subtraction +, -
 - multiplication, division *, /
 - integer division, modulus //, %
 - exponentiation **
- Python programming, I/O
 - print formatted output (to stdout)
 - raw_input() string input (from stdin)