

Session 1

Introduction to Computer Programming

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Think about what you expect from this class while I go over some preliminaries.

What is computer coding or programming?

- In general, it's creating instructions for a computer to perform repeatable chores.
- Spreadsheet use is programming in a specific environment (domain-specific). The coding we will do is more general purpose.

How can you use programming for practical purposes? We'll look at some possibilities, including open source projects:

- + Address database (db) in a spreadsheet, then use Perl 6 to manipulate it.
- + Generate, populate, and query an SQLite database
- + Generate mailing labels from db

Programming languages

There are **many** programming languages. Can you name some?

We will see also that there are some categories, generally mutually exclusive, that each can be put into:

- compiled or interpreted (C or Perl 6)
- C-like or not (Perl 6 or Python)
- strongly or weakly typed (C++ or Python)
- small core or large (C or Perl 6)
- native or virtual (C++ or Java)

Programming languages (cont.)

Here are the top-20 languages' ratings from the latest **Tiobe Programming Index** (total rankings equal 100%) along with the number of jobs available for them from the **Indeed.com** website:

1	Java	17.44%	26,269
2	C	15.45%	8,111
3	Python	7.65%	11,757
4	C++	7.39%	8,584
7	PHP	2.76%	4,971
8	JavaScript	2.13%	24,248
9	SQL	2.06%	
10	Objective-C	1.51%	1,730
11	Delphi/Object Pascal	1.29%	
12	Ruby	1.29%	4,417
13	MATLAB	1.28%	789
14	Assembly language	1.23%	
15	Swift	1.22%	
16	Go	1.08%	4,038
17	Perl (6?)	1.07%	
18	R	1.02%	1,599
19	PL/SQL	0.85%	2,962
20	Visual Basic	0.68%	

My background

- Retired USAF fighter pilot (1987-12-31)
- Retired engineer with ManTech International Corporation (<http://mantech.com>) (2016-01-01)
- Have used Unix and GNU/Linux and FOSS professionally for over 22 years while developing software tools for my vulnerability assessment team using Perl 4 and 5, C, C++, Fortran, Python, Bash, and PostScript
- Have used Perl 6 since 2015, and have been a Perl 6 core developer since early 2018

What I hope to cover in this class:

- + 1 - Introduction to Programming
 - Pseudo code
- + 2 - Getting around
 - Linux CLI
 - Editors
 - Running a program
 - Getting help

Course overview (cont.)

- + 3 - Introduction to Perl 6
 - Variables and sigils
 - Operators
 - Conditional blocks
 - Subroutines
 - The ****MAIN**** subroutine
 - Plain Old Documentation (POD)
 - Classes
 - Modules
- + 4 - User input

Course overview (cont.)

- + 5 - Application configuration
 - Grammars
- + 6 - Wrapping up
 - What you've learned
 - Where to now?

Introduction to programming

It might seem like a lot, and we may not adhere to that schedule; but don't worry, there's no grade:

- See if you can find ways to use programming in your life
- See if it's something you want to keep doing

Our environment

We'll be Using Debian Linux running on VirtualBox on Windows Pro

What is Linux?

More formally known as **GNU/Linux**, it's a free operating system (OS) invented by Linus Torvald to provide a UNIX-like system with all the standard command-line and graphical tools that accompany such a system.

Linux, rather than Windows or Mac, provides much of the behind-the-scenes *cloud* computing in data centers and *high-performance computing facilities*. It also powers the Android and the *Internet of Things* (IoT).

What is Linux? (cont.)

A more detailed look:

`<https://www.lifewire.com/
basic-guide-linux-operating-system-2202786>`

Why Linux?

The command-line environment provides the user with almost complete freedom to automate tasks typical in research or other work or study in technical fields.

Linux also gives the user much greater control over what happens and what does not happen on his or her computer.

Windows:

- Is everywhere
- Is primarily a GUI operation
- Is expensive
- **Hides internals**
- **Has a non-case-sensitive file system**
- Updates when Microsoft says it should, often restarting your computer without your permission.

Linux:

- Is pretty much the opposite of Windows in most respects
- Is everywhere, although it is usually working behind the scenes
- Has both GUI and intrinsic command line capabilities
- **Is FREE**
- Shows as much or as little of the internals as you want to see

- Has a case-sensitive file system
- **Performs upgrades only if you want it to**
- Is unparalleled for the scientist or engineers: a powerful, “programmable calculator”

Other opinions:

<<https://www.lifewire.com/windows-vs-linux-mint-2200609>>

<<http://whylinuxisbetter.net/en/>>

<<https://www.popsci.com/switch-to-linux-operating-system#page-4w>>

<<https://www.makeuseof.com/tag/linux-beginners-guide/>>

Linux: How to get it

On Windows or Mac:

- Use **Putty** to connect to a cloud server (as cheap as \$2.50 per month)
- Install the Windows 10 Ubuntu subsystem
- Use a live, bootable USB [recommended for intro]
- Use a live, bootable CD/DVD [only as a last resort]

Linux: How to get it (cont.)

- Install Linux as a VM guest on Windows 10 Pro Hyper-V
- Install VirtualBox to run a Linux Virtual Machine
- Use *Cygwin* on Windows

Best:

- Use a dual-boot, native installation
- Use a dedicated GNU/Linux PC or laptop

Linux comes in many “flavors” Linux comes in many flavors

A Linux system comes packaged in many **distributions** such as Debian, Ubuntu, Linux Mint, and others.

See <<https://distrowatch.com>> for lots of information about popularity, download statistics, and other stats on hundreds of **distros**.

The NWFLUG thinks *Linux Mint* is one of the best *distros* for beginners. I prefer *Debian* and have used it for over ten years

There is practically an infinite amount of Linux resources to be found on the Internet.

My group, the Northwest Florida Linux User Group (NWFLUG), meets monthly, and we have an installation meeting (by appointment only) on the third Monday of every month.

Check out our website at <<https://nwflug.org>>.

VirtualBox

- Open the VirtualBox program (app)
- Look at the various menu items
- Start the Debian VM
- Expand it completely

Windowing

- HOST key:
- HOST + C
- HOST + L
- HOST + HOME

Devices

- USB
- CD-ROM

Getting around Linux (cont.)

- Log in to your Debian host:
 - User name: **perl6**
 - Password: **perl6**
- Shutting down