




Developing Data Structures with Open Source Tools

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Module One – Introduction

Part B – All About Open Source



- What is Open Source?
- What's an Open Source License?
- What are Open Source Tools?
- A Brief History
- Open Source Communities
- The Future of Open Source



What is Open Source?

The basic idea behind open source is very simple: When programmers can read, redistribute, and modify the source code for a piece of software, the software evolves. People improve it, people adapt it, people fix bugs. This can happen at a speed that, if one is used to the slow pace of conventional software development, seems astonishing.

- from <http://www.OpenSource.org>

In order to fulfill the general idea of Open Source (that you can use it for virtually whatever purpose you like on the condition that any modifications you make become Open Source themselves), the actual human-readable source code needs to be made available to the Open Source community. Proprietary software is generally only available in compiled, ready-to-run, binary format. Open Source software, while often distributed similarly, is also available in “human”-readable source code format (e.g., C, Java, C#, etc.).



What's an Open Source License?

For any of this to work there needs to be “open” licensing of Open Source software. While the details are varied and can get rather obtuse, the general idea is this: You are free to use Open Source software for (virtually) whatever purpose you like on the condition that any modification you make becomes Open Source itself, thereby allowing others the same benefit you enjoyed.

An Open Source license is an official or legal agreement between the creators of some intellectual property (IP) and its users. It embodies the private grant (from the creator(s) of the IP to the users of the IP) of certain explicit rights to use, modify, and redistribute said IP. Those “certain explicit rights” vary from one Open Source license to another.

For a more complete definition of and rationale for open source, see <http://www.opensource.org/docs/definition.php>.



What are Open Source Tools?

Open Source tools are computer programs released under some sort of “Open Source” license that help us write and run other computer programs: integrated development environments (IDE), compilers, debuggers, testing frameworks, source code editors, application frameworks, etc. There are many excellent but proprietary tools like Microsoft’s Visual Studio.Net, Borland’s Delphi and JBuilder, IBM’s WebSphere, but they are not Open Source because their source code is proprietary and their licenses are restrictive. Thankfully, there are many excellent tools that are Open Source.

This course focuses on two very important Open Source tools available today: the Eclipse IDE and the Derby embedded database. Other important Open Source tools include the Apache Web Server, Ant, the JBoss application server, the Postgres and MySQL relational database management systems, application frameworks (like Struts), and many more.



Open Source: A Brief History

In the beginning there was hardware equipped with [dials](#) or [switches](#) for input and [blinking lights](#) for output. Software followed soon thereafter. Some software was sold with the hardware and was “free” to the users of that hardware. Other software had to be purchased. In those days, there were only two legal ways to obtain software: either buy (or license) it or write it yourself.

As more and more people wrote software on their own, they formed [communities](#) in which they would trade software. Everybody was happy as long as they traded their own software. But once they started trading copies of other people’s software, [some folks got upset](#).

The [Free Software Foundation](#) was the primary sponsor of the GNU project in the mid-1980s.



Open Source Communities

SourceForge

SourceForge.Net is “the world’s largest development and download repository of Open Source code and applications”, according to them. I am inclined to believe it. They provide a free collaborative environment enabling the development of a great many Open Source projects, both big and small.

Apache

Apache.org is the home of the Apache Software Foundation, which supports the “Apache community” of Open Source software projects. Like SourceForge, Apache provides a collaborative community for software development, emphasizing an “open and pragmatic” software license. SourceForge has more projects, but Apache projects are generally larger and more impactful.

There are others as well...



The Future of Open Source

Like most assessments of the future, this is hard to predict. That said, here are some thoughts on the matter:

- We're going to see the open source philosophy become integral to the news industry. In the future, everyone will be able to act as their own researchers and writers.
 - Craig Newmark – Founder, Cragislist
- Whether it's the fashion industry or retail, any business can benefit from open source principles.
 - Bob Young – Cofounder, Red Hat
- It's only a matter of time until someone releases a therapeutic molecule under an open source license. That could change the ecology of innovation in the pharmaceutical sector. Of course, the puzzle is finding ways for these companies to create advantages in the value chain. Lawyers provide a great example: Legal code is available free for anyone to use. But lawyers are very good at working the rest of the value chain and doing things that are hard to replicate.
 - Steven Weber – Author, *The Success of Open Source*



Resources to Explore

[The Success of Open Source](#) by Steven Weber

[Just For Fun](#) by Linus Torvalds

[ACM Queue “Open Source” issue – Volume 1 number 5 – July/August 2003](#) It's all interesting, especially the following articles:

- *From the Server Room to the Living Room*
This article discusses some history of open source and relates it to the development of the TiVo®, which fits in perfectly with the content of this course.
- *Commercializing Open Source Software*
- *Viewing Open Source with an Open Mind*
- *The Age of Corporate Open Source Enlightenment*

[SourceForge.Net](#)

[Apache.org](#)





Self-review

What is the idea behind Open Source?

What is the gist of an Open Source license?

What are the salient details of the GPL?

What are the salient details of the Creative Commons license?

What are some issues to consider when evaluating proprietary tools against Open Source tools?





Discussion Topics



I particularly like Steven Weber's comment about open source principles in other industries.

- What are your thoughts on the matter?
- Give some other examples of successful business models based on open source (like the lawyers example he mentions)?

Homework



1b1. What is the difference between free software and open source software?

1b2. List some development tools, both Open Source and proprietary.

1b3. Note some differences between SourceForge and Apache.

1b4. GNU is a recursive acronym. What does it stand for? More interestingly, create some of your own recursive acronyms. GNU is “front-end” recursive. I’m a fan of “tail-end” recursive acronyms. For extra credit, or at least some good will from your instructor, think up some tail-recursive acronyms.



Coming Attractions



Data Structures: What Are They Good For?

- When fans from around the world gather at Royal Albert Hall in London for the premiere of a James Bond film, they “queue up” at the entrance.
- This is but one place you’ll find a data structure in the “real” world. A cafeteria is another.