The Non-Profit FOSS Institute
Tips and Resources for Instructors

The Non-Profit FOSS Institute (NPFI) helps a college-level instructor and student team to develop an open source software product prototype for a non-profit. Subsequently, that prototype can be deployed and supported by a professional developer. In this way, the Instructor/Students, Non-Profit, and Software Developer form a *triad*.

The NPFI **Project Roadmap for Instructors** lists 10 steps for developing and deploying an NPFI-like product. This document provides practical tips and links to resources to help instructors complete these 10 steps. Links in this document provide examples from recent successful projects.

Examples of NPFI Project Outcomes

Successful NPFI software projects are scoped for completion in a single semester. This goal provides students with a tangible measure of success and ensures that the non-profit receives a working prototype. Here are two examples of software that student groups have completed in a 1-semester course for a non-profit:

- **Volunteer Scheduling**: An online volunteer scheduling system allows non-profit staff and volunteers to manage volunteer scheduling, replacing cumbersome paper-based calendars and phone calls. Example: Homebase for the Ronald McDonald House in Providence, RI.
- **Inventory Management:** Software enables a non-profit food distribution warehouse to manage product inventory, donation receipts, and shipment invoices to local food pantries and soup kitchens. Example: BMAC-Warehouse for the Blue Mountain Action Council in Walla Walla, WA.

Tip: Assess Student Readiness

Understanding your students' skills will help you define a reasonable scope for an NPFI project. Past NPFI projects have been done in one semester with project teams of about 4-6 computer science majors (upper-level undergraduates) and a client representative. As such, an 8-12-person class could develop two projects in one semester. Each team's students should have the following mix of skills:

- **Computer Science Core Curriculum:** Students in NPFI project classes in the past have completed at least 3 1-semester courses in computer science, including data structures and one or more "systems" courses like programming languages, computer organization, operating systems, or networks.

- **Data Structures**: Most of your students should be well versed in data structures so that they are prepared to learn and use the database development principles needed for this class.

- **Analysis and Communication Skills**: Because this class focuses on interacting with non-profit staff members to build working software, one or more student team members should have good language and communication skills to help facilitate client feedback and develop meaningful user documentation.

Tip: Develop Project Framework

In general, NPFI projects are completed using an agile approach, with new functionality developed during each weekly or bi-weekly sprint. Each sprint initiates from a video call with the non-profit client where progress is reviewed and new development tasks are identified. NPFI provides the following resources for implementing this kind of agile development:

- **Syllabus**: The course syllabus essentially becomes the semester-long project plan, including milestones to be achieved during each sprint.
- **Design Document:** Design documents capture the project's requirements, goals, fundamental software architecture, and methodology.
- **Teaching Slides**: Slides from past NPFI-related classes can be customized for use by a new project.
- **Weekly Assignments:** Assignments from past classes can be customized to help scope each weekly/bi-weekly sprint
- **Class Presentations:** Past class presentations can be used as a model for students to present their project at the end of the semester.
- **Code Bases and Sandbox Database:** Reference software models can be used as a starting point for your own class Since all code is GPL-licensed free and open source software (FOSS), it can be freely refactored and embedded into new FOSS projects.

The NPFI website provides links to examples of these resources, which any instructor can freely download and use as a template for a new project.

Resources

A successful NPFI-like project requires a number of supporting tools and resources. Here's a summary:

- **Project Site for Collaboration and Document Sharing**: Past NPFI projects have established a Google Community to store documents and allow instructors, students, and non-profit staff to post documents and share information. Each Community is associated with a Google Drive folder for document sharing
- **Hosting Site for Sandbox Demonstrations**: Past NPFI projects have established an on-line server where the partially developed software can be uploaded and new features demonstrated to the client as they are developed.
- **Localhost Testing Environment:** Your project team will need to establish an individualized local server environment that facilitates individual student development and unit testing.

- **Virtual Communication:** Past student teams have used Google Hangouts to facilitate real-time virtual meetings between students and non-profit staff. Screen-sharing the sandbox site enables students to present their partial results to clients and gain immediate feedback.
- **Code Hosting and Issue Tracking:** Current NPFI projects are hosted on Github, which is an open source code hosting and issue tracking tool. There, clients can post new issues as they arise and students who "own" each issue can understand and resolve it.
- **Version Control System (VCS):** The project team uses a VCS to enable students to develop, share, and test different modules in the software. Past NPFI projects have used Mercurial and Git. Git is highly recommended since it interacts seamlessly with the project's Github site.
- **Integrated Development Environment:** Each student team member needs to establish an IDE on his/her computer that will facilitate coding, unit testing, and communication with the team's shared current version of the software. Eclipse is highly recommended since it is widely-used and configured to work with any of several major programming languages and tools (Java, PHP, MySQL, Ruby, etc.)

You are not alone! This document provides you with a practical collection of tips and resources for launching an NPFI-like project. The resources themselves are all open source (free) and have been used successfully in past projects.

We are happy to provide you with *pro bono* personal guidance as you begin to develop your first NPFI-like FOSS project for an upcoming class. Please feel free to Contact us.