

# Sakai Programmer Manual

## Getting Started

- [Getting started with Sakai development](#)

## Developer Guides

How to get started developing tools and apps for Sakai

1. [Development Environment Setup Walkthrough](#)
2. [Sakai application \(tool\) structure](#)
3. [Sakai app and tool naming tips](#)
4. [Sakai Programming Best Practices](#)
5. [Developing with the Sakai Framework](#)
6. [Persistence](#)
7. [Presentation Layer](#)
  - a. [Comparing Sakai Display Technologies](#)
  - b. [Sakai UI Widgets - List of user interface widgets in Sakai](#)
  - c. [Using Java Server Pages \(JSP\)](#)
  - d. [Using Java Server Faces \(JSF\)](#)
  - e. [Using Reasonable Server Faces \(RSF\)](#)
  - f. [Using Apache Wicket \(Wicket\)](#)
  - g. [A Guide to Programming for Responsive Design -](#)
8. [Testing](#)
9. [Internationalization \(I18N\)](#)

## Developer Tools

Tools created to assist with developing in Sakai

- [Maven2 hibernate DDL generator POM](#) — Maven 2 hibernate DDL generating POM and support files
- [Sakai Spring MVC Maven Archetype](#) — Run a single Maven command to generate a complete working Sakai tool based on Spring MVC.
- [Sakai App Builder](#) — Eclipse plugin for Sakai Rapid Application Development
- [Sakai Wicket Maven Archetype](#) — Run a single Maven command to generate a complete working Sakai tool based on Apache Wicket
- [Generic DAO package](#) — Package for developers to use persistent objects without writing DAOs

## Sample Code

## Sakai Programmer FAQ

## Sakai Coding Tips

- [Using lightweight object comparison](#)
- [Using commons lang for object comparison](#)
- [Using the commons logger](#)
- [sakai.properties configuration tips](#)
  - [Database settings in sakai.properties](#)
  - [Controlling logging from sakai.properties](#)
- [Getting the ApplicationContext in a spring bean](#)
- [Using the Sakai global sessionFactory](#)
- [Creating sessions from the Sakai SessionFactoryBase](#)
- [Sakai app and tool naming tips](#)
- [Best Practices for High Quality Code](#)
- [Best Practices for Javascript](#)
- [Sakai URL handling](#)
- [Changing sakai.properties live \(No restart\)](#)
- [Javadocs for the Sakai API](#)

*Current tips assume you are using Sakai 2.2+*

## Sakai Framework Tips

- [Using the UserDirectoryService](#)
- [Using the ToolManager Service](#)
- [Using the AuthzGroup Service](#)
- [Using the FunctionManager Service](#)
- [Using the SecurityService](#)
- [Using the EntityManager Service](#)
- [Using the SiteService](#)
- [Using the SessionManager Service](#)
- [Using the MemoryService](#)

*Current tips assume you are using Sakai 2.2+*

## Sakai Provider Tips

- [CourseManagementProvider gotchas](#)

*All tips assume you are using Sakai 2.2+ unless otherwise noted*

## Eclipse Tips

- [Implementing an interface](#)
- [Adding a try-catch block](#)
- [Filtering out external libraries in package explorer](#)
- [Getting the Eclipse updater to work for minor releases](#)
- [Debugging Tomcat Remotely Using Eclipse](#)
- [Install SpringIDE](#)
- [Install Eclipse WTP](#)
- [Add bin and target to global svn ignore in Eclipse](#)
- [Install Subclipse](#)
- [Install Eclipse 3.2+](#)
- [Install Maven Eclipse Plugin](#)
- [Import Sakai source into Eclipse](#)

*All tips assume you have at least Eclipse 3.1.2+*

## Tomcat Tips

- [Tailing catalina.out on Windows](#)
- [Avoiding JAR and file locking under Windows](#)
- [Setting Up Tomcat For Remote Debugging](#)
- [Tips for cleaning up org.apache.jasper.compiler.Parser issues](#)
- [Install Tomcat 5.5](#)
- [Install Tomcat 7](#)
- [Install Tomcat 7 / 8](#)
- [Install Tomcat 8](#)
- [Install Tomcat 9](#)

## Subversion Tips

- [Change your working copy to a different repository](#)
- [Install Subversion](#)

## Maven Tips

- [Maven 1.0.x](#)
  - [Maven 1.x build.properties file](#)
  - [Maven project.xml tips](#)
  - [Using Maven 1.0.x to build Sakai tools](#)
- [Maven 2.x](#)
  - [Maven 2.x settings.xml file](#)
  - [Using Maven 2.x to build and deploy Sakai](#)