

CS520 Web Programming

Introduction to Ant

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Build

- ◆ Compilation
- ◆ Maintenance
- ◆ Distribution
- ◆ Deployment

Background

- ◆ A build tool for Java
- ◆ Developed by James Duncan Davidson, who also wrote Tomcat
- ◆ Ant stands for
 - Another Neat Tool (ANT), or
 - Ant, the small creature who can *build* big things

A Simple Ant Example

build.xml

```
<project name="ant-example"
  default="compile"
  basedir=".">

  <target name="compile">
    <javac srcdir="." includeAntRuntime="no" />
  </target>

</project>
```

Why Not Use Javac

- ◆ You probably don't want to use `javac`
 - When your project has a complex directory structure
 - When you need to include multiple JAR files during compilation
 - When you want to compile only some of the source code files

Why Not Use an IDE

- ◆ Can your IDE do *everything* you want?
 - Deploy a web application to a remote server
 - Generate source code from some metadata files
 - Create a zip package of selected files for homework submission
 - ...

Why Use Ant

- ◆ Ant is a “mini scripting language” that can be used to implements operations that are not provided by an IDE

Ant installation

- ◆ Download from <http://ant.apache.org>
- ◆ Unzip to a local directory
- ◆ Environment variables
 - JAVA_HOME: JDK directory
 - ANT_HOME: Ant directory
 - Add \$ANT_HOME/bin (%ANT_HOME%/bin) to PATH

Ant Basics

- ◆ Build file
- ◆ Property
- ◆ Target
- ◆ Task
- ◆ Type

Build File

- ◆ build.xml
- ◆ An XML file
- ◆ <project>
 - *name* – name of the project
 - *basedir* – the directory where the project is located

Sample Build File

```
<project name="ant-example" default="compile" basedir=".">
  <property name="tomcat.dir" value="/usr/share/tomcat6"/>
  <target name="compile" depends="init">
    <javac srcdir="src" destdir="classes">
      <classpath>
        <fileset dir="${tomcat.dir}/lib">
          <include name="**/*.jar"/>
        </fileset>
      </classpath>
    </javac>
  </target>
  <target name="init">
    <mkdir dir="classes"/>
  </target>
</project>
```

Properties

- ◆ <property>
 - name
 - value/location
- ```
<property name="tomcat.home" location="d:\tomcat"/>
<fileset dir="${tomcat.home}">
 <include name="common/lib/**/*.jar"/>
 <include name="shared/lib/**/*.jar"/>
 <include name="server/lib/**/*.jar"/>
</fileset>
```

## Targets

- ◆ Targets
  - Things we want to do, e.g. compile, install, clean ...
- ◆ Multiple targets
  - Default target
  - Target dependency

## Tasks

- ◆ "Commands" that can be used to accomplish a *target*
  - E.g. <javac>, <copy>, <move> ...
- ◆ Why use XML instead of console commands??

See the Ant Manual at  
<http://ant.apache.org/manual/index.html>

## Example 1

- ◆ <target name="compile">
- ◆ <target name="init">
- ◆ <target name="clean">

## Types

- ◆ Mostly related to describing files and directories
  - <fileset>
  - <path>

## <fileset>

- ◆ A set of files
- ◆ <fileset>
  - dir – root directory of this file set
  - <include>
  - <exclude>

## <fileset> Examples

```
<fileset dir="d:/tomcat/common/lib/">
<fileset dir="d:/tomcat/common/lib">
 <include name="*.jar"/>
</fileset>

<fileset dir="d:/tomcat/common/lib">
 <include name="**/*.jar"/>
</fileset>

<fileset dir="d:/tomcat/common/lib">
 <include name="**/*.jar"/>
 <exclude name="**/naming*.jar"/>
</fileset>
```

## <path>

- ◆ A list of files and directories
- ◆ <path>
  - files: <fileset>, <filelist>
  - directories: <dirset>
  - other paths: <pathelement>, <path>
- ◆ <classpath>

## Example 2

- ◆ Specify a classpath that include
  - Java class libraries
  - Tomcat class libraries
  - Additional class libraries
    - lib/\*.jar

## The Scripting Language Analogy

- |             |   |             |
|-------------|---|-------------|
| ◆ build.xml | → | ◆ Program   |
| ◆ Property  | → | ◆ Variable  |
| ◆ Target    | → | ◆ Function  |
| ◆ Task      | → | ◆ Command   |
| ◆ Type      |   | ◆ Data type |

## Using Ant in Eclipse

- ◆ Run → External Tools → External Tools Configurations...
- ◆ Select Ant Build, then New
- ◆ Give the build a name
- ◆ In the Main tab, select the build file
- ◆ In the Targets tab, choose the target(s)
- ◆ Run

## Using Ant for Your Projects

- ◆ You don't have to be an Ant expert
- ◆ Start with a sample build file
  - Understand it
  - Adapt it
- ◆ Ant Manual
  - <http://ant.apache.org/manual/index.html>