



# ADMINISTRATION

- **Apr 5<sup>th</sup> – Session 11: Complex Development/Deployment**
  - @Annotations
  - Libraries and Packages
  - GUI / GIS Development
  - Quiz 3
- **Apr 12<sup>th</sup> – Session 12: Extra**
  - Assignment \$5abc due
- **Apr 19<sup>th</sup> – Session 13: Full Review**
- **Apr 26<sup>th</sup> – Final Exam (Online proctored)**

# THE LECTURE

- **Recap**
- **@Annotations**
- **Libraries and Packages**
  - External Jars
  - Using third party libraries
- **GIS Development**
  - Basic World
  - Layers

# RECAP

# @ANNOTATIONS

# @ANNOTATIONS

## Example:

```
import java.lang.annotation.ElementType;
import java.lang.annotation.Retention;
import java.lang.annotation.RetentionPolicy;
import java.lang.annotation.Target;
```

```
@Retention (RetentionPolicy.RUNTIME)
```

```
@Target (ElementType.TYPE) class, interface
```

```
public @interface MyPlugin {
```

```
    String name();
```

```
}
```

```
    @Target determines where an annotation can be applied
```

```
    CONSTRUCTION, FIELD, METHOD, LOCAL_VARIABLE, TYPE_USE, PACKAGE, PARAMETER
```

# @ANNOTATIONS

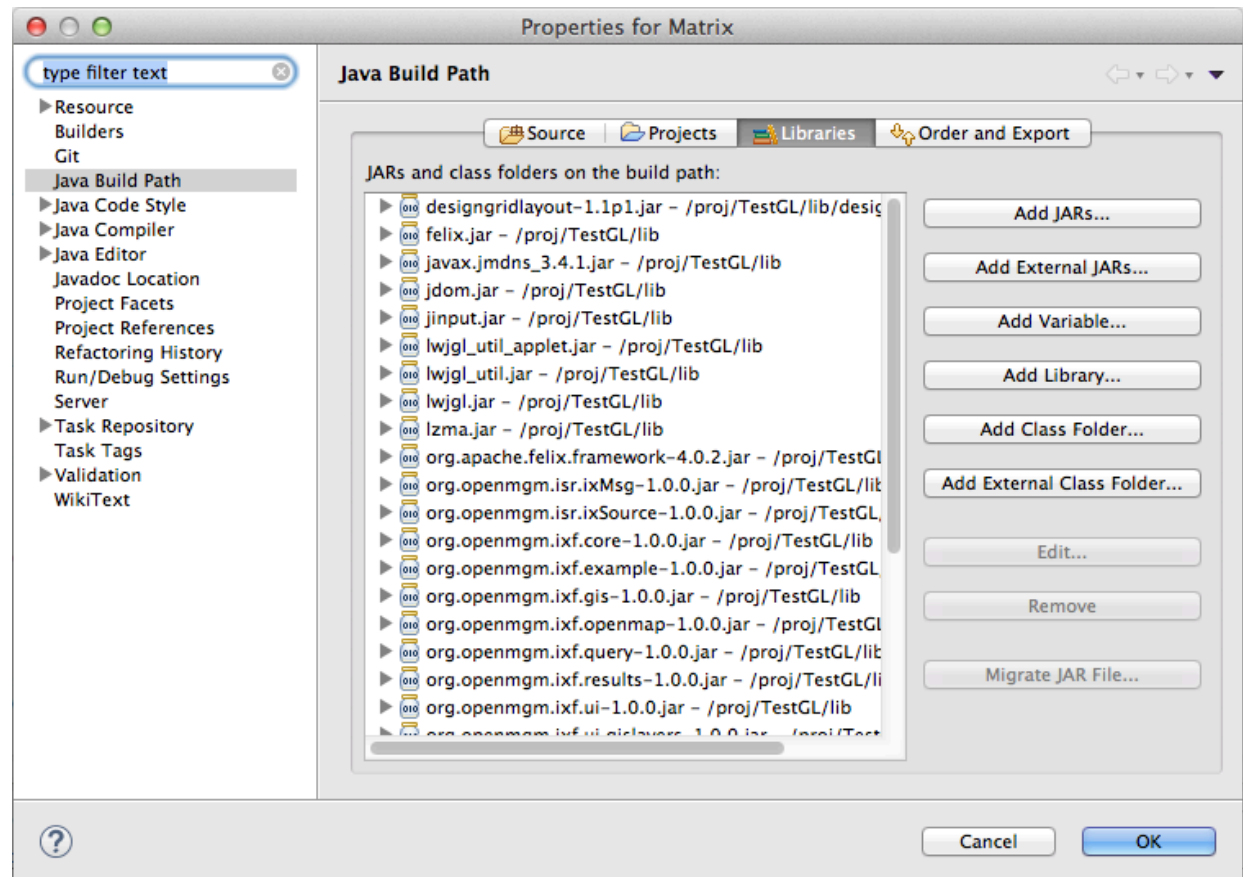
An annotation may be accessed during program execution (Runtime), by leveraging Reflection:

```
@MyAnno(str = "Annotation", val = "50")  
  
public static void myMethod() {  
    Meta ob = new Meta();  
    Class<?> c = ob.getClass(); // Reflection  
    Method m = c.getMethod("myMethod");  
    MyAnno anno = m.getAnnotation(MyAnno.class);  
    ...  
}
```

# **LIBRARIES AND PACKAGES**



# LIBRARIES



- **Importing Libraries into your project**
  - Eclipse: Project -> Properties
  - Select the 'Java Build Path', then the Libraries tab

# ADDING JARS TO YOUR CLASSPATH

Like a path to your class files, a jar may be provided as a classpath destination:

```
java -cp ../lib/lwjgl.jar org.a.Example
```

If you have multiple jars, they be be listed in sequence, separated by a colon (:)

```
java -cp ../lib/lwjgl.jar:../lib/lwjgl_test.jar org.a.Example
```

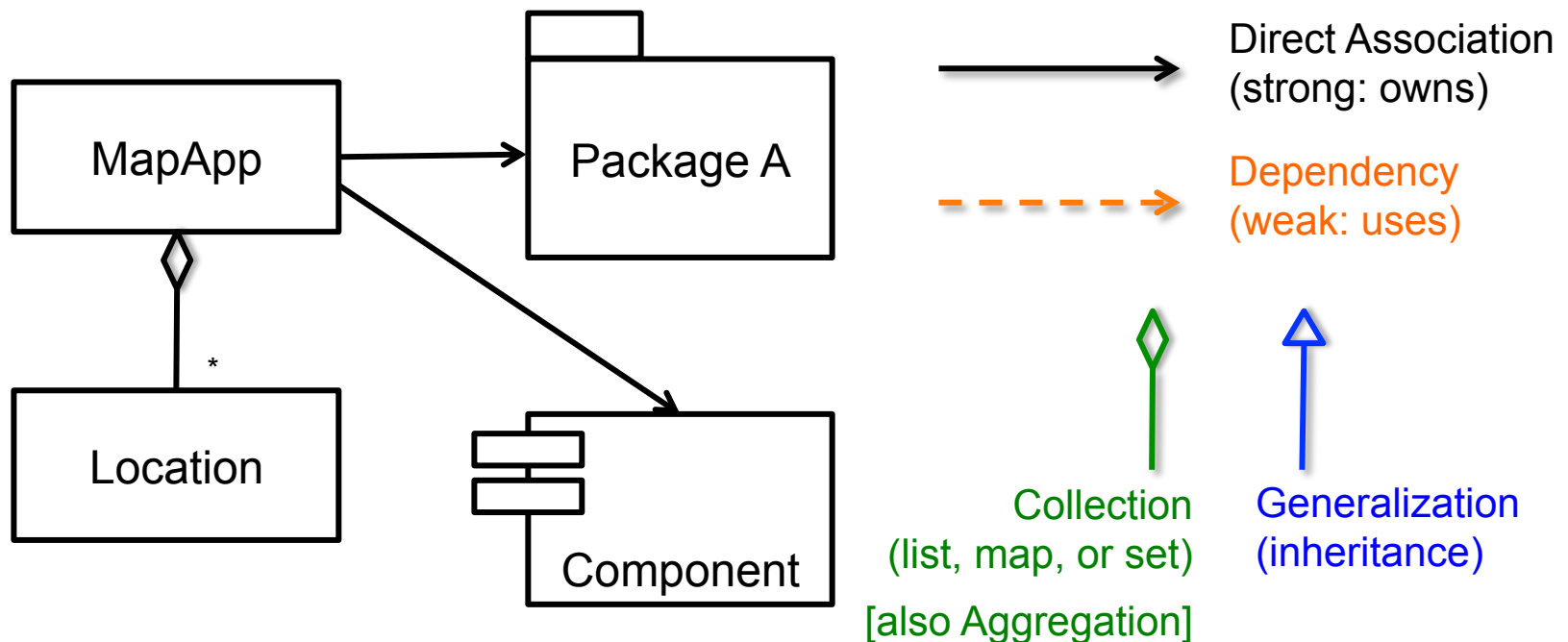
## UML – EXTERNAL PACKAGES



# PACKAGES

# UML CLASS DIAGRAM

- For convenience, we can reference an entire package or library, rather than show every class



# LAYOUT LIBRARY

# ALTERNATE LAYOUT

```
public class myApp {  
    private JTextField nameTF = new TextField();  
    private JTextField idTF = new TextField;  
    //..  
  
    private makePanel() {}  
        JPanel aPanel = new JPanel();  
        DesignGridLayout pLayout = new DesignGridLayout(aPanel);  
  
        pLayout.row().grid(new JLabel("Name")).add(nameTF);  
        pLayout.row().grid(new JLabel("ID")).add(idTF);  
        pLayout.emptyRow();  
        pLayout.row().center().add(okButton, cancelButton);  
}
```

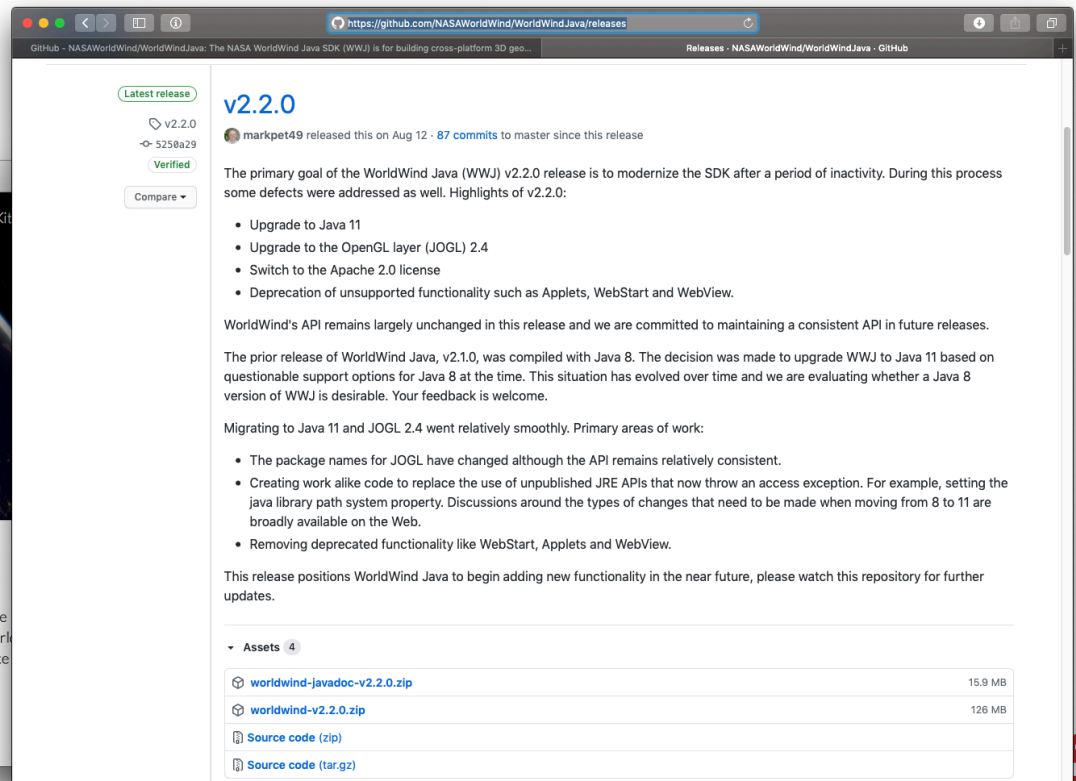
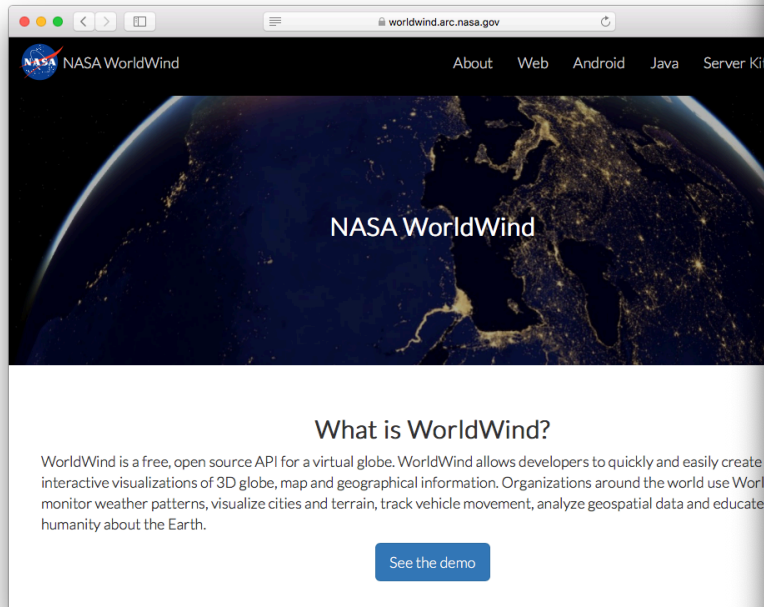
**DESIGNGRID LAYOUT**

# **LIBRARY DEMO**

# BUILDING WORLDS

## Download the NASA WorldWind v2.2.0 Java SDK from GitHub

- <https://github.com/NASAWorldWind/WorldWindJava/releases>
- Download a .zip archive (version 2.2.0 or later)





# RUNNING EXAMPLES

Example code may be executed using a script

```
> cd installPath\worldwind-v2
```

Examples java programs are in the source (src) folder at:

```
gov\nasa\worldwindx\examples
```

To execute an example type:

```
> run-demo full-classname
```

For example, to run NASA's HelloWorldWind application, type:

(Windows)

```
> run-demo gov.nasa.worldwindx.examples.HelloWorldWind
```

(OSX & Linux)

```
> ./run-demo.bash gov.nasa.worldwindx.examples.HelloWorldWind
```

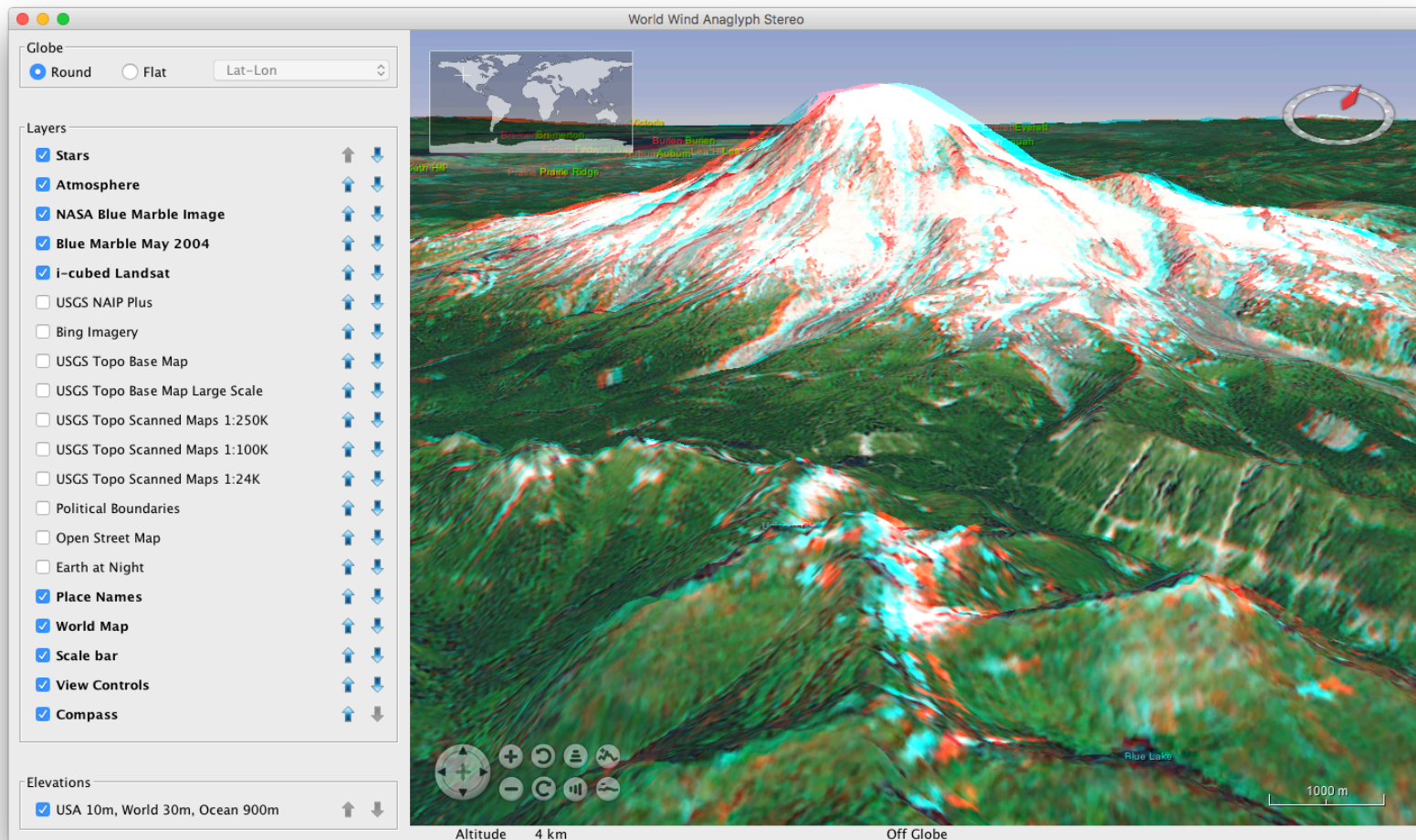
# BUILDING WORLDWIND

NOTE: The .zip archive includes pre-built .jar files, so building is not required

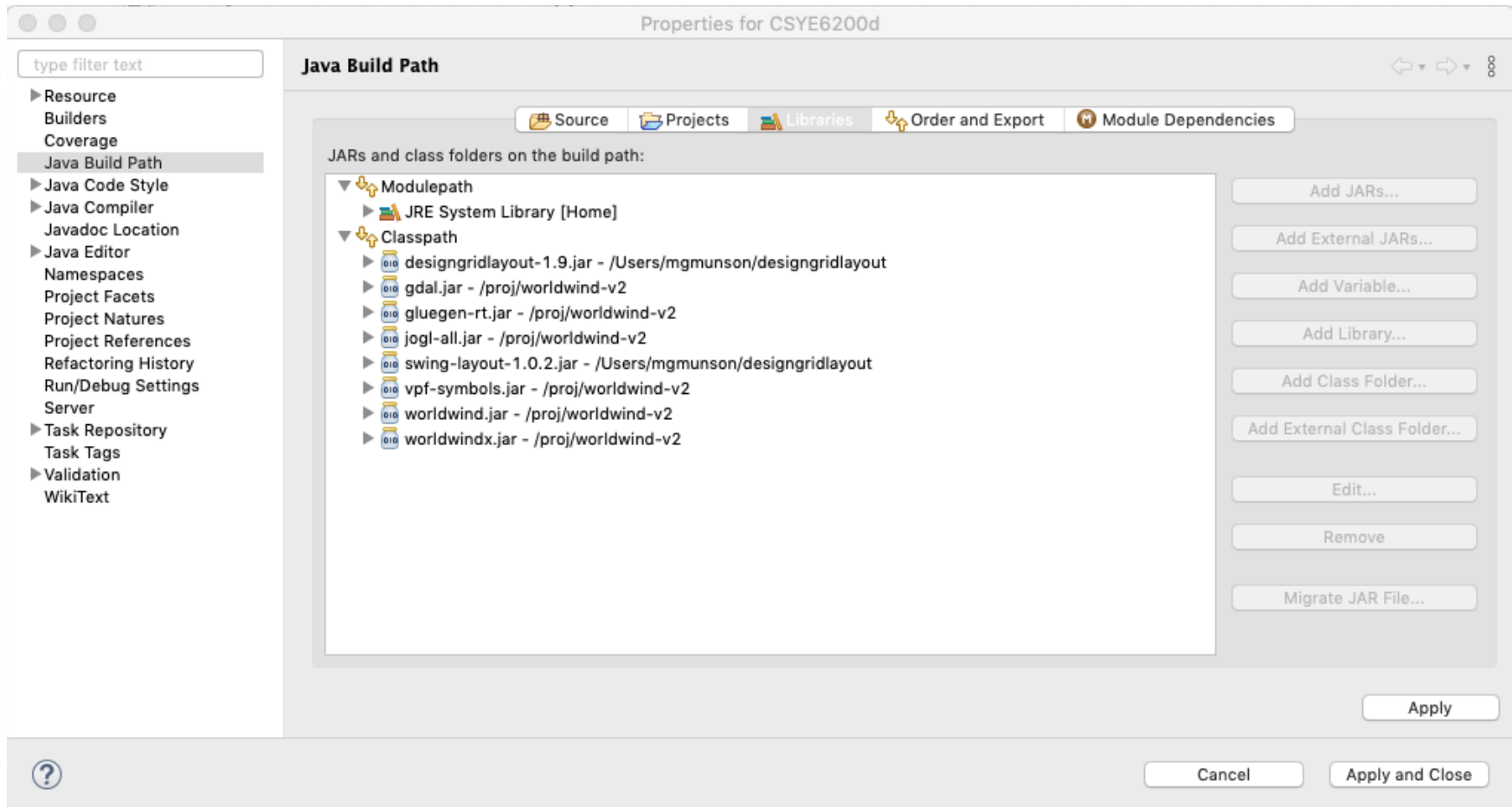
- If you've retrieved the WorldWind Java source code, the libraries (i.e. jar files) must be built before you can run demos or code
- Download/Install the Apache Ant tool ([ant.apache.org](http://ant.apache.org))
- Open a console window
- Enter the 'WorldWindJava-master' folder and type 'ant' to build worldwind.jar and worldwindx.jar

# WORLDWIND STEREO

```
./run-demo.bash gov.nasa.worldwindx.examples.Stereo
```



# WWJ LIBRARIES



**NASA WORLDWIND**

# **GIS DEMO**

# NEXT WEEK

JABG: Review

- Extra Topic
- Assignment 5abc due
- Following week: Comprehensive Review