CS520 Web Programming
Java Annotations

Chengyu Sun
California State University, Los Angeles

Java Annotations

◈ Available since JDK 1.5 (Java 5)
◈ Data about a program that is not part of the program itself
◈ Can be used by compiler, VM, and other software tools for *various purposes*

Annotation Examples …

◈ Error detection

```
@Override
protected void doGet( HttpRequest request,
        HttpResponse response )
```

◈ Suppress warning

```
@SuppressWarnings("unchecked")
public List<User> getAllUsers()
```

… Annotation Examples …

◈ Servlet mapping in Sevelet 3.x Specification

```
@WebServlet(name="Hello", urlPatterns="/Hello")
public class HelloServlet extends HttpServlet
```

◈ Web service

```
@WebService
public class HashService {

    @WebMethod
    public String md5( String text )
}
```

… Annotation Examples

◈ Hibernate mapping

```
public class Employee {

    @Id
    private Integer id;

    @Basic
    private String name;

    @ManyToOne
    private Employee supervisor;
}
```

Create Annotation

◈ `BubbleSort.java`
◈ `BubbleSortTest.java`
◈ `TestRunner.java`
  ▪ Run `test1()` and `test2()`, or
  ▪ Run all the test methods annotated with `@Test`

@Test

```
@Retention( RetentionPolicy.RUNTIME )
@Target( ElementType.METHOD )

public @interface Test  {}
```

Target

- Indicates where the annotation can be applied
  - ElementType - http://download.oracle.com/javase/6/docs/api/java/lang/annotation/ElementType.html

Retention

- Indicates how long the annotation is to be retained
  - `RetentionType.SOURCE` – the annotation should be discarded by the compiler
  - `RetentionType.CLASS` (default) – the annotation should be stored in the class file
  - `RetentionType.RUNTIME` – the annotation should be stored in the class file and be availabe during runtime

Apply and Access Annotation

- Apply @Test to a method

```
@Test
public static boolean test1() {…}
```

- Access the annotation

```
Test testAnnotation = method.getAnnotation( Test.class );
```

The `repeat` Element

```
@Retention( RetentionPolicy.RUNTIME )
@Target( ElementType.METHOD )

public @interface Test  {

        int repeat() default 1;

}
```

About Annotation Elements

- An element is defined as a method
- The type of an element is limited to primitives, `String`, `Class`, enums, annotations, and arrays of these types
- An element can have a default value

Specify Element Values

@Test(repeat = 3)

@Column(nullable = false, unique = true)

@WebServlet(value = {"/Hello", "/World"})

@WebServlet(value = {"/HelloWorld"})
⬇
@WebServlet(value = "/HelloWorld")
⬇
@WebServlet("/HelloWorld")

Readings

◈ Annotations -
http://download.oracle.com/javase/1,5.0/docs/guide/language/annotations.html