

## CS520 Web Programming Java Annotations

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## Annotation Examples ...

### ◆ Error detection

```
@Override  
protected void doGet( HttpServletRequest request,  
                      HttpServletResponse 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;  
}
```

## 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*

## Create Annotation

- ◆ `BubbleSort.java`
- ◆ `BubbleSortTest.java`
- ◆ `TestRunner.java` – run all the test methods in `BubbleSortTest`

## @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 available during runtime

## 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>