

Java Workshop



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Previous Experience

Morgan Stanley
One client at a time.

OILspace
the resource enriched

Future *i*

 **image-union.com**

London e-Science Centre
Le-SC


syzygy



Topics

- Swing
 - Building a simple GUI driven application
- Collections and ADTs
 - Using containers to store data
- XML
 - APIs for working with XML in Java



Format

- No (or not much) code on slides
- Better to show real code “live”
- All code will go on the web later

<http://www.doc.ic.ac.uk/~rbc/javaworkshop>



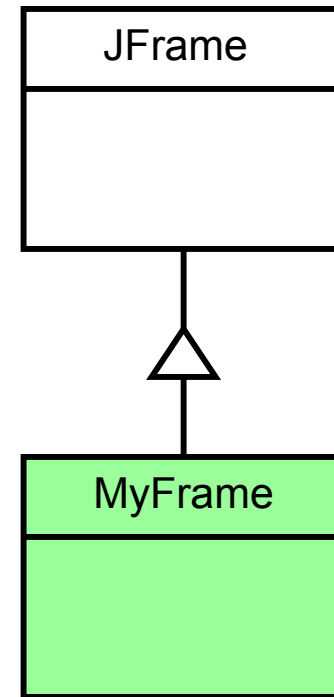
Swing

- Java's GUI toolkit
- Easy to make programs with windows, buttons, menus, etc
- Swing classes live in `javax.swing`
Most begin with a J (JButton, JMenu...)



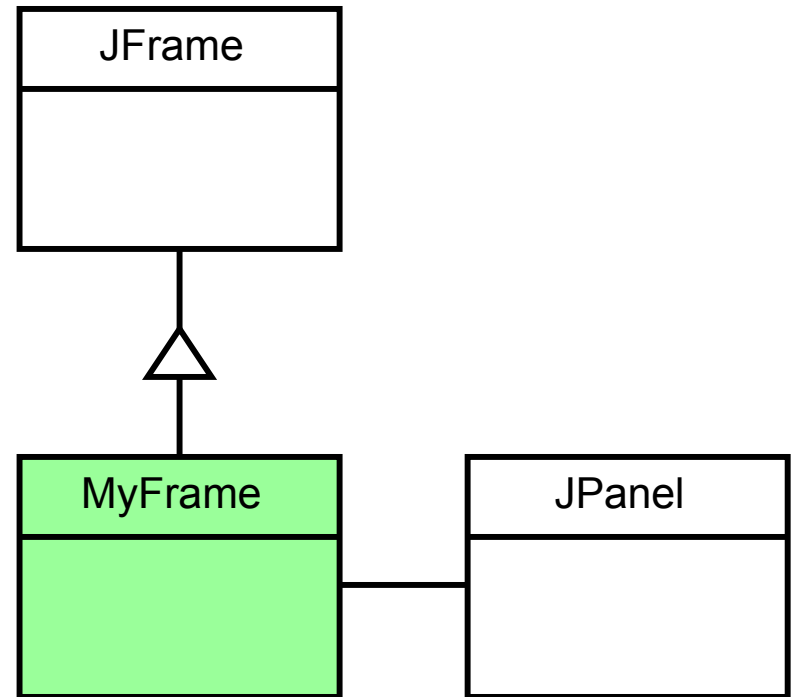
Starting off - JFrame

- JFrame provides basic window functionality
- Make your main GUI class extend JFrame
- Use `pack()` and `show()`



Adding things to your frame

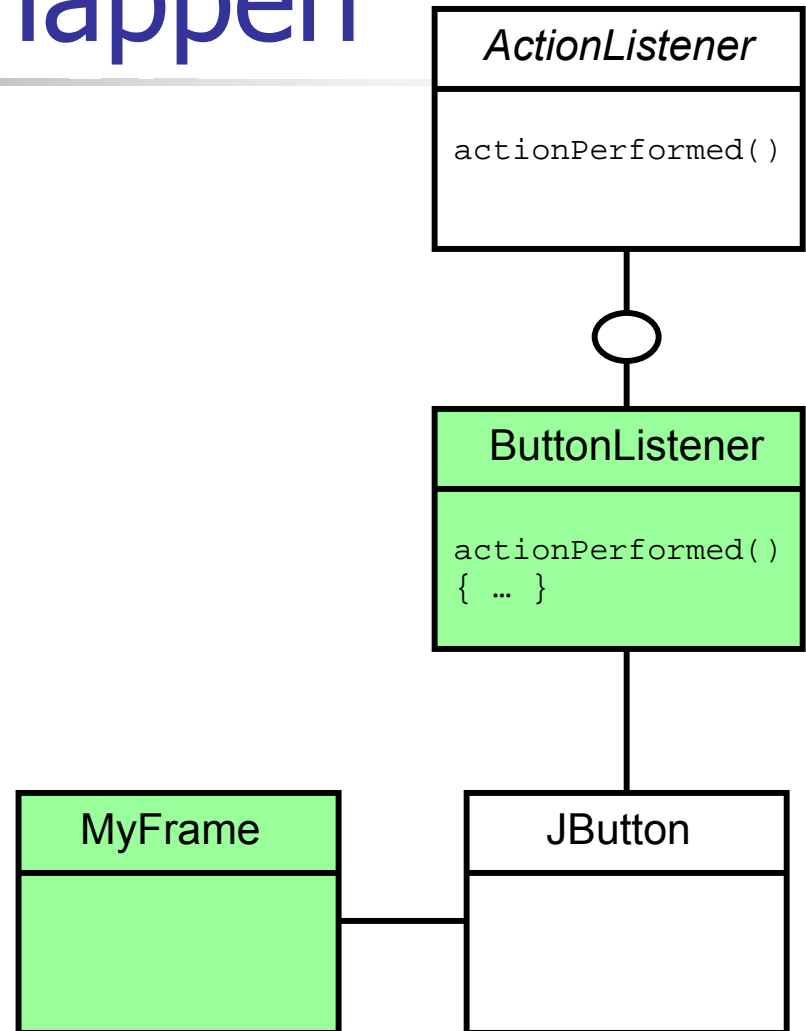
- Frames don't do much on their own
- Need to put something in it to display text/graphics
- Add a JTextArea or JPanel





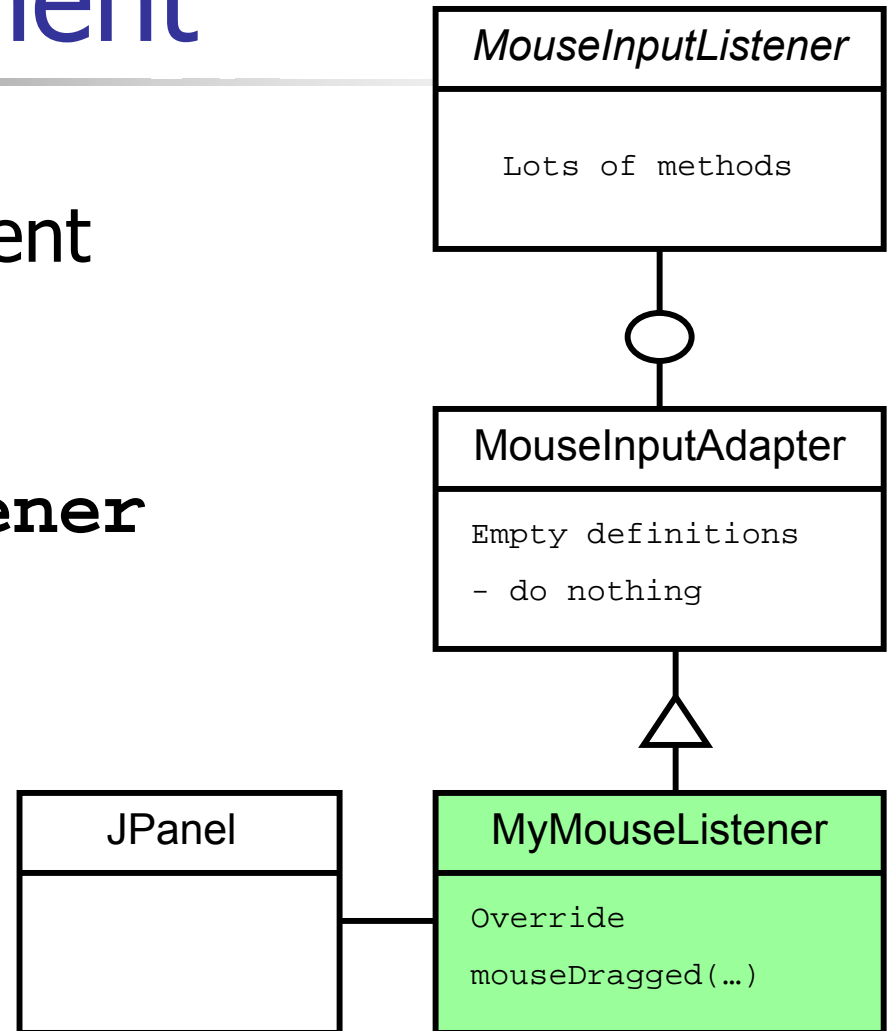
Making things Happen

- Listen for events (button presses etc)
- Swing will call methods you define when events occur
- **ActionListener** interface



Mouse Movement

- Different type of event
MouseEvent
- **MouseListener** interface
- Use an adapter to save code



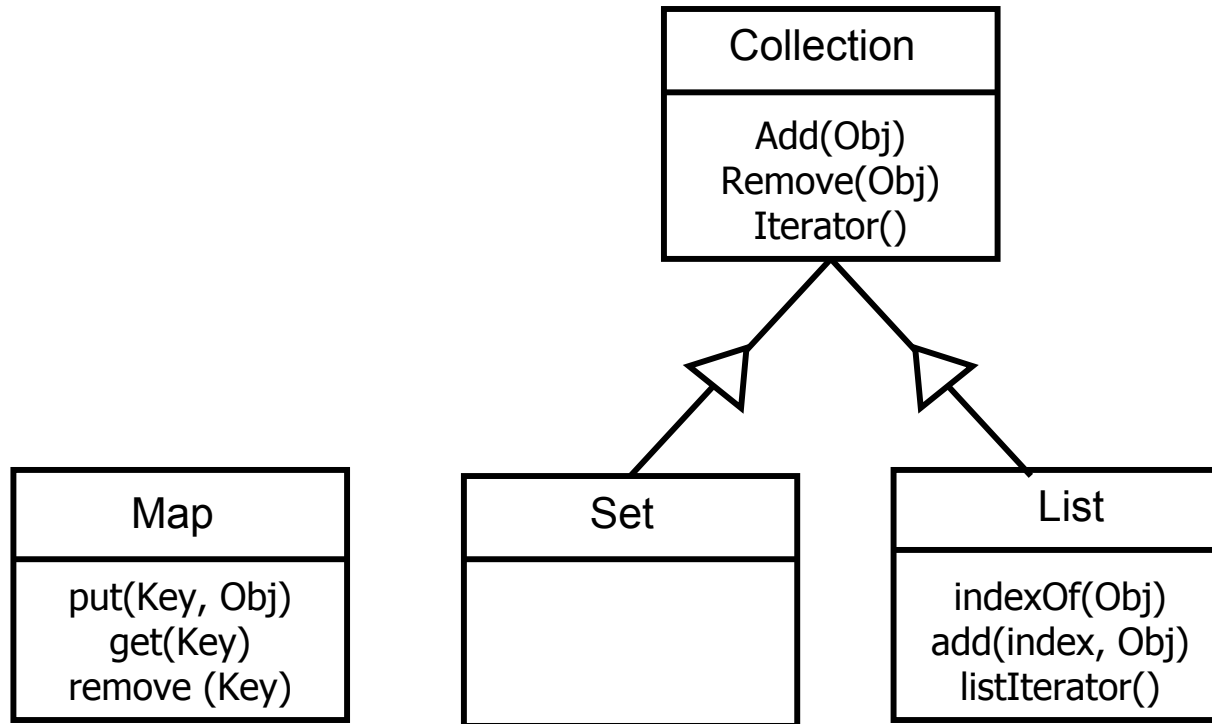


Collections

- Abstract Data Type
- Collection Interface
 - `java.util.List` - ordered items
 - `java.util.Map` - indexable items
 - `java.util.Set` - unordered non-duplicate items



Collections API





java.util.Set

- Implementations
 - HashSet - (Constant time)
 - SortedSet
 - TreeSet - ($\log(n)$ time)



java.util.List

- Implementations
 - ArrayList
 - LinkedList
 - Vector (synchronized)
 - Stack - LIFO



java.util.Map

- Implementations
 - HashMap
 - Hashtable (synchronized)
 - SortedMap (ordered by key order)
 - TreeMap (Red-black tree, $\log(n)$)
 - WeakHashMap (entry can be garbage collected when key is not in use)



Other Collection Classes

- `java.util.Collections`
 - Helper methods working on Collection classes
- `java.util.Arrays`
 - Helper methods working on java array (`Object[]`)



XML

- Structured Data
- Plain Text
- Easily Processed
- Verify against well-defined schema

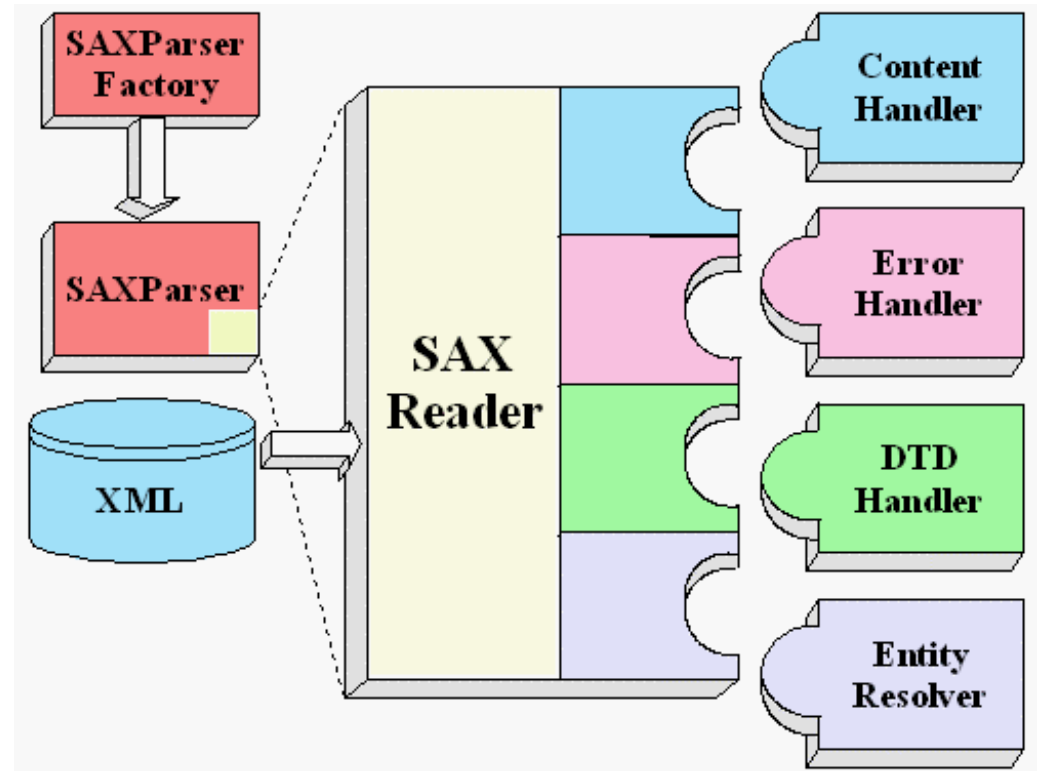


Processing Model

- Simple API for XML (SAX)
- Document Object Model (DOM)

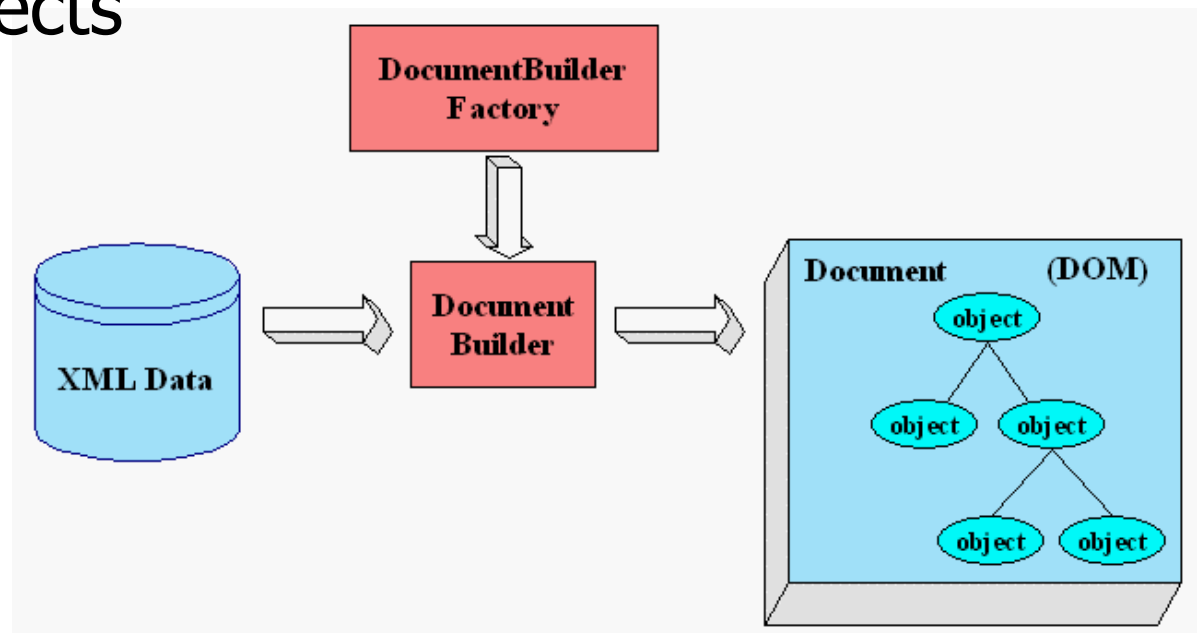
SAX

- Event Based
- User-defined Callbacks



DOM

- Object Based
- Translate XML into tree of Java Objects for easy manipulation





Servlets, JSP & JDBC

- Servlets
 - Java programs that run on web server
 - Comparable with CGI scripts (eg Perl)
- JSP
 - Combine HTML with Java code fragments
 - Comparable with PHP
- JDBC
 - Mechanism for connecting to a database



Servlets

- Dynamically produce web page
- Run on server – in servlet container
 - Tomcat
 - Resin
- Get and Post
- Write out HTML to browser



JDBC

- Java Database Connection library
- Connect to a particular DB
 - Driver
 - Username and password
- Pass SQL query as String
- Get results and ResultSet
- Catch exceptions