Research Overview

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Outline

- Software Engineering Research
- Applications of Statistical Learning
- Software Engineering Projects

Software Engineering Research

- **Code analysis** for developer productivity
  - **CnP: C**opy a**n**d **P**aste Support
  - **BCC: B**etter **C**ode **C**ompletion
  - **CriticAL**: a **Critic** for **A**PI's and **L**ibraries
- Interested in applying **code analysis** to solve **security** problems (e.g., malware detection, security vulnerability detection, intrusion detection)

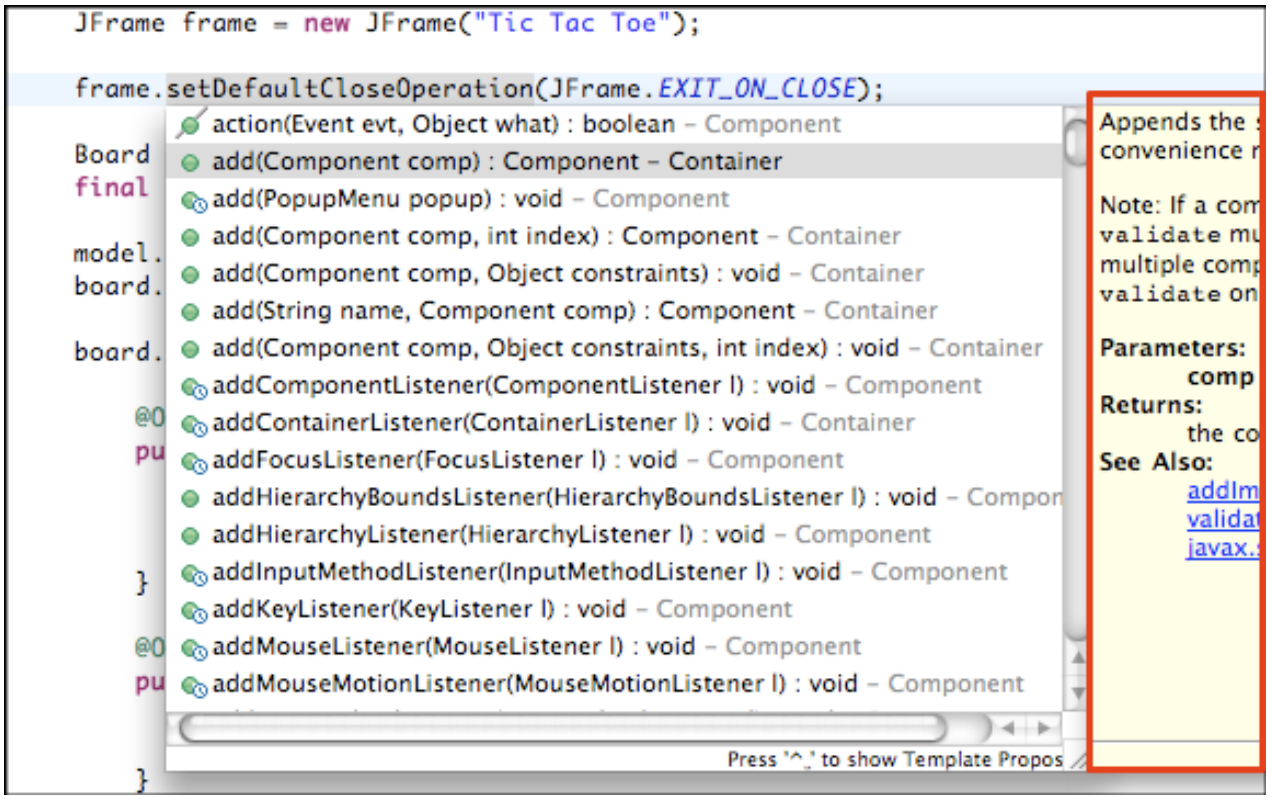
CnP: Copy, Paste, and Modify

- Better quality and faster development by leveraging *regularity* within code clones

```
115
116         rPanel = new JPanel(new FlowLayout());
117         rPanel.setOpaque(false);
118         rPanel.add(new JLabel("Red"));
119         rSlider = new JSlider(0, 255, 0);
120         rSlider.setOpaque(false);
121         rSlider.addChangeListener(colorChangeListener);
122         rPanel.add(rSlider);
123
124         gPanel = new JPanel(new FlowLayout());
125         gPanel.setOpaque(false);
126         gPanel.add(new JLabel("Red"));
127         gSlider = new JSlider(0, 255, 0);
128         gSlider.setOpaque(false);
129         gSlider.addChangeListener(colorChangeListener);
130         gPanel.add(gSlider);
131
```

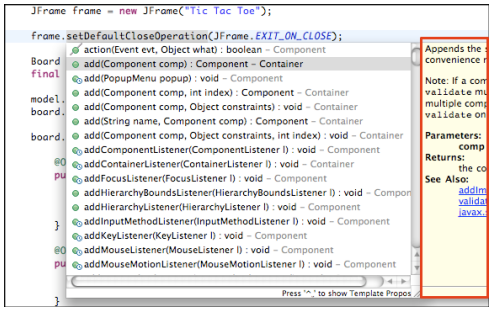
BCC: Better Code Completion

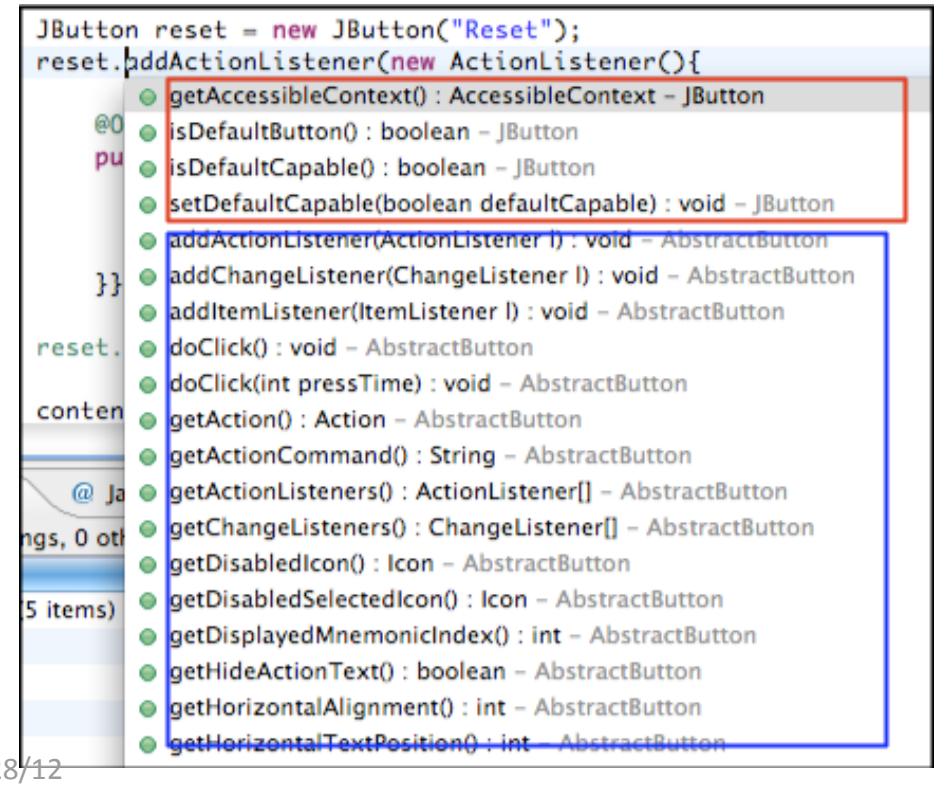
- Current Code Completion, alphabetical



BCC: Better Code Completion

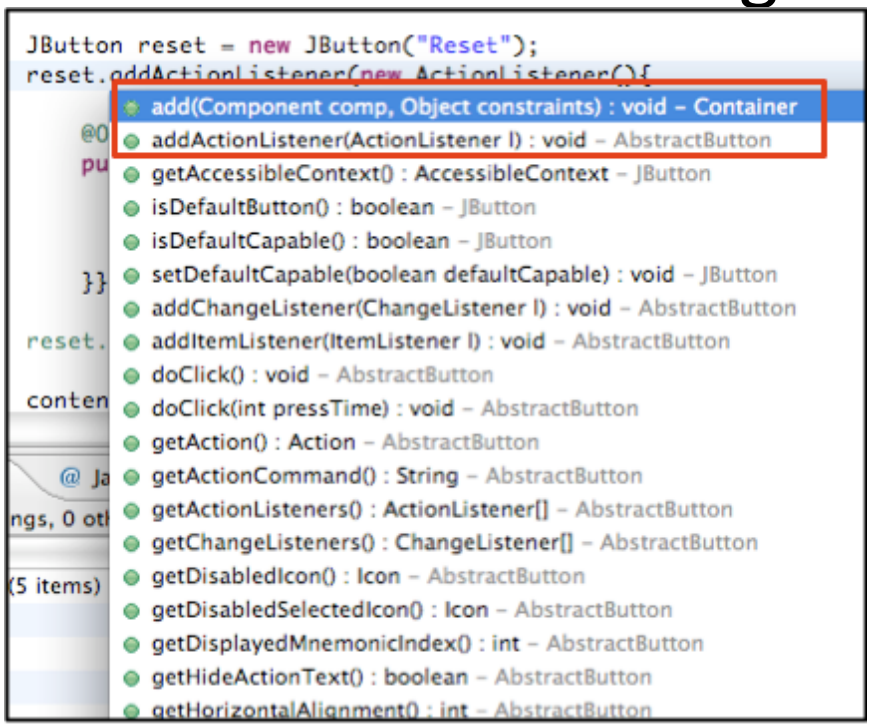
- Current Code Completion
- Type-based sorting

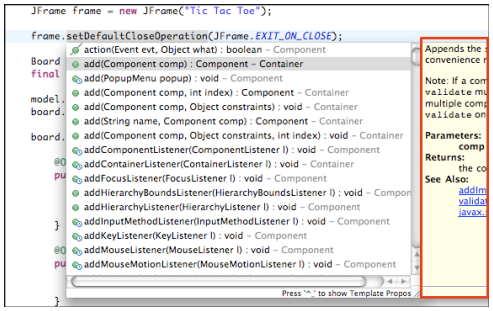


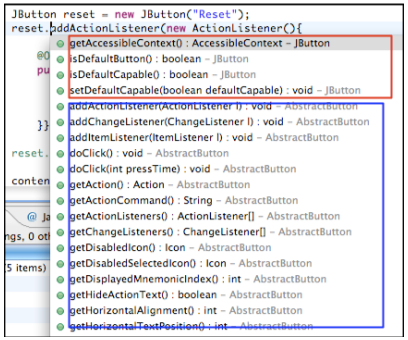


BCC: Better Code Completion

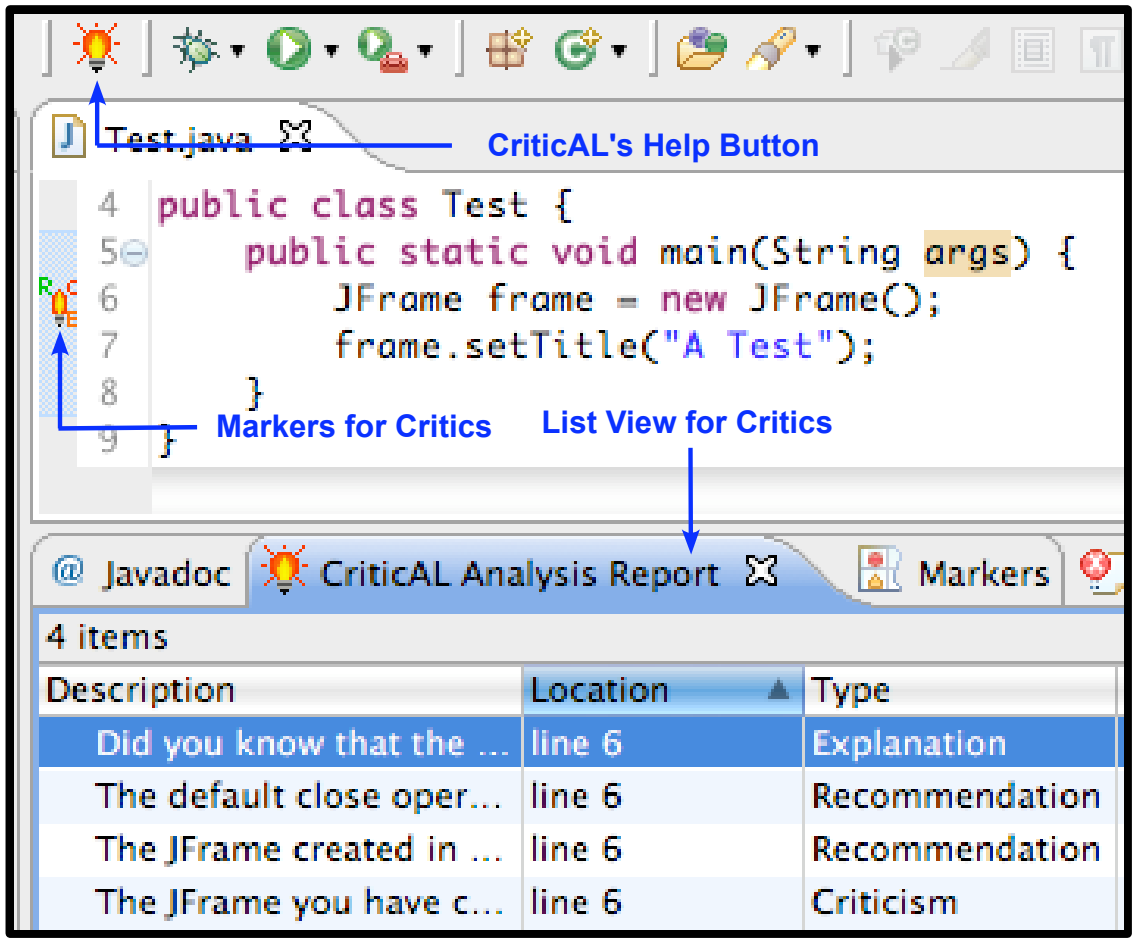
- Current Code Completion
- Type-based sorting
- Use-count-based sorting







CriticAL: **Critic** for **A**PIs and **L**ibraries



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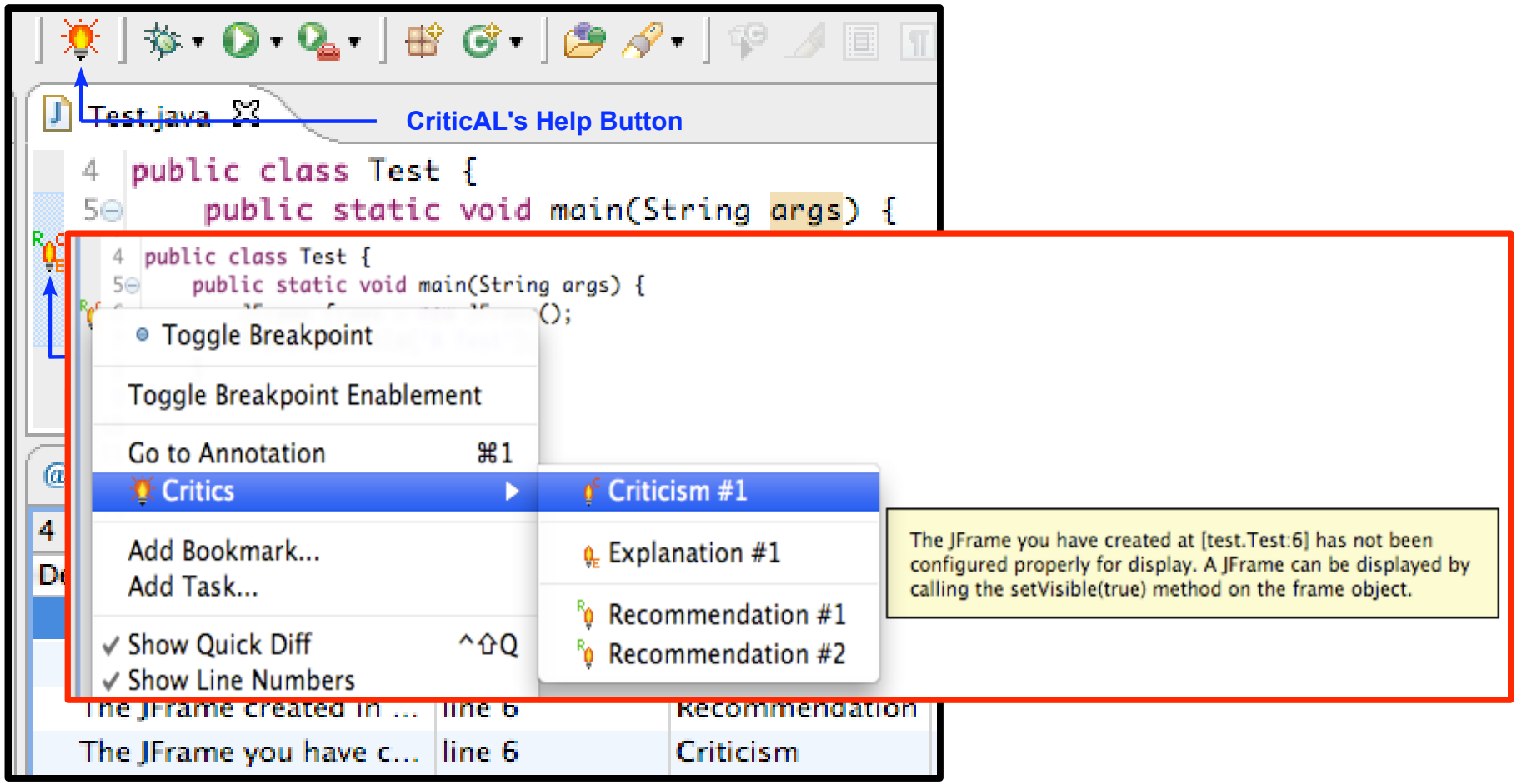

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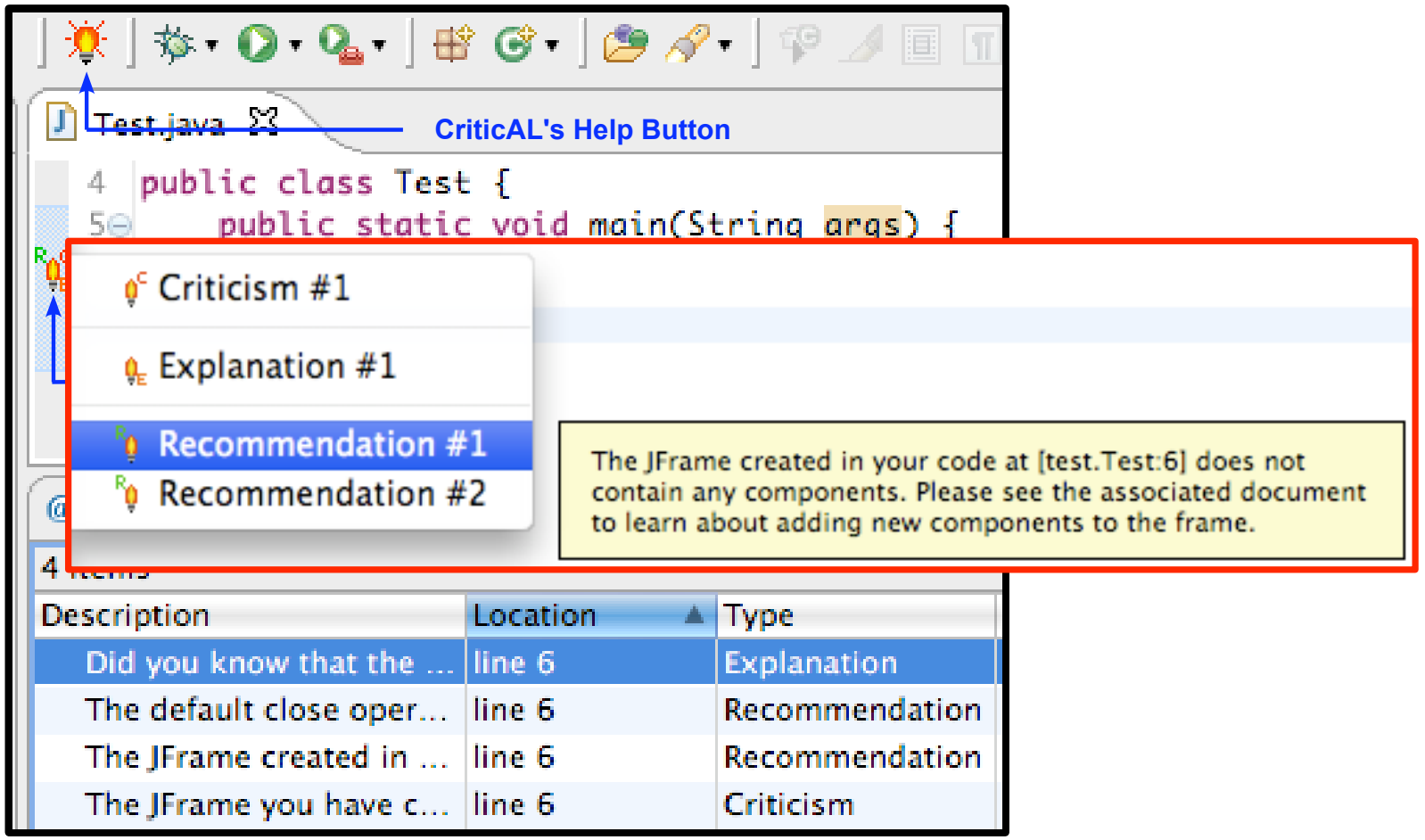

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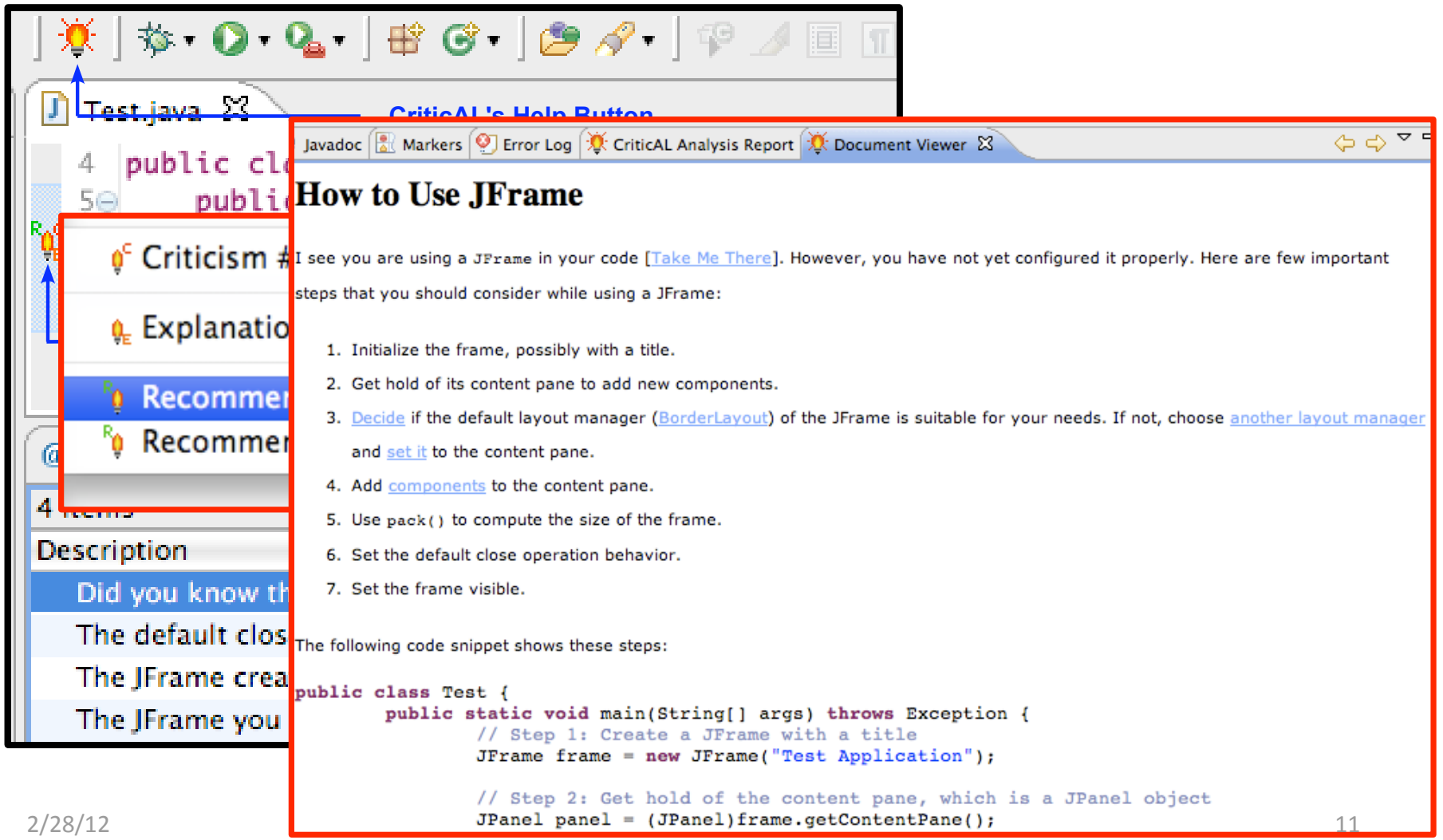

Software Engineering Research

- **Code analysis** for developer productivity
  - **CnP: C**opy a**n**d **P**aste Support
  - **BCC: B**etter **C**ode **C**ompletion
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- Interested in applications in **security** (e.g., malware detection, security vulnerability detection)

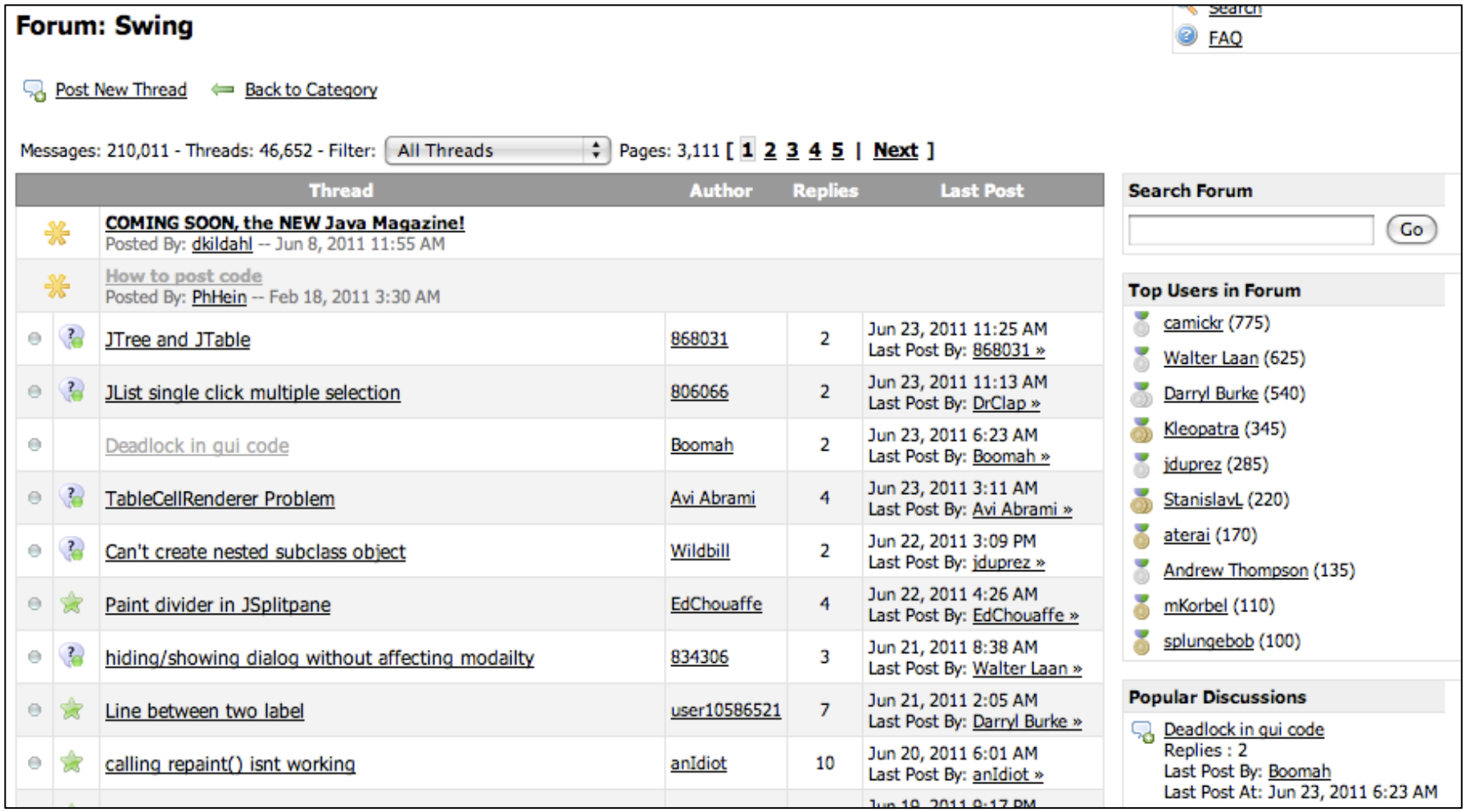
Applications of Statistical Learning

- Automated classifications of online discussions of programming problems into topics
  - may result in better technical support
  - Cyber-security???
- Keystroke analysis as a means to continuously authenticate a computer user, after they are logged in (complementing password/user id)

Classification of online discussions

- Categorize Java Swing newsgroup discussions
  - currently 8 categories of Swing-specific problems
- Nearly 1,000 manually labeled discussions
- ~94% accuracy using a Naïve Bayes classifier

Classification of online discussions



Forum: Swing

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Messages: 210,011 - Threads: 46,652 - Filter: All Threads Pages: 3,111 [1 2 3 4 5 | Next]

Thread	Author	Replies	Last Post
COMING SOON, the NEW Java Magazine! Posted By: dkildahl -- Jun 8, 2011 11:55 AM			
How to post code Posted By: PhHein -- Feb 18, 2011 3:30 AM			
JTree and JTable	868031	2	Jun 23, 2011 11:25 AM Last Post By: 868031 »
JList single click multiple selection	806066	2	Jun 23, 2011 11:13 AM Last Post By: DrClap »
Deadlock in gui code	Boomah	2	Jun 23, 2011 6:23 AM Last Post By: Boomah »
TableCellRenderer Problem	Avi Abrami	4	Jun 23, 2011 3:11 AM Last Post By: Avi Abrami »
Can't create nested subclass object	Wildbill	2	Jun 22, 2011 3:09 PM Last Post By: jduprez »
Paint divider in JSplitpane	EdChouaffe	4	Jun 22, 2011 4:26 AM Last Post By: EdChouaffe »
hiding/showing dialog without affecting modailty	834306	3	Jun 21, 2011 8:38 AM Last Post By: Walter Laan »
Line between two label	user10586521	7	Jun 21, 2011 2:05 AM Last Post By: Darryl Burke »
calling repaint() isnt working	anIdiot	10	Jun 20, 2011 6:01 AM Last Post By: anIdiot »

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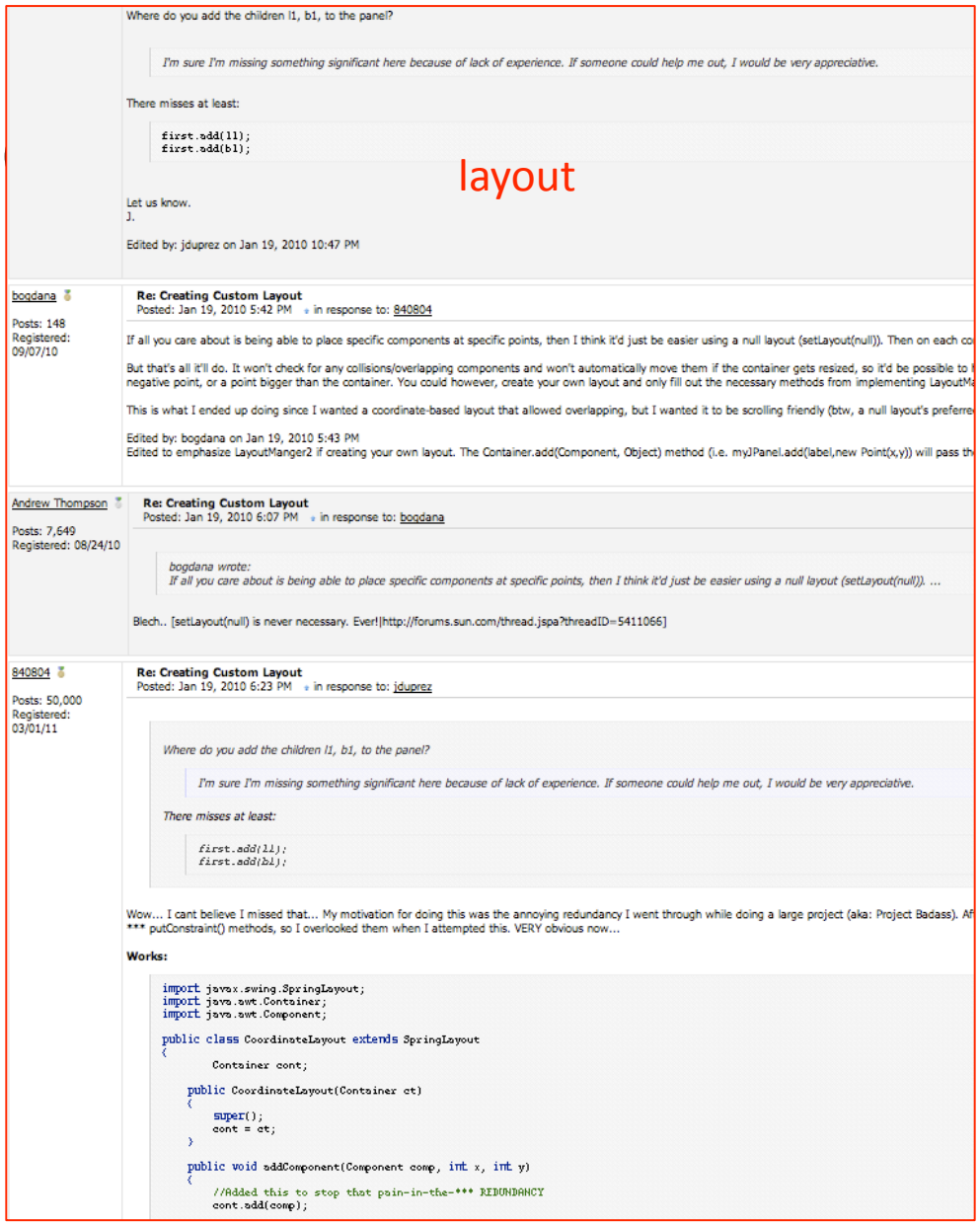
mKorbel (110)
splungebob (100)

Popular Discussions

Deadlock in gui code
Replies : 2
Last Post By: Boomah
Last Post At: Jun 23, 2011 6:23 AM

Classification



Where do you add the children l1, b1, to the panel?

> *I'm sure I'm missing something significant here because of lack of experience. If someone could help me out, I would be very appreciative.*

There misses at least:

```
first.add(l1);
first.add(b1);
```

Let us know.
J.

Edited by: jduprez on Jan 19, 2010 10:47 PM

bogdana
Posts: 148
Registered: 09/07/10

Re: Creating Custom Layout
Posted: Jan 19, 2010 5:42 PM in response to: 840804

If all you care about is being able to place specific components at specific points, then I think it'd just be easier using a null layout (setLayout(null)). Then on each co

But that's all it'll do. It won't check for any collisions/overlapping components and won't automatically move them if the container gets resized, so it'd be possible to
negative point, or a point bigger than the container. You could however, create your own layout and only fill out the necessary methods from implementing LayoutM

This is what I ended up doing since I wanted a coordinate-based layout that allowed overlapping, but I wanted it to be scrolling friendly (btw, a null layout's preferre

Edited by: bogdana on Jan 19, 2010 5:43 PM
Edited to emphasize LayoutManger2 if creating your own layout. The Container.add(Component, Object) method (i.e. myJPanel.add(label,new Point(x,y)) will pass th

Andrew Thompson
Posts: 7,649
Registered: 08/24/10

Re: Creating Custom Layout
Posted: Jan 19, 2010 6:07 PM in response to: bogdana

> *bogdana wrote:*
> *If all you care about is being able to place specific components at specific points, then I think it'd just be easier using a null layout (setLayout(null)). ...*

Blech.. [setLayout(null) is never necessary. Ever!|http://forums.sun.com/thread.jspa?threadID=5411066]

840804
Posts: 50,000
Registered: 03/01/11

Re: Creating Custom Layout
Posted: Jan 19, 2010 6:23 PM in response to: jduprez

> *Where do you add the children l1, b1, to the panel?*
>
> > *I'm sure I'm missing something significant here because of lack of experience. If someone could help me out, I would be very appreciative.*
>
> *There misses at least:*
>
> ```
> first.add(l1);
> first.add(b1);
> ```

Wow... I cant believe I missed that... My motivation for doing this was the annoying redundancy I went through while doing a large project (aka: Project Badass). Af
*** putConstraint() methods, so I overlooked them when I attempted this. VERY obvious now...

Works:

```
import javax.swing.SpringLayout;
import java.awt.Container;
import java.awt.Component;

public class CoordinateLayout extends SpringLayout
{
        Container cont;

    public CoordinateLayout(Container ct)
    {
        super();
        cont = ct;
    }

    public void addComponent(Component comp, int x, int y)
    {
        //Added this to stop that pain-in-the-*** REDUNDANCY
        cont.add(comp);
```

https://forums.oracle.com/forums/thread.jspa?messageID=5698221

Software Engineering Projects

- One cannot do software engineering research without practicing!

- **Commercial projects (Feasibility exploration and prototyping)**
  - My group has more than 5 grad/undergrad any given year
  - As research, or course projects
- Expertise areas
  - Web-/desktop-based information systems
  - GUI/usability design
  - Numerical and other algorithms
  - Testing/maintaining systems
  - Developer tools …
- Company Benefits
  - Low cost, low risk, service of experienced professor and a grad
  - Able to evolve the system with the customer

Summary

- **Software Engineering Research**
  - Code analysis for cyber-security (e.g., malware detection, security vulnerability detection)
- **Applications of Statistical Learning**
- **Software Engineering Projects**

Daqing Hou, dhou@clarkson.edu

Home page: http://people.clarkson.edu/~dhou

Research group: http://serl.clarkson.edu