
JMV Programmer's Guide

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JMV WWW home page: <http://www.ks.uiuc.edu/Development/jmv/>

Description

These pages give information to those wanting to develop their own code with JMV. They include information on modifying the applet to suit specific needs, and adding new items into the applet.

¹<http://www.ks.uiuc.edu/>

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Chapter 1

Introduction

This manual, along with the User's Guide and Installation Guide, document the use of JMV.

This guide is designed to aid users who are interested in modifying or extending the current implementation of JMV. This manual is organized into the following chapters following this introduction:

- **Modifying the applet parameters**

When using JMV as an applet, you can set certain parameters to control the applet's appearance. You can disable certain features, or have the molecule screen appear in a separate window. You can also customize default parameters that the applet will use when it starts, such as the molecule it displays, and the color and representation.

- **Adding a new feature**

JMV uses Java Beans to communicate information between the menu and the molecule window. Here, we provide instructions on how to add a new bean to JMV.

- **Javadocs**

Java has a program to generate Javadocs, documentation describing classes, their functions, and their members. Here, we tell you how to access JMV's Javadocs.

1.1 Credits and Program Reference

The authors request that any published work or images created using JMV include the following reference:

Bach, M., Brunner, R., Stone, J., Vandivort, K. "JMV"

JMV has been developed by the Theoretical Biophysics group at the University of Illinois and the Beckman Institute. The main authors of JMV are M. Bach, R. Brunner, J. Stone, K. Vandivort. This work is supported by grants from the National Institutes of Health (grant number PHS 5 P41 RR05969-04), the National Science Foundation (grant number BIR-9423827 EQ), and the Roy J. Carver Charitable Trust.

1.2 Copyright and Disclaimer

JMV is Copyright © 2000-2002 Theoretical Biophysics Group and the Board of Trustees of the University of Illinois

Chapter 2

Modifying the applet

JMV has several ways that programmers can change the appearance of the applet for their users. For example they can the molecule that appears on startup, which controls get shown in the menu, and the URL that shows up for the Help page.

2.1 Manually changing the applet code

There are several PARAM tags you can add to customize the JMV applet's appearance. Please note that in HTML code that has already been modified to use the Java Plug-In, these applet parameters must be added in 3 places in order to be effective:

1. Once as `<PARAM NAME = name VALUE=value>` after the `<OBJECT>` tag.
2. Once as `<... name = value ...>` within the `<EMBED...>` tag.
3. Once again as `<PARAM NAME = name VALUE = value>` after the `<APPLET>` tag.

The available JMV applet parameters are listed below.

- **FILE:**

If the FILE parameter is not null, then JMV will start by displaying the specified molecule. This is necessary if the LOADBUTTON or CONTROLS parameters are set, since there would be no other way to load a molecule. The file must be publicly available if others are to view it.

- **SEPARATE_WINDOW:**

If the SEPARATE_WINDOW parameter is “true”, then the molecule window will appear in a separate frame, instead of within the webpage. This is useful because the new window is resizable.

- **LOADBUTTON:**

If the LOADBUTTON parameter is “false”, then the “Load a file” option in the “File” menu will not be displayed. This is useful if you want the user to view a molecule, and change colors and representations, but not change the molecule being viewed.

- **CONTROLS:**

If the CONTROLS parameter is “false”, then the menu will not be shown. Only the molecule

window will be shown. This is useful if you want to display a molecule with a given representation and color, and not allow those to be changed, or to make the applet present itself with no controls for aesthetic reasons.

- **REP:**

If the REP parameter is set, JMV will display the initial molecule with the given rep. These are the current representation options:

- 1: Lines
- 2: VDW
- 3: Bonds
- 4: CPK
- 5: Trace
- 6: Tube
- 7: Licorice

- **COLOR:**

If the COLOR parameter is set, JMV will display the initial molecule with the given color scheme. These are the current options:

- 0: color by name
- 1: color by index
- 2: color by residue name
- 3: color by chain
- 4: color by segment name
- 5: color by structure

- **GRADIENT:**

If the GRADIENT parameter is set, JMV will display the initial molecule with the given color gradient. These are the current options:

- 0: Red→Green→Blue
- 1: Blue→Green→Red
- 2: Red→White→Blue
- 3: Blue→White→Red
- 4: Black→White
- 5: White→Black

- **WINHEIGHT:**

The WINHEIGHT parameter specifies the height of the molecule window. If not specified, the default is 400.

- **WINWIDTH:**

The WINWIDTH parameter specifies the width of the molecule window. If not specified, the default is 400.

- **PUBSYNCH:**

If the PUBSYNCH parameter is set to FALSE, the “Load session” and “Save session” options will not be shown in the “File” menu.

- **HELPPAGE:**

You can set the HELPPAGE parameter with the value of a URL to display when the “JMV Help” option under the “Help” menu is chosen. It defaults to the help page on the main JMV site.

Two additional parameters that can be specified are HEIGHT and WIDTH. These are specified within the APPLET tag. These parameters control the height and width of the applet itself. The default dimensions are 400 for height and 400 for width.

2.2 Creating a JMV applet with the Html Creator

The JMV downloads also come with a form to help you create your own JMV applet. (JMV-Form.html, in the /creator/ directory). To use the form, fill out all the options you want modified (these are the same as the ones described earlier), and click on the “Create Applet” button at the bottom. The text for the Applet will appear in the text box below it. Copy and paste this text into your html page to use it.

Chapter 3

Adding a new Bean

JMV communicates information between the menu and the molecule window through Java Beans. Here is how to add your own Bean to the JMV code.

Starting with the code in JMV, make the following changes to add/modify a bean: You can add a new Bean, or change sizes, positions, etc. The files are located in the JMV_files directory. In the examples, replace “NewBean”, “NewHookup”, etc with names corresponding to the beans you’ve created.

- **In directory JMV_files:**

1. Create a new Hookup class. It should be just like the others, but with a new name.

```
...
public class NewHookup implements java.beans.PropertyChangeListener...
...
```

- **To JMV_files/JMVMenus.java:**

1. You’ll need to modify buildMenus() to add your new Bean to the menu. Add a new JMVMenuItem as a function parameter, and add it to the main menu.

```
public void buildMenus(...
JMVMenuItem newBeanMenuItem,
...)
{
JMenu newBeanMenu;
...
newBeanMenu = new JMenu("Title");
menuBar.add(newBeanMenu);
newBeanMenuItem.initMenu(newBeanMenu); If you want to add a bean to an already
existing menu, replace “newBeanMenu” with the name of the menu.
```

- **To the JMV.java file:**

1. Add new bean object:

```
private NewBean newBean1;
```
2. Add new hookup:

```
private NewHookup hookupX;
```
3. Modify writeObject(); add new object to data[]. (data is an array containing each bean in the applet, plus the applet name, so set its size to the number of beans in the applet+1. Add the new bean(s) to the end of it.):

```
Object data[] = new Object[(# of beans)];
data[i] = newBean1;
```
4. Modify readObject():

```
newBean1 = (NewBean) data[i];
...
acquire(newBean1, null);
```
5. Modify addConnections():

```
hookupX = new NewHookup();
hookupX.setTarget(newBean1);
newBean1.addPropertyChangeListener(hookupX);
```
6. Modify init():

```
newBean1 = (NewBean) Beans.instantiate(myLoader, "NewBean");
```
7. Also in init(), modify the call to JMVMenus.buildMenus() to include a JMVMMenuItem from the Bean:

```
new JMVMenus().buildMenus(...
(JMVMMenuItem)newBean1,
...);
```
8. Modify getMinimumSize() (if adding new bean changes dimensions of applet):

```
return new Dimension(width, height);
```

- **To JMV_files/Makefile:**

1. Add hookup to HOOKUPS:

```
HOOKUPS = \
< alreadyexistinghookups > \
NewHookup.class
```

- **To /src/Makefile:**

For the bean to be found, you must add the class file to the allbeans.jar file in the src/ directory in JMV.

1. Add new bean class to CLASSPATH:

```
CLASSFILES=< alreadyexistingclasses > \
NewBean.class
```
2. Add new bean class to allbeans option:

```
allbeans: ($CLASSFILES)
@echo "Building allbeans.jar..."
@jar cf $(ALLBEANSJARFILE) < alreadyexistingclasses > NewBean.class
```

3. Create the new jar file with “make src-build applet-dist”

- **To JMV.html:**

1. Change HEIGHT and WIDTH parameters in the applet if necessary

For use on webpages, both `jmv-<version>.jar` must be signed. See <http://developer.java.sun.com/developer/qow/archive/99/index.html> for more information on signing applets.

Chapter 4

Javadocs

The Javadocs (Java-generated documentation files) for JMV can be accessed at <http://www.ks.uiuc.edu/Develop>. They contain information about the classes, functions, and member variables in the JMV code.