Software Requirements Specification

for

<JHotDraw>

Requirements for Version 7.6.1

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<September 2011>

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Revision History (may not be needed)

Name	Date	Reason For Changes	Version
JHotDraw	**2004-03-01**	Finished adaptation from JHotDraw 5.4b1. JHotDraw 7's framework is based now entirely on Java idioms. It makes use of Java2D, Swing Undo/Redo, XML. The user interface is now very close to MS Office 2002.	**7.0.1**
JHotDraw	**2006-01-18**	Revived the project. Replaced integer coordinate system by a double precision coordinate system.	**7.0.2**
JHotDraw	**2006-01-29**	• Added support for Bézier paths and replaced all legacy Polygon code with it. • Cleaned up the framework. CompositeFigure does not implement FigureListener anymore. • Moved layout strategy for ConnectionFigure into a separate class named Liner. Added a SlantedLiner. ElbowLiner not yet implemented. • Migrated from Java 1.4 to 1.5. The framework uses now type save collections.	
JHotDraw	**2006-06-25**	• Reorganized package structure. • Added support for type safe Figure attributes. • Replaced the application framework with a new one. • Added support for double strokes. • Added support for line positions: centered, inside, outside. • Added more sample figures. • Replaced MS Office style icons by a	**7.0.4**

		new open source icon set. • Removed dependency to NanoXML library. • Removed dependency to JGoodies Looks library.	
JHotDraw	**2006-06-26**	Removed copyright notice of NanoXML and JGoodies Looks from Draw Application and Draw Applet.	**7.0.4_1**
JHotDraw	**2006-07-30**	• Moved all packages from ch.randelshofer to org.jhotdraw. • Reimplemented the 'Net' and 'Pert' sample applications. • Implemented an 'SVG' sample application. • Fixed minor issues here and there. • Added a tweaked version fo NanoXML back into the framework. The tweaked version of NanoXML allows to read XML documents which have a DTD, without opening a network connection to the DTD document and thus improving performance when opening a XML document. Once we figure out, how can use the javax.xml API in a more performant way, we might throw out NanoXML again.	**7.0.5**
JHotDraw	**2006-08-27**	• Renamed PlasmaDraw to JHotDraw 7. • Changed copyright notices in all source files.	
JHotDraw	**2006-11-12**	• Reorganized file structure. • Fixed NetBeans project files and Ant build scripts. • Fixed guide.	**7.0.7**
JHotDraw	**2007-01-10**	• Streamlined interface names and class names to make it easier to learn the framework. • InputFormat/OutputFormat interfaces and default implementations added to drawing framework. • ImageHolderFigure interface and ImageFigure default implementation added to drawing framework.	**7.0.8**

		• Enhanced SVG sample application. • Removed NanoXML-Lite library. • All code is now compilable with J2SE6. The minimum platform requirements for JHotDraw 7 remains J2SE5.	
JHotDraw	**2007-06-21**	• Redesigned Undo/Redo handling for Figure attributes. • Made many incompatible changes in all packages in order to pave the way for SVG support. • Rewrote the SVG sample application. • Enhanced the Draw package to make support for transformations on Figures possible, in order to be able to support SVG. • Added Batik gradient classes, in order to be able to support SVG. • Added new package org.jhotdraw.application based on JSR-296 "appframework" version 0.42. This package will replace org.jhotdraw.app in future versions.	**7.0.9**
JHotDraw	**2008-03**	Substantial changes have been made to fix shortcomings and bugs of the frameworks. Please take a look at the JDiff report for a detailed description of all API changes between JHotDraw 7.0.9 and 7.1. Drawing Framework: • Most Figure methods with prefix basic… have been removed. These methods were used to support Undo/Redo by the Figure objects. In JHotDraw 7.1, this task has been moved to the Tool objects. • The class structure has been modified to gain more flexibility. Most notably, the Drawing interface extends now from the CompositeFigure interface. Application Framework: • The experimental application	**7.1**

		framework based on JSR-296 has been removed, because it is not mature enough yet, to keep JHotDraw in sync with it. • The Project interface has been renamed to View, to be more in line with the upcoming Swing application framework JSR-296. Samples: • SVG: The background colors of SVG drawings can be set now. A number of bugs related to reading and writing gradients has been fixed. There is no support for editing gradients yet. • ODG: This sample is not functional yet. It consists only of a few skeleton classes.	
JHotDraw	**2009-05**	Substantial changes and enhancements have been made to fix shortcomings and bugs of the frameworks and to improve the usability of drawing editors. Please take a look at the JDiff report for a detailed description of all API changes between JHotDraw 7.1 and 7.2. Drawing Framework: • The type safety of figure attributes has been improved, by making use of type tokens in AttributeKey and setter and getter methods with templates in Figure. • The usability has been improved. Figures indicate there bounds when the mouse is moved over them. A substantial number of user interface classes for the creation of toolbars have been added, and are used by the SVG sample application.	**7.2**

		• Drawing objects can now be serialized using the SerializationInputOutputFormat. This allows to easily implement short-term persistence for drawings (for example for clipboard support). Application Framework: • The resource support has been reimplemented to be closer to JSR-296. Resource bundles can now use place holders in their values. The resource keys used by JHotDraw match now with the correspoinding JavaBeans property names.	
JHotDraw	**2009-10-11**	Substantial changes and enhancements have been made to fix shortcomings and bugs of the frameworks and to improve the usability of drawing editors. Please take a look at the [JDiff report](#) for a detailed description of all API changes between JHotDraw 7.2 and 7.3. Notable changes are: General: • The documentation of framework interfaces and classes shows now the design patterns being used(like JHotDraw 6 did). Drawing Framework: • The method names for setting and getting an attribute from a Figure have been shortened to get(AttributeKey), set(AttributeKey,Object). The sample code uses now these methods instead of the setter and getter methods in class AttributeKey.	**7.3**

		• DefaultDrawingView uses now double buffering to improve editing performance. **Application Framework:** • The Worker class has been redesigned, to better support the common use cases of a Worker. • Support for weak event listeners has been added to class AbstractBean. Weak event listeners help to prevent memory leaks in applications. **Sample applications:** • SVG Sample: SVG Tiny 1.2 compliance has been improved. The SVGDrawingPanel can now more easily integrated as a component into an application.	
JHotDraw	**2009-10-18**	This version fixes bugs found in 7.3. Notable enhancements: • Default input map and action map are now handled by the DrawingEditor instead by AbstractTool. Notable fixes: • Copy and paste did not work on Mac OS X 10.6. • Figures which were very small caused rendering artefacts on DefaultDrawingView and caused ImageOutputFormat to crash. • Setting a drawing on DefaultDrawingView caused flickering.	**7.3.1**
JHotDraw	**2010-01-16**	Enhancements:	**7.4**

		• Application Framework: The application framework works now with URI objects instead of File objects. This allows the creation of applications which are not file-based, such as network-based applications (browsers) and database-oriented applications. Changes: • Application Framework Actions in the application framework are now organised in an ActionMap hierarchy. (File-)URIChoosers are now created by the ApplicationModel instead by the View. • Drawing Framework The package org.jhotdraw.draw has been split up into sub-packages. • Platform requirements: Minimum platform requirement is now J2SE6. The following third-party libraries have been removed: MRJAdapter.jar, swing-layout.jar. The following third-party source files have been removed: LinearGradientPaint and RadialGradientPaint from the Apache Batik library.	
JHotDraw	**2010-07-28**	Enhancements and Changes: • Drawing Framework InputFormat and OutputFormat work now with URI's instead of files for identifying the storage location of a drawing. The ResizeHandleKit supports now aspect preserving resizing by	**7.5**

		pressing the Alt- or Ctrl-Key. The canvas area is now drawn by Drawing instead of DrawingView. The ButtonFactory can now create color chooser popup buttons. DOMStorable is not implemented by the Figure interface anymore allowing the implementation of figures which do not depend on this persistence framework. • User Interface An UI delegate for JColorChooser has been added to the "Palette" look and feel. • Example applications The user interface of the SVG example application has been improved. • General Java annotations have been added for clarity. @Nullable and @NotNull annotations specify allowed and disallowed occurences of null values. This is work in progress. • Some changes in the package structure and renamings of classes have been made in order to improve the clarity of the frameworks.	

1.   Introduction

1.1   Purpose

In this document are specified the software requirements for JHotDraw graphic design framework version 7.6.1. This documents includes functional, non-functional requirements and use cases for all features. JHotDraw is a free open source software under the GNU Library or Lesser General Public(LGPL).

1.2   Document Conventions

This document was created after the completation of JHotDraw when it was to Beta status so all requirments described in the document are already satisfied. However it is important to update this document with every future requirement to stay informed.

1.3   Intended Audience and Reading Suggestions

This Software Requirements document is intended for:
 General users who wish get informed on what this project can do.It can be used as user manual.
 Developers who can review project's capabilities and more easily understand where their efforts should be targeted to improve or add more features to it.
 Project testers who can use this document as a base for their testing strategy as some bugs are easier
to find using a requirements document. This way testing becomes more methodically organized.

1.4   Project Scope

JHotDraw is a two-dimensional graphics framework for structured drawing editors that is written in Java. It is based on Erich Gamma's JHotDraw, which is copyright 1996, 1997 by IFA Informatik and Erich Gamma. JHotDraw is written is Java and that ensures the cross-platform ability.

1.5   References

The program, and the source code is available to *http://sourceforge.net/projects/jhotdraw/* and also at the official site *http://www.jhotdraw.org/* .

2.   Overall Description

2.1   Product Perspective

JHotDraw started as a closed source program from Erich Gamma and Thomas Eggenschwiler.
After a while it became free open source softaware and stays so. One of the reason that JHotDraw

became open source is to build new applications based upon JHotDraw like Jarp, Joone, Renew, ChemSense that are based on JhotDraw(full list is available at the official site).

2.2   Product Features

All the below features of JHotDraw are alreary satisfy because as mentioned before by the time this document prepared the program is at beta version.
Main features:
- Easy creation of basic shapes.
- Tools for drawing seperating lines with different forms.
- Free drawing of closed or open lines
- Ability to insert and format text.
- Insert images.
- Formatting options of all above items.
- Open/Close/Save/Open Recent Documents.
- All the fundamental options of navigation between recent actions(Redo/Undo).
- Adapting the design lines.
- Toggle Grid design.
- Easy design of nodes for graphs.
- Desing of node tasks for creating timing graphs.

2.3   User Classes and Characteristics

JHotDraw can be used from developers that want to incorporate it to their applications or to used it as a base to build an application. The simplicity of using JHotDraw makes it easy to use to anyone that wants to take advantage of the cross-platform and the functionality abilities.
It can be used also from kids as an alternative painting program and from profesionals for making complex plans and from everyone that wants a framework with advanced abilities of drawing.

2.4   Operating Environment

JHotDraw has written is Java so is compatible with all the operating systems ie is platform independent(OS independent). It only need jvm.(java virtual machine).

2.5   Design and Implementation Constraints

As JHotDraw is a free open source software under the GNU Library or Lesser General Public(LGPL) means that is 100% free and open. Everybody who will involved with it he must respect the licence and agree with licence rules. That is the main constraint.

2.6   User Documentation

As mentioned before the documents is available at the official site and at Source Forge where you can find every information you need. Other information can be found on 1.5 chapter in this document.
Official Site URL: http://www.jhotdraw.org/
Source Forge URL: http://sourceforge.net/projects/jhotdraw/

3.　Assumptions and Dependencies

JHotDraw run without installation. Simply unzip the files into a directory of your choice and run JHotDraw.jar. So runs on any platform, any operating system.

4.　System Features

4.1　New Project

3.1.1　Description and Priority

New Project is part of the File Menu.
When the program opens a new project is automatically created. So the new project option should only be chosen when we want to close a previous project (saving it or not) and open a new empty project.

3.1.2　Stimulus/Response Sequences

Data Flow
　　a)User selects File-> Menu
　　b)a new instance of the program open and the other one retain in the backround.

4.2　Open Project

3.2.1　Description and Priority

Open Project is part of the file Menu.
User is able to open a previous created file(xml file).

3.2.2　Stimulus/Response Sequences

3.2.2.1 Data Flow
Basic Data Flow
　　a) User selects File->Open...
　　b) User is prompted to choose the file that he wants to open
　　c) User chooses the file he wants to open
　　d) User chooses "Open".
　　e) The project loads and opens in the screen.
3.2.2.2 Alternative Data Flows
　Alternative Data Flow 1
　　a) User selects "Cancel" when he is prompted to choose the file that he wants to open
　　b) User returns to the main window, without any changes made.

3.2.3　Functional Requirements

REQ-1 File selected must be of type the program can read and that is "project_name".xml
REQ-2 A project must have been created before using this feature.

4.3   Open Recent

3.3.1   Description and Priority

Open Recent is part of the file Menu.
User is able to open recent closed documents.

3.3.2   Stimulus/Response Sequences

Data Flow
         a)User selects File->Open Recent->filename.xml
         b)opens a new instance of the program with the saved file
   3.3.3   Functional Requirements
            REQ-1 A file must be created and saved
            REQ-2 Not Clear Menu has been selected.

4.4   Clear Menu

3.4.1   Description and Priority

Clear Menu is a subment option of Open Recent choice in File Menu.
User is able to clear the recent opened or created files.

3.4.2   Stimulus/Response Sequences

Data Flow
         a) User Selects Menu->Open Recent->Clear Menu
         b)System clears the list.

3.4.3   Functional Requirements

         REQ-1 A file must be recently created or opened

4.5   Save Project

3.5.1   Description and Priority

With this function user is able to save his project that contains all the changes that
have been made and retrieved in the future

3.5.2   Stimulus/Response Sequences

Data Flow
3.5.2.1 Basic Data Flow

a) User selects File->Save.

b) User is prompted to choose a name for the file that he is about to save and a
destination
c) User enters a name.
d) User picks a destination
e) User selects save.
f) Project is saved.
g) User returns to the main window that still shows his project.

3.5.2.2 Alternative Data Flow 1

a)User selects File->Save and the file is saved without any further interaction with the user because the file had already been saved at some point in the past, so there is the name of the file and the destination are already known to the system.

3.5.2.3 Alternative Data Flow 2

a) User selects "Cancel" when he is prompted to enter a name and pick a destination for the project about to be saved
b) User returns to the main window without saving the file

3.5.3 Functional Requirements

REQ-1 Enough disk space.

4.6 Save As..

3.6.1 Description and Priority

With this function user is able to save his project again under a different name if it has already been saved or just save it if it hasn't.

3.6.2 Stimulus/Response Sequences

Data Flow

3.6.2.1 Basic Data Flow
a) User selects File->Save as...

b) User is prompted to choose a name for the file that he is about to save as well as the location of the file

c) User enters a name.
d)User picks a location for his file.
e) User selects save.
f) Project is saved.
g) User returns to the main window that still shows his project.

3.6.2.2 Alternative Data Flow 1
a) User selects "Cancel" when he is prompted to input a name and pick a destination for the project to be saved.
b) User returns to the main window that still shows the current project

4.7 Exit

3.7.1 Description and Priority

With this function user is able to close the whole application.

3.7.2 Stimulus/Response Sequences

Data Flow
3.7.2.1 Basic Data Flow
a) User selects File->Exit.
b) The program exits
3.7.2.2 Alternative Data Flow 1
a) User selects File->exit or selects the "X" on the top right corner of the program.
b) User has made changes to the project he was working on so he is prompted to save it.
c) User selects "yes".
d) User hasn't saved his file again so he is prompted to pick a name and a location for the file about to be saved
g) Users hits "Cancel" button.
h)His project is not saved.
i) The program exits.
3.7.2.3 Alternative Data Flow 2
a) User selects File->exit or selects the "X" on the top right corner of the program.
b) User has made changes to the project he was working on so he is prompted to save it.
c) User selects "no".
d) The program exits.
3.7.2.4 Alternative Data Flow 3
a) User selects File->exit or selects the "X" on the top right corner of the program.
b) User has made changes to the project he was working on so he is prompted to save it.
c) User selects "Cancel".
d) The program returns to the previous screen.

4.8   Undo

3.8.1   Description and Priority

With this feature the user can negate his last change to his project.

3.8.2   Stimulus/Response Sequences

a)User Selects Edit->Undo or presses Ctrl + Z
b)The system negates the last acttion made by user to the project.

4.9   Redo

3.9.1   Description and Priority

With this action the user can undo the last undo.

3.9.2   Stimulus/Response Sequences

a) User Selects Edit->Redo or presses Ctrl + Y
b)The system restores the previous state

4.10 Cut

3.10.1 Description and Priority

With this feature system copies the selected item.

3.10.2 Stimulus/Response Sequences

Data Flow

a)User selects an item by doing a click on it.
b)User selects Edit->Copy or presses Ctrl + C
c)The system copies to the clipboard the selected item

4.11 Paste

3.11.1 Description and Priority

With this feature the user can add to the draw the item that has previously copied or cut to clipboard

3.11.2 Stimulus/Response Sequences

Data Flow

a)User selects Edit-> paste or presses Ctrl + V
b) The system pastes the clipboard content

3.11.3 Functional Requirments
REQ-1:The clipboard is not empty

4.12 Duplicate

3.12.1 Description and Priority

With this feature the system duplicates the selected item. The system shows the duplicate item below the original.

3.12.2 Stimulus/Response Sequences

Data Flow

a)The user selects an item
b)The user selects Edit → Duplicate
c) The system adds to the draw a copy of the selected item below it.

3.12.3 Functional Requirments
REQ-1:The user must have selected an item

4.13 Delete

3.13.1 Description and Priority

The user can delete a selected item.

3.13.2 Stimulus/Response Sequences

Data Flow

a) The user selects an item.
b) The user selects Edit->Delete or presses Delete
c) The system deletes the item

3.13.3 Functional Requirments
REQ-1:The user must have selected an item

4.14 Select All

3.14.1 Description and Priority

With this feature the user can selected all the items that exists in the draw.

3.14.2 Stimulus/Response Sequences

Data Flow

a) The user selects Edit-> Select All or presses Ctrl + A
b) The system selects all the items

3.14.3 Functional Requirments

REQ-1:The draw must have at least one item

4.15 Deselect All

3.15.1 Description and Priority

With this feature the user can deselected all the items that are selected.

3.15.2 Stimulus/Response Sequences

Data Flow

a) The user selects Edit-> Deselect All or presses Ctrl + Shift + A
b) The system deselects all the selected items.

3.15.3 Functional Requirments
REQ-1:TAt least one item should be selected.

4.16 Deselect All

3.16.1 Description and Priority

With this feature the user can deselected all the items that are selected.

3.16.2 Stimulus/Response Sequences

Data Flow

a) The user selects Edit-> Deselect All or presses Ctrl + Shift + A
b) The system deselects all the selected items.

3.16.3 Functional Requirments
REQ-1:TAt least one item should be selected.

4.17 Toolbars

3.17.1 Description and Priority

With this menu choice the user can select the toolbars that wants to appear.

3.17.2 Stimulus/Response Sequences

Data Flow

a)User Selects View->Toolbar
b)User selects the toolbar that wants to dissapear/appear.
c)The system dissapears/appears the toolbar from the menu

4.18 Selection Tool

3.18.1 Description and Priority

With this tool the user can select an item from the draw.

3.18.2 Stimulus/Response Sequences

Data Flow

a)User selects the Selection Tool from the Draw Toolbar
b)The user clicks on an item.
c)The system sets the tool to selected state.

3.18.3 Functional Requirments
REQ-1 The draw must have at least one item.

4.19   RectangleTool

3.19.1   Description and Priority

With this tool the user can draw a rectangle.

3.19.2   Stimulus/Response Sequences

Data Flow
3.19.2.1 Basic Data Flow
a)The user selects the Rectangle Tool.
b)The user clicks and drags the mouse to draw a rectangle.
c)The user lets the mouse to a point different from the start.
d)The system sets the item to the selected situation.
3.19.2.2 Alternative Data Flow 2
a)The user selects the Rectangle Tool.
b)The user clicks and drags the mouse to draw a rectangle.
c)The user lets the mouse to the same point that began..
d)The system doesn't draw anything

4.20   Rounded RectangleTool

3.20.1   Description and Priority

With this tool the user can draw a rounded rectangle.

3.20.2   Stimulus/Response Sequences

Data Flow
3.20.2.1 Basic Data Flow
a)The user selects the Rounded Rectangle Tool.
b)The user clicks and drags the mouse to draw a rounded rectangle.
c)The user lets the mouse to a point different from the start.
d)The system sets the item to the selected situation.
3.20.2.2 Alternative Data Flow 2
a)The user selects the Rounded Rectangle Tool.
b)The user clicks and drags the mouse to draw a rounded rectangle.
c)The user lets the mouse to the same point that began.
d)The system doesn't draw anything

4.21   Elipse Tool

3.21.1   Description and Priority

With this tool the user can draw a elipse.

3.21.2   Stimulus/Response Sequences

Data Flow

3.21.2.1 Basic Data Flow
a)The user selects the Elipse Tool.
b)The user clicks and drags the mouse to draw a elipse.
c)The user lets the mouse to a point different from the start.
d)The system sets the item to the selected situation.
3.21.2.2 Alternative Data Flow 2
a)The user selects the Elipse Tool.
b)The user clicks and drags the mouse to draw a elipse.
c)The user lets the mouse to the same point that began.
d)The system doesn't draw anything

4.22   Diamond Tool

3.22.1   Description and Priority

With this tool the user can draw a diamond.

3.22.2   Stimulus/Response Sequences

Data Flow
3.22.2.1 Basic Data Flow
a)The user selects the Rounded Diamond Tool.
b)The user clicks and drags the mouse to draw a diamond.
c)The user lets the mouse to a point different from the start.
d)The system sets the item to the selected situation.
3.22.2.2 Alternative Data Flow 2
a)The user selects the Diamond Tool.
b)The user clicks and drags the mouse to draw a diamond.
c)The user lets the mouse to the same point that began.
d)The system doesn't draw anything

4.23   Triangle Tool

3.23.1   Description and Priority

With this tool the user can draw a Triangle.

3.23.2   Stimulus/Response Sequences

Data Flow
3.19.2.1 Basic Data Flow
a)The user selects the Triangle Tool.
b)The user clicks and drags the mouse to draw a triangle.
c)The user lets the mouse to a point different from the start.
d)The system sets the item to the selected situation.
3.19.2.2 Alternative Data Flow 2
a)The user selects the Triangle Tool.
b)The user clicks and drags the mouse to draw a triangle.
c)The user lets the mouse to the same point that began.
d)The system doesn't draw anything

4.24 LineTool

3.24.1 Description and Priority

With this tool the user can draw a line.

3.24.2 Stimulus/Response Sequences

Data Flow
3.24.2.1 Basic Data Flow
a)The user selects the Line Tool.
b)The user clicks and drags the mouse to draw a line.
c)The user lets the mouse to a point different from the start.
d)The system sets the item to the selected situation.
3.24.2.2 Alternative Data Flow 2
a)The user selects the Line Tool.
b)The user clicks and drags the mouse to draw a Line.
c)The user lets the mouse to the same point that began.
d)The system doesn't draw anything

4.25 ArrowTool

3.25.1 Description and Priority

With this tool the user can draw an arrow.

3.25.2 Stimulus/Response Sequences

Data Flow
3.25.2.1 Basic Data Flow
a)The user selects the Arrow Tool.
b)The user clicks and drags the mouse to draw a arrow.
c)The user lets the mouse to a point different from the start.
d)The system sets the item to the selected situation.
3.25.2.2 Alternative Data Flow 2
a)The user selects the Arrow Tool.
b)The user clicks and drags the mouse to draw a arrow.
c)The user lets the mouse to the same point that began.
d)The system doesn't draw anything

4.26 Line Connection Tool

3.26.1 Description and Priority

With this tool the user can draw a connection line between two shapes..

3.26.2 Stimulus/Response Sequences

Data Flow
3.26.2.1 Basic Data Flow
a)The user selects the Line Connection Tool.
b)The user setes the mouse close to the center of the fistr shape
c)The system shows the center of the first shape.
d)The user clicks and drags the mouse to draw a line from the center of the fisrt shape to the second.
e)The system draws a line from the region of the first shpae to the second.
3.26.2.2 Alternative Data Flow 1
a)The user selects the Line Connection Tool.
b)The user setes the mouse close to the center of the fistr shape
c)The system shows the center of the first shape.
d)The user clicks and drags the mouse to draw a line from the center of the fisrt shape somewhere except from the second shape's region.
e)The system doesn't draw the line.

3.26.3 Functional Requirments
REQ-1 The draw must have at least two items.

4.27   Elbow Connection Tool

3.27.1   Description and Priority

With this tool the user can draw a elbow connection between two shapes..

3.27.2   Stimulus/Response Sequences

Data Flow
3.27.2.1 Data Flow
a)The user selects the Elbow Connection Tool.
b)The user setes the mouse close to the center of the fistr shape
c)The system shows the center of the first shape.
d)The user clicks and drags the mouse to draw a elobow line from the center of the fisrt shape to the second.
e)The system draws a elbow line from the region of the first shpae to the second.
3.27.2.2 Alternative Data Flow 1
a)The user selects the elbow line Connection Tool.
b)The user setes the mouse close to the center of the fistr shape
c)The system shows the center of the first shape.
d)The user clicks and drags the mouse to draw a elbow line from the center of the f isrt shape somewhere except from the second shape's region.
e)The system doesn't draw the elbow line.

3.27.3 Functional Requirments
REQ-1 The draw must have at least two items.

4.28   Curve Connection Tool

3.28.1   Description and Priority

With this tool the user can draw a Curve connection between two shapes..

3.28.2   Stimulus/Response Sequences

Data Flow
3.28.2.1 Data Flow
a)The user selects the Curve Connection Tool.
b)The user setes the mouse close to the center of the first shape
c)The system shows the center of the first shape.
d)The user clicks and drags the mouse to draw a curve line from the center of the fisrt shape to the second.
e)The system draws a curve line from the region of the first shpae to the second.
3.28.2.2 Alternative Data Flow 1
a)The user selects the curve line Connection Tool.
b)The user setes the mouse close to the center of the fistr shape
c)The system shows the center of the first shape.
d)The user clicks and drags the mouse to draw a curve line from the center of the f isrt shape somewhere except from the second shape's region.
e)The system doesn't draw the curve line.

3.28.3   Functional Requirments
REQ-1 The draw must have at least two items.

4.29   Scribble Tool

3.29.1   Description and Priority

With this tool the user can draw a custom shape or line.

3.29.2   Stimulus/Response Sequences

Data Flow

a)The user selects the Scribble Tool.
b)The user begins to draw by dragging the mouse.
c)The system draws the line
d)The user clicks and drags the mouse to draw a elobow line from the center of the fisrt shape to the second.

4.30   Polygon Tool

3.30.1   Description and Priority

With this tool the user can draw a custom polygon.

3.30.2   Stimulus/Response Sequences

Data Flow

a)The user selects the Polygon Tool.
b)The user begins to draw by dragging the mouse.

c)The system draws the polygon

4.31   Text Tool

3.31.1   Description and Priority

With this tool the user can insert one line of text.

3.31.2   Stimulus/Response Sequences
Data Flow

a)The user selects the Text Tool.
b)The user clicks at the spot that he wants to insert the text line.
c)The system show a text box with the word "Text"
d) The user insert the text and presses Enter.

4.32   Text Area Tool

3.32.1   Description and Priority

With this tool the user can insert multiple lines of text

3.32.2   Stimulus/Response Sequences
Data Flow

a)The user selects the Text Area Tool.
b)The user clicks and drags at the spot that he wants to insert the text at the preferred size.
c)The system show a text area with the word "Text"
d)The user insert the text and presses Enter.

4.33   Image Tool

3.33.1   Description and Priority

With this tool the user can insert an image to the draw.

3.33.2   Stimulus/Response Sequences
Data Flow

a)The user selects the Image Tool.
b) A file Chooser widow appears.
c) The user selects an image.
d)The user clicks and drags at the spot that he wants to insert the image at the preferred size.

4.34   Pick Attributes Tool

3.34.1   Description and Priority

With this tool the user can copy the attributes of an item to paint another item.The tool copies the circumference line colour and the fill colour.

3.34.2   Stimulus/Response Sequences

Data Flow

a)The user selects selection Tool.
b) The user selects an item.
c) The user selects the Pick atrribute tool..
d)The user clicks on one shape.
e)The system copies the atrributes.

3.34.3 Functional Requirments

REQ-1 The draw must have at least one item.

4.35   Apply Attributes Tool

3.35.1   Description and Priority

With this tool the user can apply the copied attributes of an item to paint another item.

3.35.2   Stimulus/Response Sequences

Data Flow

a)The user selects selection Tool.
b) The user selects an item.
c) The user selects the apply atrribute tool..
d)The user clicks on the item.
e)The system copies the atrributes to the shape.

3.35.3 Functional Requirments

REQ-1 The draw must have at least one item.

4.36   Line Colour

3.36.1   Description and Priority

With this tool the user can choose the preferred line colour for the lines or the shapes region.

3.36.2   Stimulus/Response Sequences

Data Flow
3.36.2.1 Basic Data Flow
a)User selects line colour tool.

b)System shows a small palette of the basic colours (48 colours)
c)User selects the colour.
3.36.2.2 Alternative Data Flow 1
a)User selects line colour tool
b)System show a small pallete of the basic colours.
c) User selects "No colour"
d)System sets the colour to a transparent colour that is not visible.
3.36.2.3 Alternative Data Flow 2
a)User selects line colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user chooses a colour from the 279-colour palette from the tab "Swatches".
f)The system shows a preview of the colour
g)The user selects OK.
h)The system sets the line colour to the selected colour
3.36.2.4 Alternative Data Flow 3
a)User selects the line colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user chooses a colour from the 279-colour palette from the tab "Swatches".
f)The system shows a preview of the colour
g)The user selects CANCEL or RESET and the OK or CANCEL.
h)The system retains the line colour as it was.
3.36.2.5 Alternative Data Flow 4
a)User selects the line colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "HSB"
f)The system show the HSB tab.
g)The user choose a colour by giving values to H, S and B parametres.
h)The system shows a preview of the colour.
i)The user selects OK.
j) The system sets the colour to the specified colour.
3.36.2.6 Alternative Data Flow 5
a)User selects the line colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "HSB"
f)The system show the HSB tab.
g)The user choose a colour by giving values to H, S and B parametres.
h)The system shows a preview of the colour
i)The user selects CANCEL or RESET and CANCEL or OK.
j)The system retains the line colour as it was.
3.36.2.7 Alternative Data Flow 6
a)User selects the line colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window

e)The user selects the tab "RGB"
f)The system show the RGB tab.
g)The user choose a colour by giving values to R, G and B parametres.
h)The system shows a preview of the colour
i)The user selects OK.
j) The system sets the colour to the specified colour.

3.36.2.8 Alternative Data Flow 7
a)User selects the line colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "RGB"
f)The system show the RGB tab.
g)The user choose a colour by giving values to R, G and B parametres.
h)The system shows a preview of the colour
i)The user selects CANCEL or RESET and CANCEL or OK.
j)The system retains the line colour as it was.

4.37   Fill Colour

3.37.1   Description and Priority

With this tool the user can choose the preferred fill colour for the shapes.

3.37.2   Stimulus/Response Sequences

Data Flow
3.37.2.1 Basic Data Flow
a)User selects line colour tool.
b)System shows a small palette of the basic colours (48 colours)
c)User selects the colour.
3.37.2.2 Alternative Data Flow 1
a)User selects line colour tool
b)System show a small pallete of the basic colours.
c) User selects "No colour"
d)System sets the colour to a transparent colour that is not visible.
3.37.2.3 Alternative Data Flow 2
a)User selects fill colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user chooses a colour from the 279-colour palette from the tab "Swatches".
f)The system shows a preview of the colour
g)The user selects OK.
h)The system sets the fill colour to the selected colour
3.37.2.4 Alternative Data Flow 3
a)User selects the fill colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window

e)The user chooses a colour from the 279-colour palette from the tab "Swatches".
f)The system shows a preview of the colour
g)The user selects CANCEL or RESET and the OK or CANCEL.
h)The system retains the fill colour as it was.
3.37.2.5 Alternative Data Flow 4
a)User selects the fill colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "HSB"
f)The system show the HSB tab.
g)The user choose a colour by giving values to H, S and B parametres.
h)The system shows a preview of the colour.
i)The user selects OK.
j) The system sets the colour to the specified colour.
3.37.2.6 Alternative Data Flow 5
a)User selects the fill colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "HSB"
f)The system show the HSB tab.
g)The user choose a colour by giving values to H, S and B parametres.
h)The system shows a preview of the colour
i)The user selects CANCEL or RESET and CANCEL or OK.
j)The system retains the fill colour as it was.
3.37.2.7 Alternative Data Flow 6
a)User selects the fill colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "RGB"
f)The system show the RGB tab.
g)The user choose a colour by giving values to R, G and B parametres.
h)The system shows a preview of the colour
i)The user selects OK.
j) The system sets the colour to the specified colour.

3.37.2.8 Alternative Data Flow 7
a)User selects the fill colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "RGB"
f)The system show the RGB tab.
g)The user choose a colour by giving values to R, G and B parametres.
h)The system shows a preview of the colour
i)The user selects CANCEL or RESET and CANCEL or OK.
j)The system retains the fill colour as it was.

4.38   Text Colour

3.38.1   Description and Priority

With this tool the user can choose the preferred text colour.

3.38.2   Stimulus/Response Sequences

Data Flow
3.38.2.1 Basic Data Flow
a)User selects text colour tool.
b)System shows a small palette of the basic colours (48 colours)
c)User selects the colour.
3.38.2.2 Alternative Data Flow 1
a)User selects text colour tool
b)System show a small pallete of the basic colours.
c) User selects "No colour"
d)System sets the colour to a transparent colour that is not visible.
3.38.2.3 Alternative Data Flow 2
a)User selects text colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user chooses a colour from the 279-colour palette from the tab "Swatches".
f)The system shows a preview of the colour
g)The user selects OK.
h)The system sets the text colour to the selected colour
3.38.2.4 Alternative Data Flow 3
a)User selects the text colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user chooses a colour from the 279-colour palette from the tab "Swatches".
f)The system shows a preview of the colour
g)The user selects CANCEL or RESET and the OK or CANCEL.
h)The system retains the fill colour as it was.
3.38.2.5 Alternative Data Flow 4
a)User selects the text colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "HSB"
f)The system show the HSB tab.
g)The user choose a colour by giving values to H, S and B parametres.
h)The system shows a preview of the colour.
i)The user selects OK.
j) The system sets the colour to the specified colour.
3.38.2.6 Alternative Data Flow 5
a)User selects the text colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "HSB"
f)The system show the HSB tab.
g)The user choose a colour by giving values to H, S and B parametres.
h)The system shows a preview of the colour
i)The user selects CANCEL or RESET and CANCEL or OK.

j)The system retains the fill colour as it was.
3.38.2.7 Alternative Data Flow 6
a)User selects the text colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "RGB"
f)The system show the RGB tab.
g)The user choose a colour by giving values to R, G and B parametres.
h)The system shows a preview of the colour
i)The user selects OK.
j) The system sets the colour to the specified colour.

3.38.2.8 Alternative Data Flow 7
a)User selects the text colour tool
b)System shows a small palette of the the basic colour.
c)User select Open Colour Chooser
d)The system shows the open colour chooser window
e)The user selects the tab "RGB"
f)The system show the RGB tab.
g)The user choose a colour by giving values to R, G and B parametres.
h)The system shows a preview of the colour
i)The user selects CANCEL or RESET and CANCEL or OK.
j)The system retains the text colour as it was.

4.39   Arrow Tips Tool

3.39.1   Description and Priority

With this tool the user can select the tip of the arrow which is created with the arrow tool.

3.39.2   Stimulus/Response Sequences

Data Flow

a)The user selects the Arraw Tip tool.
b)The user selects the style of the tip.
c)The user selects the Arrow tool and draws the arrow.
d)The system show the arrow with the selected tip.

4.40   Stroke Width

3.40.1   Description and Priority

With this option the user can change the stroke width.

3.40.2   Stimulus/Response Sequences

Data Flow

a)The user selects the Stroke Width toolbar option.

b)The user selects the preferred size of the stroke.

4.41 Line Dashes

3.41.1   Description and Priority

With this option the user can add dashes to the lines.

3.41.2   Stimulus/Response Sequences

Data Flow

a)The user selects the Line Dashes toolbar option.
b)The user selects the preferred dash line.

4.42 Stroke Type

3.41.1   Description and Priority

With this option the user can change the stroke type.

3.41.2   Stimulus/Response Sequences

Data Flow

a)User selects the Stroke type option.
b)User selects the preferred stroke type
c)The system changes the stroke type to the selected.

4.43 Stroke Placement

3.43.1   Description and Priority

With this option the user can change the stroke placement compared to the rectangle context.

3.43.2   Stimulus/Response Sequences

Data Flow

a)User selects the Stroke Placement option.
b)User selects the preferred stroke placement
c)The system changes the stroke placement to the selected.

4.44 Line Caps

3.44.1   Description and Priority

With this option the user can change the line caps.

3.44.2   Stimulus/Response Sequences

Data Flow

a)User selects the Line Caps option.
b)User selects the preferred cap for the lines
c)The system changes the line caps to the selected.

4.45   Stroke Joint

3.45.1   Description and Priority

With this option the user can change the stroke joint.

3.45.2   Stimulus/Response Sequences

Data Flow

a)User selects the Stroke Joint option.
b)User selects the preferred joint for the strokes
c)The system changes the stroke joint to the selected.

4.46   Font Tool

3.46.1   Description and Priority

This is a feature that gives the ability to the user to choose a font.

3.46.2   Stimulus/Response Sequences

Data Flow

a)User selects Font.
b)User selects the preferred Collection
c)System shows the fonts that make up the collection and a preview.
d)User selects one font.
e)System shows a preview
f)User selects a typeface.
g)User selects a typeface
h)System shows a preview.
i)User presses Enter

4.47   Bold

3.47.1   Description and Priority

With this feature the user can change the type of the font to bold.

3.47.2   Stimulus/Response Sequences

Data Flow

a)User selects the bold option.
b)The system changes the font to bold

4.48   Italic

3.48.1   Description and Priority

With this feature the user can change the type of the font to italic.

3.48.2   Stimulus/Response Sequences

Data Flow

a)User selects the bold option.
b)The system changes the font to italic

4.49   UnderLine

3.49.1   Description and Priority

With this feature the user can change the type of the font to UnderLine.

3.49.2   Stimulus/Response Sequences

Data Flow

a)User selects the bold option.
b)The system changes the font to underLine

4.50   Align Left

3.50.1   Description and Priority

With this feature the user can align to left for a couple of item.

3.50.2   Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects at least two items

c)User selects align left
d)System aligns all the item left.

3.50.3 Functional Requirments

REQ-1 The draw must have at least two items.

4.51 Align Right

3.51.1 Description and Priority

With this feature the user can align to right for a couple of item.

3.51.2 Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects at least two items
c)User selects align right
d)System aligns all the items right .

3.51.3 Functional Requirments

REQ-1 The draw must have at least two items.

4.52 Align Horizontal

3.52.1 Description and Priority

With this feature the user can align horizontal a couple of items.

3.52.2 Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects at least two items
c)User selects align horizontal
d)System aligns all the item horizontal.

3.52.3 Functional Requirments

REQ-1 The draw must have at least two items.

4.53 Align Top

3.53.1 Description and Priority

With this feature the user can align top for a couple of items.

3.53.2 Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects at least two items
c)User selects align top.
d)System aligns all the items top.

3.53.3 Functional Requirments

REQ-1 The draw must have at least two items.

4.54 Align Bottom

3.54.1 Description and Priority

With this feature the user can align bottom for a couple of items.

3.54.2 Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects at least two items
c)User selects align bottom
d)System aligns all the item bottom.

3.54.3 Functional Requirments

REQ-1 The draw must have at least two items.

4.55 Align Vertical

3.55.1 Description and Priority

With this feature the user can align vertical for a couple of items.

3.55.2 Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects at least two items
c)User selects align Vertical
d)System aligns all the items vertical.

3.55.3 Functional Requirments

REQ-1 The draw must have at least two items.

4.56 Move Left

3.56.1   Description and Priority

With this feature the user can move items to left

3.56.2   Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects a couple of items, at least one.
c)User selects move left
d)System moves the item left one pixel.

3.56.3 Functional Requirments

REQ-1 The draw must have at least one item.

4.57 Move Right

3.57.1   Description and Priority

With this feature the user can move items to right

3.57.2   Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects a couple of items, at least one.
c)User selects move right
d)System moves the item right one pixel.

3.57.3 Functional Requirments

REQ-1 The draw must have at least one item.

4.58 Move Up

3.58.1 Description and Priority

With this feature the user can move items up

3.58.2 Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects a couple of items, at least one.
c)User selects move up
d)System moves the item up one pixel.

3.58.3 Functional Requirments

REQ-1 The draw must have at least one item.

4.59 Move Down

3.59.1 Description and Priority

With this feature the user can move items down

3.59.2 Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects a couple of items, at least one.
c)User selects move down
d)System moves the item down one pixel.

3.59.3 Functional Requirments

REQ-1 The draw must have at least one item.

4.60 Bring To Front

3.60.1 Description and Priority

With this feature the user can move items to front

3.60.2 Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects a couple of items, at least one.
c)User selects Bring to Front
d)System moves the items to the front in relation to other objects..

3.60.3 Functional Requirments

REQ-1 The draw must have at least two items.

4.61   Send to Back

3.61.1   Description and Priority

With this feature the user can move items to back

3.61.2   Stimulus/Response Sequences

Data Flow

a)User selects the selection tool
b)User selects a couple of items, at least one.
c)User selects Send To Back
*d)System moves the items to back in relation to other objects..*

3.61.3 Functional Requirments

REQ-1 The draw must have at least two items.

5.   External Interface Requirements

5.1   User Interfaces

The following image is a sample of JHotDraw main window with all toolbars. On the top we can see the Menu bar with "Menu" ,"Edit","View","?". The last one is an about menu item. Below tha we can see the Draw, Atrributes and Align toolbars. At the bottom left corner we can see the two options for zoom and Toggle Grid tool.
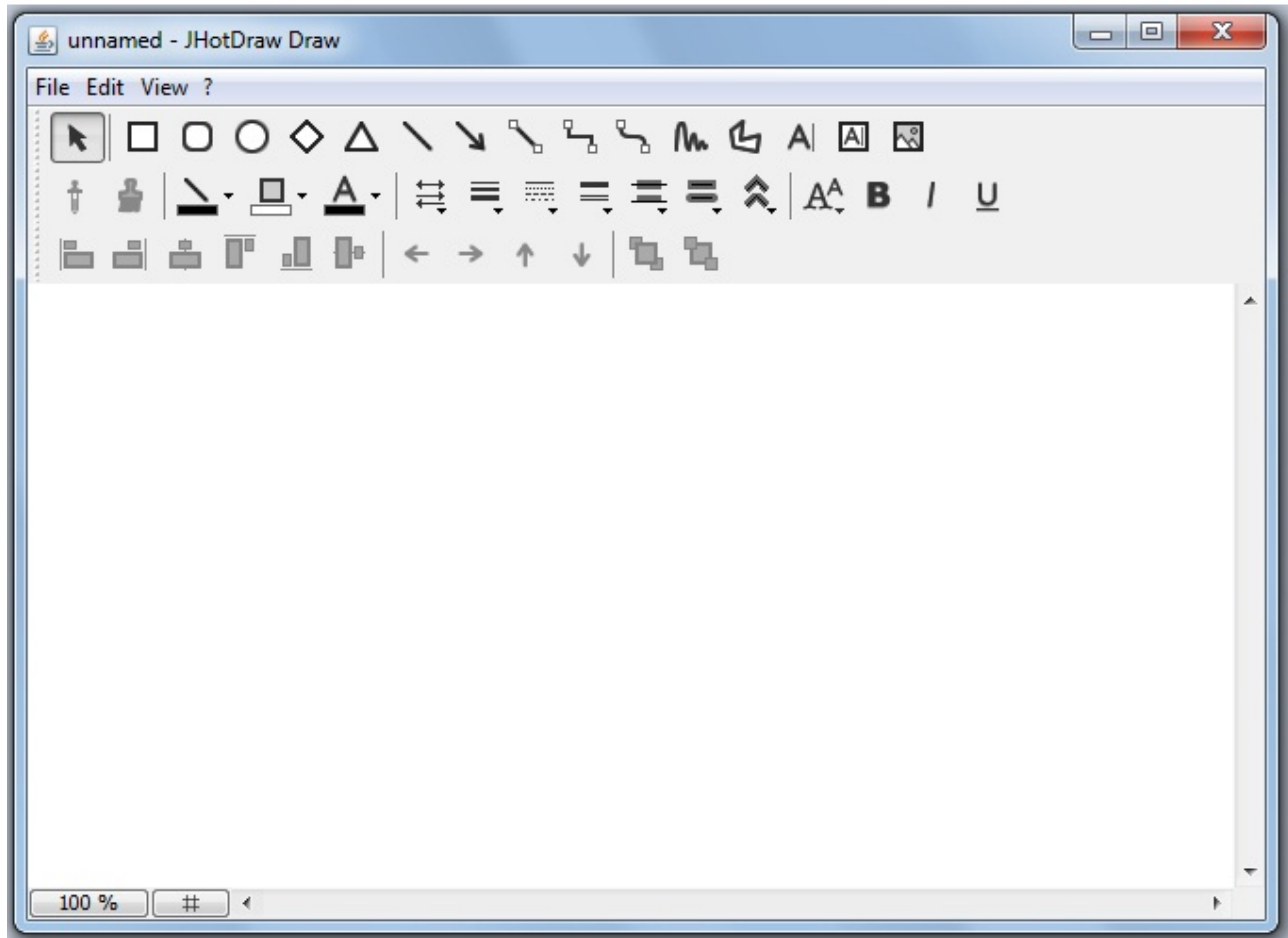
JHotDraw also provides some useful shortcuts:
- New   Ctrl + N
- Open Ctrl + O
- Save Ctrl + S
- Close Ctrl + F4
- Undo Ctrl + Z
- Redo Ctrl + Y
- Cut Ctrl + Z
- Copy Ctrl + C
- Paste Ctrl + V
- Delete Delete
- Select All Ctrl + A
- Deselect All Ctrl + Shift + A

Also with right click program shows a menu with cut, copy, paste and select same choices.

5.2   Hardware Interfaces

There are no special hardware Interfaces. JHotDraw needs only keyboard and mouse for use it.

5.3   Software Interfaces

The only requirement that JHotDraw needs is Java(J2SE6).

5.4   Communications Interfaces

No communication Interfaces.

6.   Other Nonfunctional Requirements

6.1 Extensibility
The framework strictly uses design by contract. Design by contract explicitly allows different implementation classes.

6.2 Use of proven development paradigms
The framework strictly uses of well-documented design patterns and idioms rather than inventing the wheel again.

6.3 Support for static code analysis
Where possible, the framework makes use of type-safe constructs, annotations and static dependencies.
So that many errors can be detected with the compiler, and that correctness can be proven with static code analysis tool (for example FindBugs is explicitly supported).

6.4 Early failure
In case of an implementation error, failure should occur near the cause of the error.
This goal is not always met, but we are still aiming for it. For example, if the clone method of a figure is not implemented properly, the drawing editor starts to behave in a strange way, instead of stopping to work right after the buggy clone method was invoked.

6.5 Modularity
JHotDraw 7 consists of two framework: drawing and application. Each framework can be used independently.

6.6 Other
JHotDraw don't aim for backwards compatibility. All users of the framework must adapt their code if there is a substantial change in the framework.