

3. The **File** menu has options for loading CLIPS definitions and commands, and running rule-based programs.
4. Type (`get-top-card`) into the command window, and press the return key.
5. Type (`show-card 100`) where 100 is the number returned from the above command. The top card will be brought to the front.
6. These and around 200 other Hardy commands can be built into functions which are executed from custom diagram menus, or via event handlers (clicking, dragging, deletion of nodes, and so on).

6. Note the **Document** menu in the **KADS Inference** card. Such customized menus can be linked to CLIPS code (not supplied!) to print out a Latex document, lay the diagram out neatly, etc.

4.5 Sample diagram 3: Process Modelling

1. Go to the diagram labelled **Process Modelling**.
2. This diagram shows a process modelling notation based on SADT.
3. Notice the multi-segment lines. Nodes have *attachment points*, that is, the side of the node is significant, and arcs stay attached to the side they were linked to.
4. You can try the line-straightening feature by SHIFT-left clicking on a multi-segment line, moving the control points a little, then going to the **Layout** menu and selecting **Straighten lines**.

4.6 Linking new cards

1. Show any existing card.
2. Choose **Hyperlinks: Link new card**, and select an appropriate card type (Text or diagram card).
3. If Diagram Card, choose a diagram type.
4. Card appears linked to previous card, and with a reverse link back to the parent.
5. The hypertext tree in the browser window disappears since it's now out of date; use the *Cards: Draw tree* option to redraw.

4.7 The CLIPS development window

This is where you may develop interpreted CLIPS code (rules, functions, objects) to tailor diagram type functionality. Users have developed CLIPS code for such things as document printing, code generation, knowledge elicitation tools, and process model animation.

1. Go to the browser window and select **Tools: Show development window**.
2. From here you can enter CLIPS commands in the top half of the window, press the return key or **Do**, and have the output displayed in the bottom half of the window.

3. Arcs represent strengths of confirmation or denial, and are coloured and labelled on this basis. For example, PD means Potentially Denying, while PC means Potentially Confirming.
4. This diagram type has been used to help elicit belief networks from an expert, and diagrams are automatically translated into KEE or CLOS code for animation.
5. The translation code is written in Prolog and run in batch mode, but could now be done in Hardy's CLIPS language, and executed from within Hardy.
6. The animation could also be done in CLIPS instead of using KEE or CLOS.
7. Accessing attributes: not all attributes are displayed on the screen. Pressing Control and left-clicking pops up a form for editing the attributes of a node (there are no arc attributes in this diagram type).
8. Code could be included in attributes, e.g. **combining_function**, and executed by the animation.
9. Create a new node (for example, a Cluster) by clicking on a symbol in the palette, and then clicking on the diagram card. Enter name attribute with Control left-click, then press on **Finished**.
10. Link new node to another Cluster by dragging with the right mouse from one to another, and then selecting an arc type from the pop-up menu.
11. (Labels on all new arcs can be drawn by choosing the **File: Options** menu item, and selecting the **Label arcs with abbreviation** option).
12. Try linking a yellow Cluster to a red Evidence. It is illegal and will not cause an arc to be created.

4.4 Sample diagram 2: KADS Inference

1. Iconize or Quit from the previous diagram card.
2. Go to the browser window and left-click on **KADS Inference**.
3. This is a **KADS Inference** diagram, used to document model selection processes.
4. Clicking on the first node - Well Test Data and External Data - shows a text card with annotation.
5. Clicking on the second node - Transform - shows the next level in the diagram hierarchy (an *expansion* card). You will need to resize and scroll the diagram. It has been scaled. To remove the Link Panel, choose **Hyperlinks: Toggle link panel display**.

4 The Demo

4.1 Introduction

1. Hardy is a flexible diagramming tool, based around a hypertext framework.
2. Hypertext allows the construction and browsing of a network of information.
3. The diagram editor allows construction and processing of diagrams consisting of nodes and arcs.
4. Diagram *types* may be constructed interactively.
5. Hardy's built-in language, CLIPS, allows a fine degree of tailoring of diagram types.

4.2 The browser

1. If necessary, maximize the main Hardy window by clicking on the top-right up-arrow icon.
2. The Hardy browser (sometimes called control window) should show a 'tree' representing the structure of the hypertext index. You may need to iconize or move the top card to see the browser window.
3. Each title represents a different *card*, and each arc is a *hypertext link* between cards.
4. Left-click on the left-most title - **A hypertext card**. This highlights the *top card*, already displayed on the screen. This is a *hypertext card*, for arbitrary text. The highlighted, red phrases indicate links to other cards.

4.3 Sample diagram 1: Belief Network

1. Click on **Belief Network** on the tree, or on the top level card, and wait for this card to appear. Resize the window if necessary to see more of the diagram. This is the second card type: the *diagram card*.
2. This is an example of a **Belief Network** diagram.

The goal is to choose the mathematical model which best fits a geological description. Data coming in from the bottom (blue nodes) confirm or deny hypotheses (evidence and cluster nodes), and these in turn propagate upwards until a model at the top is confirmed or denied (top-level model not shown here).

```
hardy -f demo.ind
```

Hardy should appear with two windows (if running the XView version, ignore the XView font warnings, this is just the font matcher at work).

3.2 PC

Double-click on the 'Hardy Demo' icon in the Program Manager. By default, Hardy will appear in MDI (Multiple Document Interface) mode. Note that when you point to a child window, the menu bar along the top of the main window will change to reflect the facilities of the current window.

If a blank browser window appears, the demo index has not been loaded. Load the index by selecting the **File: Open Index File** option and double-clicking on `demo.ind`.

NOTE: in the demo version of Hardy, some of the editing operations mentioned in this document may result in a warning message box, because of the restricted functionality. This can be cured by obtaining a serial number from AIAI.

– the text file `changes.txt`

- a demo directory containing the files with `.dia`, `.def`, `.ind`, `.txt`, `.clp` and `.xlp` extensions
- the help files `hardy.xlp`

To use the on-line help facility, install `wxhelp` in your path and set the environment variable `WXHELPPFILES` to the directory where the `.xlp` are to be found.

2.2 PC

Hardy requires Windows 3.1 running in enhanced mode, a minimum of 4 MB of RAM, 3MB of disk space, and an 80386SX processor or above.

To install from the 3.5" floppy disk, ensure the Program Manager is running. If installing from a zip file, use `pkunzip` to unzip into a suitable directory.

Run `install.exe`, for example from the Program Manager **Run** menu.

You will be prompted for a directory to install Hardy into. This must be a different directory from the one in which the installation files reside. The installation program will then copy and uncompress the Hardy files, and create a new Program Manager group called Hardy Demo.

You can now delete the original directory of installation files.

In your Hardy directory you will now have:

- the executable `hardy.exe`;
- the text files `readme.txt` and `changes.txt`;
- the demo files with `.dia`, `.def`, `.ind`, `.txt`, and `.wav` extensions;
- the help file `hardy.hlp`.

Please read the files `readme.txt` and `changes.txt`.

3 Starting Hardy

3.1 Sun

Change to the directory where Hardy is installed and type:

Hardy Installation Instructions

Artificial Intelligence Applications Institute
University of Edinburgh
80 South Bridge
Edinburgh EH1 1HN
Tel 0131-650 2733 Fax 0131-650 6513

1 This document

These instructions are intended as an installation guide and a brief introduction to Hardy features. For further information, please read the Hardy manual, which is also available in on-line form from the **Help** menu.

2 Installing Hardy

2.1 Sun

Hardy requires a Sun 4 supporting XView version 3.x or Motif 1.2 (presently the XView version is not available).

About 10 megabytes of disk space are required.

To install from a floppy disk:

```
% mkdir hardy
% cd hardy
% tar xvf /dev/rfd0          (or other appropriate device name)
% gzip -d hardy.tar.gz
% tar xvf hardy.tar
```

If you are installing from a file, ignore the first tar command.

You will now have:

- the executables `hardy` and `wxhelp`
- A docs directory, containing:
 - the PostScript manual `hardy.ps`
 - the PostScript installation instructions `install.ps`