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Installation

Dicodess is a software framework for developing distributed cooperative decision support systems. A system based on Dicodess is a collection of elements or components that are organized for a common purpose. These components come from various origins, various vendors, and under different licenses, but they all share a common feature: they are available for free. The next section briefly presents the installation process of Dicodess. The remaining of this chapter describes the various components of the software framework, as well as their relationships.

This and the following chapters are based on version 1.0 of Dicodess. If you use a different version of the software, you may notice slight differences in the screenshots and the accompanying explanation. The latest version of the user manual is always included with the software package, in the */manual* folder.

1.1 Downloading and Installing Dicodess

Download the Dicodess software from the SourceForge.net website, at *http://www.sf.net/ projects/dicodess* ("Latest File Releases", download). We recommend downloading the latest version of the software, unless you have good reasons to use an older version. Dicodess is currently available in two forms: as an EXEcutable installer or as a ZIP archive. Feel free to download the package that best suits your needs. Once the installer is copied on your hard drive, double click on it to start it (or unzip it first if you downloaded the ZIP archive).

At the moment, Dicodess is only available on Windows platforms. However, nearly all the components of the software framework are ready to run on Unix-like platforms (Dicodess classes, Jini Network Technology, Java Runtime Environment, and the mathematical solver). As soon as the LPL component will be available on Unix-like platforms, it will be possible to run Dicodess in a multi-platforms environment.

The install program will display an introduction screen explaining that it will guide you through the installation of Dicodess (Figure 1-1). Click on Next and read the licensing information (more information about the various components of the software framework and their licenses follow in the next sections of this chapter). Click again on Next.
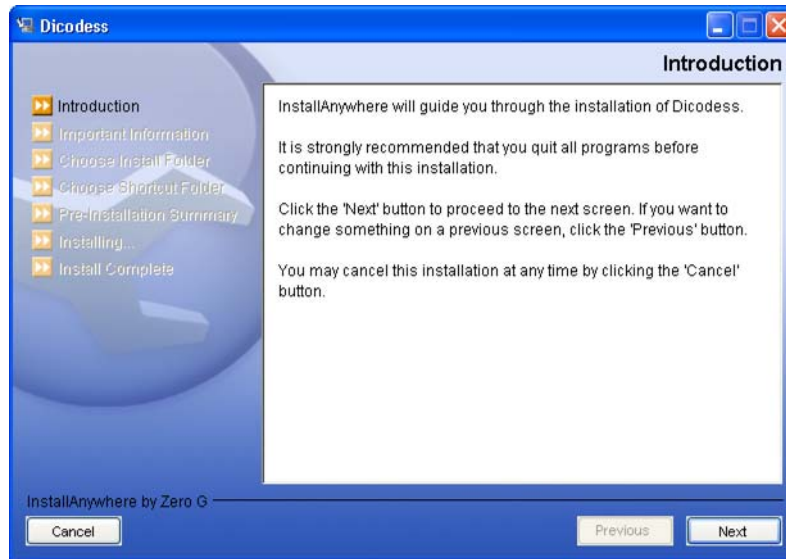

Figure 1-1. Introduction screen of the install program

The install program then asks you where you would like to install the software. In this documentation, we assume that Dicodess is directly installed on the `c:\` drive of the computer. Therefore, we will refer to `c:\dicodess` in the remainder of this chapter. However, you are free to install the software somewhere else on your hard drive. Once you are happy with your selection, click on Next.

> If the installer warns you with a message saying that you do not have write permissions on the installation folder, you might have to create the target folder by hand from the Windows Explorer and try again.

You have the possibility to create a quick startup icon for Dicodess. In this chapter, we will assume that this icon is installed on the desktop (Figure 1-2). Click on Next.

The next screen of the install program summaries your installation settings. Please check that the Java VM that will be used by the installed product is a recent one (ideally, Java version 1.4.x). If you have an older JVM installed on your computer, go on with this installation process and update your JVM by following the instructions given in Section 1.2.5 of this chapter. Click on Install. Once the installation is complete, click on Done to quit the installer.

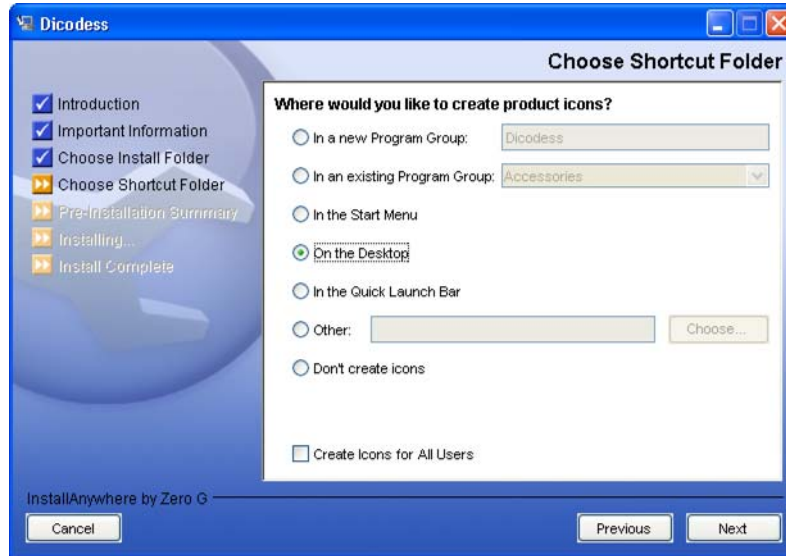Before starting Dicodess, we will briefly review the various components of the software framework.

Figure 1-2. Creating product icons

If you are new to Dicodess or if you are interested in the inner structure of the software framework, we recommend reading this chapter in its entirety. If you are already familiar with Dicodess and you are looking for a quick and no thinking version of the set up process, jump to Section 1.3.

1.2   Dicodess Components

Figure 1-3 shows the components of a typical decision support system (DSS) based on Dicodess.

1.2.1   Dicodess Classes

The *Dicodess classes* obviously represent the core of the Dicodess software framework. They have an important coordination functionality in the system. On the one hand, they manage all the distributed and cooperative activities. On the other hand, they coordinate the decision support tasks. Many distributed activities are delegated to the Jini component and many decision support tasks are delegated to the LPL component. This part of the system is completely written in Java and is licensed under the conditions of the open source Academic Free License (AFL, see Appendix B, Section B-1). These classes are available in source code form (that we will use in Part III of the book) on the SourceForge.net website (*http://www.sf.net/projects/dicodess*). Source code is only required if you intend to extend the Dicodess classes to meet your own needs. The object code (that is included in the install program used in the previous section) is perfectly

suitable if you intend to use Dicodess as an application or as a simple model-based DSS generator.
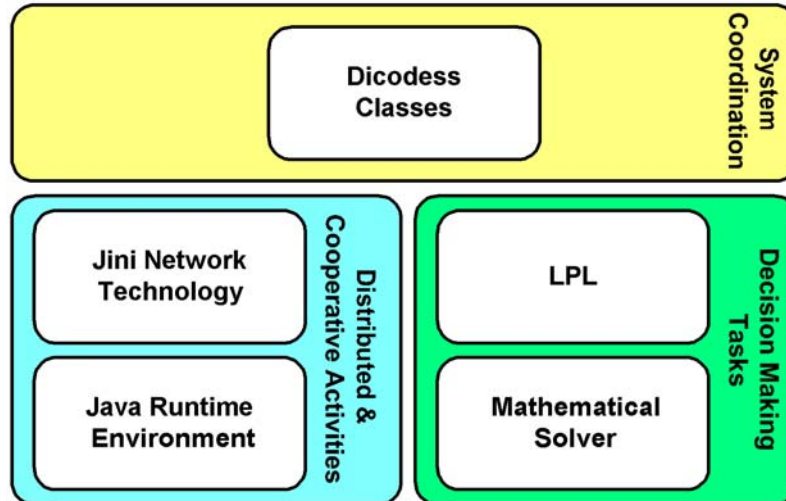

Figure 1-3. Components of Dicodess

1.2.2   LPL

LPL is a structured, mathematical, and logical modeling and programming language, which can build, maintain, modify, and document large linear, non-linear, and other mathematical models (Huerlimann 1999). By default, Dicodess delegates all the model-oriented tasks of a DSS to LPL, even though the software framework could be extended to support different modeling languages, such as AIMMS (Streiffert 2000), AMPL (Castillo 2002), or GAMS (Fourer, Gay et al. 1993). LPL is developed by a firm called virtual-optima.com and exists in three versions: free, professional, and enterprise. Dicodess uses the free version of LPL, which is licensed under the conditions of the LPL freeware license (see Appendix B, Section B-2).

The version of LPL included in the install program is a time-limited, freely renewable product. Dicodess will inform you if the LPL version you are using is out-of-date and will redirect you to the LPL download page. Besides, the free version of LPL can be downloaded directly from virtual-optima.com at *http://www.virtual-optima.com/download/lplfree.zip*.

1.2.3   Mathematical Solver

LPL can be connected with a dozen of mathematical solvers to optimize your models. Many of these solvers are commercial (and expensive) products. However, there is an excellent open source solver (GLPK, *GNU Linear Programming Kit*) that is supported by LPL. Even though you are not required to, we recommend using this solver with Dicodess. Furthermore, this solver is included in the install program of Dicodess. The *GLPK* homepage is located at *http://www.gnu.org/software/glpk/glpk.html*. GLPK is licensed under the conditions of the GNU General Public License (see Appendix B, Section B-3).

1.2.4   Jini Network Technology

Jini was conceived as the foundation upon which robust, truly distributed systems can be built (Li 2000). Jini is nothing without a network. By definition, Jini does not exist outside of a network. Jini is a middleware providing a set of classes, interfaces, helper utilities, services, and related network protocols, for building scalable, robust, distributed systems using Java. A Jini network is a network of many services able to find each other (Oaks and Wong 2000). It shares many features with ad hoc networks, which are defined as "network[s] formed without any central administration, and whose nodes can dynamically, arbitrarily, and continually connect and disconnect" (McCabe 2002). Dicodess leverages the Jini technology to manage many distributed and cooperative activities in the software framework.

Jini is developed by Sun Microsystems and distributed under the conditions of the Sun Community Source License (SCSL, see Appendix B, Section B-3). Given that we are releasing Dicodess for Research Use only, the SCSL license allows us to redistribute the object code of the Jini Technology Starter Kit (JTSK) to third parties (see Section IV. D. of the SCSL license). The complete JTSK (including source code) can be downloaded for free at the URL *http://wwws.sun.com/software/communitysource/jini/download.html*. All what is needed is a (free) registration on Sun Microsystems' Download Center.

1.2.5   Java Runtime Environment

Given that the Dicodess classes and the Jini Network Technology are written in Java, it is quite obvious that you will need a Java Virtual Machine (JVM) to execute Dicodess. If you intend to install Dicodess on a fairly recent computer, there are good chances that you already have a Java Runtime Environment installed on your machine. To find it out, simply visit the website *http://www.java.com/* and click on the "Get It Now" button. If the latest version of the Java Runtime Environment is already installed on your computer, the website will redirect you to a page whose title is "Java Software Installed". If not, the website will guide you through the installation process. The Java Runtime Environment is distributed for free under the Sun Microsystems Binary Code License Agreement. It is the only component in the Dicodess system that will not be installed in the Dicodess folder.

1.3   Configuring and Testing Dicodess

1.3.1   Configuring Dicodess

Downloading and installing Dicodess was the hard part of the process. All you need to do now before testing the software is configuring it to fit your system. In fact, if you installed Dicodess in the folder proposed by the installer (i.e. `c:\dicodess`), then you probably do not need to configure Dicodess at all! Quickly review this section to be sure that the default configuration suits your need and jump to Section 1.3.2. If you did not install Dicodess if the default folder, open the batch file `dicodess.bat` in the Dicodess home folder (e.g. `c:\dicodess\dicodess.bat`) and modify the variable under the command `setlocal`:

Dicodess is a highly dynamic distributed system. Even though you can use it without being physically connected to a network, *you will need a real IP address to run it!* If you computer is equiped with a network adapter, there is good chances that you already have an assigned IP address. Run the `ipconfig` command in a DOS shell to find out if you have one.

`set DICODESS=<dicodess home>`

 <dicodess home> is the home directory of Dicodess (e.g. `c:\dicodess`).

The variables in the second block of code can be modified in some specific situations:

`set JAVA=<Java home>`

 This variable is usually not set, as Dicodess will run with the default JVM installed on your computer. However, if you have several JVM installed on your computer and you do not want to start Dicodess with the default one, replace *<Java home>* with the home directory of the selected Java Runtime Environment (e.g. `c:\progra~1\java\j2re1.4.2_01`). Please remember that the Dicodess batch file does not accept white spaces in folder names. Consequently, you must use the short name of the folder (`progra~1`) instead of its long name (`program files`)[1].

`set JINI=<Jini folder>`

 <Jini folder> is the name of the folder in which Jini is installed. By default, Jini is installed in the folder `Jini1_2_1_001` and there is no reason why you should change this variable.

`set DICTIONARY=<Dictionary name>`

 This variable contains the base name of the dictionary files used with the current DSS. Dictionary files are beyond the scope of this introduction chapter. Do not change the value of this variable unless you know what you are doing.

`set HOST=<your hostname>`

 <your hostname> is the name of the machine where Dicodess is being installed (e.g. iiufpc39). If you do not know your hostname, open a DOS shell and type the command `ipconfig /all`. The second line of the result will give you your hostname. Note that Dicodess needs the host name — *not the IP address* — of your machine to run. By default, Dicodess uses the Windows environement variable named `COMPUTERNAME`.

Once you made the necessary changes, save `dicodess.bat` and close it.

1.3.2   Testing Dicodess

Start Dicodess by double-clicking on the quick startup icon previously created by the installer (on the desktop or in the Start menu). If you are a tech-savvy user, you can also

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1. To be sure that the short name of "program files" is "progra~1", type "dir c:\progra* /X" in a DOS shell and check that "PROGRA~1" and "program files" are on the same line. If not, use the short name associated with "program files".

open a DOS shell, change to the Dicodess home directory (e.g. `cd c:\dicodess`) and type the following command:

    dicodess.bat

If you see a dialog box similar to Figure 1-4 (maybe in a different language, as Dicodess tries to find a language suitable to your locale settings), it means that the Dicodess classes and the Java Runtime Environment have been successfully installed. The username that you have to enter is the same as the username you used to log into your Windows system[2]. The default password is "dicodess" (in lowercase, without the quotes). Enter `robots_<your name>` (e.g. `robots_gachet`) as the name of the DSS (the drop-down list should be empty, as you just installed a fresh copy of the system). You can leave the checkboxes of the communication services checked. Click on the Login button. The system will then ask you if you are starting a brand new DSS project. Answer Yes.
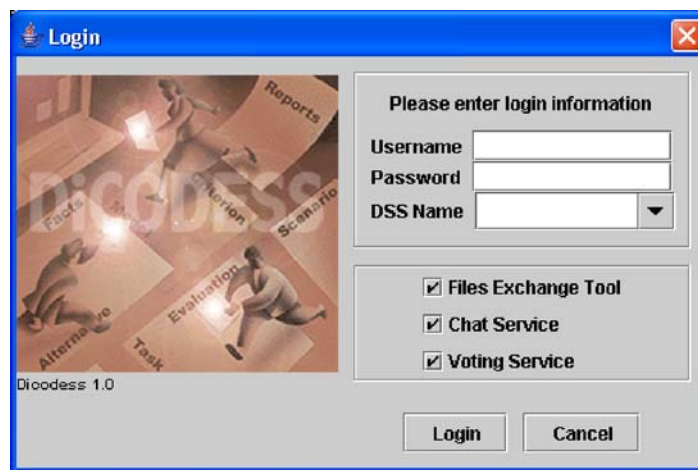

Figure 1-4. Dicodess login dialog box

The startup dialog should be replaced by a wizard box during the configuration of the system environment (Figure 1-5), and then by the DSS configuration screen shown in Figure 1-6.

In the next phase, click on the "Load Config File..." button and open the file `robots.cfg` in the folder `models\robots` (e.g. `c:\dicodess\models\robots\robots.cfg`). The various text areas of the DSS configuration screen should look like Figure 1-7. Don't worry if this procedure does not make complete sense. We will explore it in more detail in the coming chapters.

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2. If you intend to use Dicodess with a different username and a different password, create a new text file named `<myname>.dss` in the folder `badges` of Dicodess. Enter the selected username on the first line of the file, and the password on the second line. Then, restart Dicodess. Please note that there is no real authentification functionality in the current version of Dicodess. The login dialog box is mainly provided as a generic class that can be refined by DSS builders needing a higher level of security (refer to Part III of the book to learn how to extend the framework).
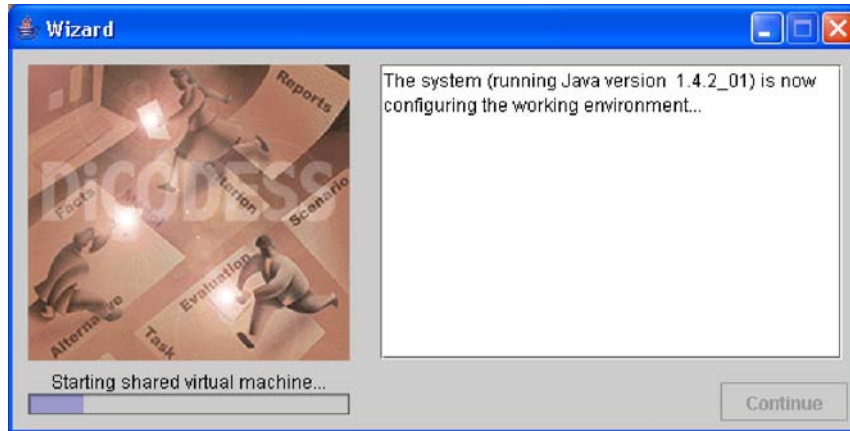
Figure 1-5. Configuring the system environment

Click the button "Continue". If the system open the main window of Dicodess, congratulations! It means that the system is successfully installed. You may now proceed to the next chapter, *Quick Start Tutorial*. This coming chapter will introduce the most important functionality of Dicodess in a standalone, single-user environment. Chapter 3 will then show how Dicodess can be used in a distributed, multi-users environment.
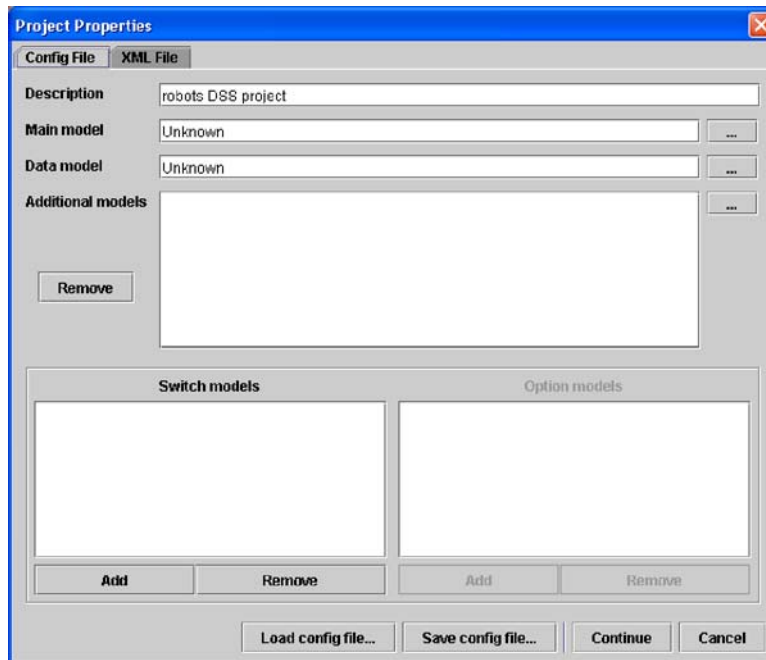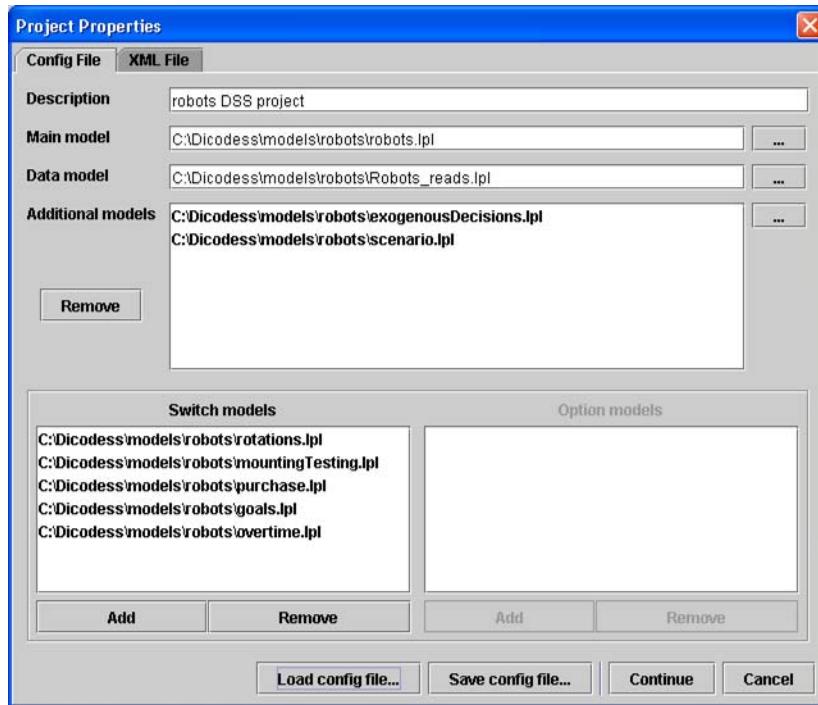

Figure 1-6. DSS configuration screen

Figure 1-7. Loading a model config file