RidgeSoft™

Creating Your First IntelliBrain Program

www.ridgesoft.com

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Introduction

This tutorial will take you through the process of using the RoboJDE™ Java™-enabled robotics software development environment to create, build, load and run your first Java program on the IntelliBrain™ robotics controller.

Before Getting Started

Before getting started, take a few minutes to locate and familiarize yourself with the *IntelliBrain User Guide* and the *RoboJDE User Guide*. These documents can be found in the "docs" folder on the Software and Documentation CDROM that came with your IntelliBrain robotics controller. The most up-to-date versions of these documents may also be obtained from the RidgeSoft™ website (www.ridgesoft.com).

If you purchased an IntelliBrain-Bot educational robot kit, assemble the robot first following the instructions in the *IntelliBrain-Bot Assembly Guide* before beginning this tutorial.

If you purchased only the IntelliBrain robotics controller, consult the *IntelliBrain User Guide* for information on assembly, powering and mounting the controller on your robot chassis.

Installing and Configuring RoboJDE

If you have not already installed and configured RoboJDE, follow the steps in this section, otherwise you may skip this section.

Installing the RoboJDE Software

1. Insert the CDROM that came with your IntelliBrain robotics controller into your PC's CDROM drive. The installation program should start automatically.

2. If the installation program did not start automatically, start it from the Windows Start Menu by selecting Start->Run then browsing to and selecting RoboJDESetup.exe on the CDROM.

3. Follow the directions provided by the installation program.

4. Before removing the CDROM, browse the "docs" folder to familiarize yourself with the documents that have been provided on the CDROM in addition to the RoboJDE software. If you would like a copy of the documents on your PC's hard disk, copy the files to a folder on your PC's hard disk.

Connecting the IntelliBrain Controller to Your PC

RoboJDE communicates with the IntelliBrain robotics controller via a serial port on your PC. You must connect the PC serial port to your IntelliBrain robotics controller using a straight through serial cable. The IntelliBrain-Bot kit includes a serial cable.

1. Attach the male end of the cable to the host port connector, labeled COM1, on the IntelliBrain robotics controller.

2. Attach the female end of the cable to a COM port on your PC, noting the number of the port you used. If your PC has USB ports, but not serial ports, you will need to first install a USB to serial adapter cable, such as the IOGear GUC232A.

Starting the RoboJDE Graphical User Interface

1. Using the Windows Start Menu, start RoboJDE.

2. Read the license agreement and, if you agree to its terms, select the agree option and click Continue.

Installing Your License Key

RoboJDE requires a license key to unlock its full functionality. A license key is included with the purchase of each IntelliBrain robotics controller and each IntelliBrain-Bot robot kit. You must install the license key; otherwise, the capabilities of RoboJDE will be limited.

1. Locate the license key label on the back of the CDROM case.

2. Select the Tools->License Key menu item to display the Install License Key dialog.

3. Type the key printed on the label into the dialog, being careful to enter the hyphens, letters and numbers correctly. Note: License keys contain only the numbers 0-9 and the letters A-F and do not contain the letter "O".

4. Click OK.

Configuring RoboJDE Settings

1. Use the RoboJDE Tools->Settings menu item to display the Settings dialog box.

2. Set the Board Type to "IntelliBrain."

3. Set the Serial Port setting to the name of the PC serial port to which you connected your IntelliBrain controller.

4. Set the Baud Rate to match the baud rate configured on your IntelliBrain controller. The default is 38400. To change to different baud rate, or view the currently configured baud rate, see the *IntelliBrain User Guide*.

5. Click OK.

Verifying Communication between your PC and the IntelliBrain Controller

At this point, if everything is configured properly and the serial cable is connected, the RoboJDE GUI should be able to communicate with the IntelliBrain controller.

1. If you have not already connected the battery back to your IntelliBrain controller, do so now, attaching the red lead to the red terminal on the power terminal block and the black lead to the black terminal.

2. Insert fresh batteries in the battery pack, being careful to install the in the proper orientation.

3. Power the IntelliBrain controller on by sliding the power switch lever in the direction of the LCD display. The green power LED should turn on. The red fault LED should blink once and the RoboJDE should version number on the LCD display. If this doesn't happen, ensure that you have installed good batteries in the battery pack and that you have installed them in the proper orientation.

4. In the RoboJDE GUI, click on the "Run" tab near lower left corner of the window if it is not already active.

5. The "VM State" field should display "Load" or "Ready" and numeric values should display in the "Threads", "Objects", "Free Blocks" and "Free Bytes" fields. If this doesn't occur, check that the serial cable is connected and the selections you made in the RoboJDE settings dialog are correct.

6. Check the RoboJDE version numbers by selecting the Help->About menu item.

7. If the version of the RoboJDE virtual machine does not correspond to the version of the user interface version, use the Tools->Download Virtual Machine menu item to download the virtual machine. At the time of this

writing, the user interface version number was 1.3.1 and the virtual machine version number was 1.3.0.

Creating Your Own Robotics Software Project

RoboJDE uses project files to make it easy for you to switch between different projects you may be working on. Use the following procedure to create a project titled "MyBot":

1. Select File->New Project menu item in the RoboJDE GUI. The Project Properties dialog will appear.

2. Click the browse button to the right of the project folder field. Browse to and select the folder you want to create the new project in.

   Note: You can create a new folder by browsing to where you want to create the folder then pressing the create folder button. A folder titled "New Folder" will appear. Click on its name to change the name to a name you choose, then click on the folder icon to the left of the name and click OK.

3. Enter the name "MyBot" in the Main class field.

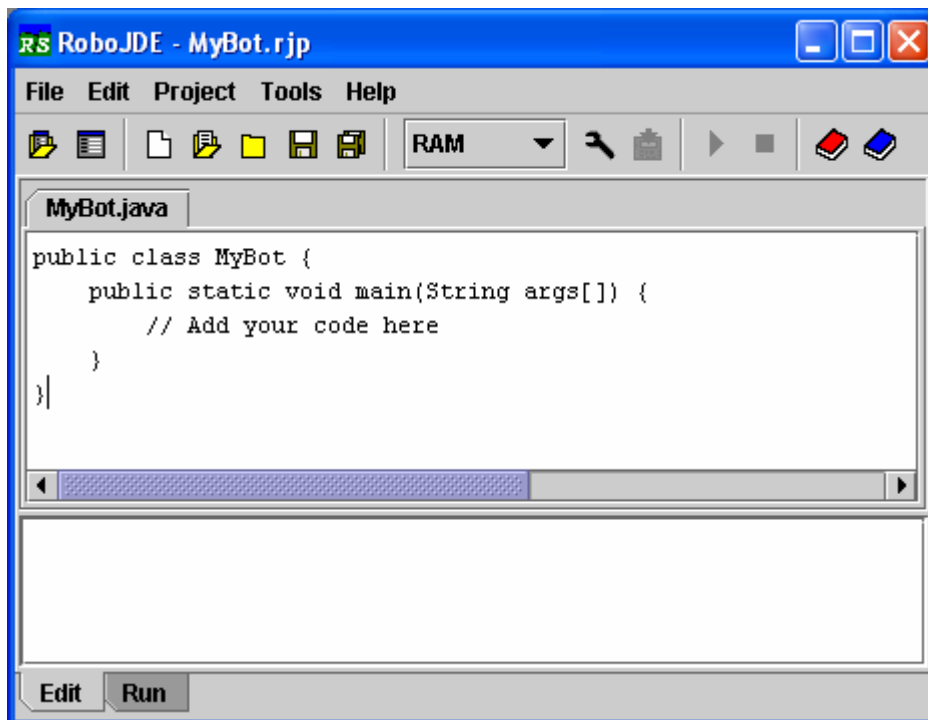4. Click OK. The MyBot class will be created, as shown in Figure 1.

Figure 1 - MyBot Project in RoboJDE

5. Click the Save all button (see Figure 2) or select the File->Save All menu
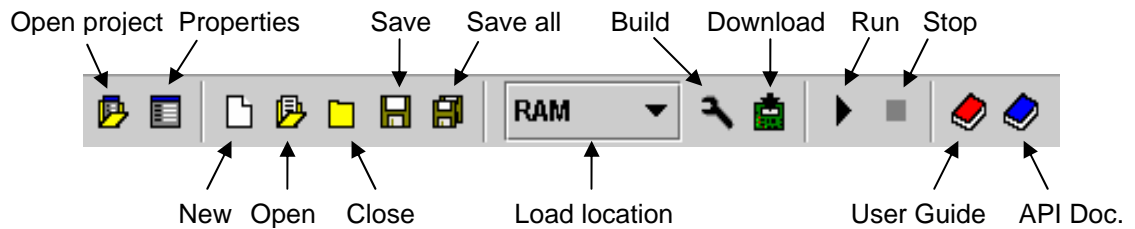   item. The Save dialog will appear with "MyBot" as the proposed file name.

Figure 2 - RoboJDE Tool Bar

6. Click the Save button to save your project.

Building, Loading and Running Your Program

The MyBot program, shown in Figure 1, is currently just a stub program that does
nothing. Never-the-less, you can build it, download it and run it on the IntelliBrain
controller. Follow the steps below to build, load and run the MyBot program:

1. Switch the IntelliBrain controller's power switch to the on position. The
    Download button on the RoboJDE tool bar (see Figure 2) will become
    enabled, changing color from grey to green, indicating the controller is
    communicating with the RoboJDE GUI.

2. Click the Download button to build the MyBot program and download it to
    the IntelliBrain controller.

    Note: You can choose to load the application to the RAM or FLASH
    memory by changing the load location on the tool bar. While developing
    your program it is faster and easier to load the program into RAM.
    However, the program will not be retained when you turn the IntelliBrain
    controller off. Downloading the program to FLASH memory will allow it to
    be retained when you turn power off.

3. Click the Run button on the RoboJDE tool bar to run the MyBot program.

    The MyBot program is currently only a stub program that does nothing
    other than start and then immediately exit. After pressing the run button,
    you will notice the state "Running" displayed briefly on the IntelliBrain LCD
    screen and in the "VM State" field in RoboJDE Run window. RoboJDE
    automatically switches to displaying the Run window when you click on
    the Run button.

Note: You can also run a program by pressing the button labeled "START" on the IntelliBrain controller.

4. Press the "START" button on the IntelliBrain controller to run the MyBot program again.

Outputting Text to the LCD Screen

Now that you've created and run your first program, you're probably eager to have the program actually do something! Use the following steps, to modify the program to print "MyBot" on the first line of the LCD screen and "Version 0.1" on the second line:

1. If the Edit window isn't currently displayed in RoboJDE, click on the Edit tab in the lower left corner of the RoboJDE window.

2. Use the Edit window to modify the MyBot program to contain the following code:

```java
import com.ridgesoft.io.Display;
import com.ridgesoft.intellibrain.IntelliBrain;

public class MyBot {
    public static void main(String args[]) {
        try {
            Display display = IntelliBrain.getLcdDisplay();
            display.print(0, "MyBot");
            display.print(1, "Version 0.1");

            Thread.sleep(5000);
        }
        catch (Throwable t) {
            t.printStackTrace();
        }
    }
}
```

If you are familiar with Java, these code changes will be easy to understand. If you are not very familiar with Java, the following paragraphs give a brief explanation of this example.

The first two lines add import statements to import the Display class and the IntelliBrain class from the RoboJDE class library. This allows you to use these classes later in the program.

The try and catch statements allow the program to catch any exceptions or errors that occur while the program runs. The t.printStackTrace method call in the catch code block will print out detailed tracing information that will help you debug unexpected exceptions or errors. The stack trace

output will be displayed in the RoboJDE Run window if the robot is connected to the host PC.

The IntelliBrain.getLcdDisplay method call gets a reference to the Display object for the IntelliBrain's LCD display.

Tip: The IntelliBrain class provides methods that enable your programs to access the features of the IntelliBrain controller. When you want to use a feature of the IntelliBrain controller that you haven't used before, refer to the IntelliBrain User Guide for basic examples of accessing various features of the controller. For more in-depth information, refer to the RoboJDE Class Library API documentation. The documentation for the IntelliBrain class is typically a good place to start. Click on the blue book icon on the RoboJDE tool bar (see Figure 2) to display the API documentation.

The two display.print method calls print text to line 0 and line 1 of the LCD display.

The Thread.sleep method call causes the program to sleep for 5000 milliseconds (5 seconds) before returning and continuing. The program terminates after this call.

3. Switch the IntelliBrain controller's power on.

4. Click the Download button to build and load the program.

If you made any errors typing the code, the Java compiler will report an error in the lower pane of the Edit window. Correct any errors and repeat this step until the program compiles and downloads.

5. Click the Run button.

The MyBot program will run and display:

```
MyBot
Version 0.1
```

for 5 seconds, before exiting.

Conclusion

Now that you have completed this tutorial, you should be familiar with using RoboJDE to: 1) create a robotics software project, 2) build and download a program to the IntelliBrain robotics controller and 3) run the program.

Exercises

1. Modify the MyBot program to display your name instead of "MyBot."
2. Download your program to FLASH memory. Verify that you can run the program without reloading it after you have turned the power off and back on.
3. Click on the User Guide button on the RoboJDE tool bar. Browse the *RoboJDE User Guide*.
4. Click on the API documentation button on the RoboJDE tool bar. Find the IntelliBrain class, the Display class, the Thread class and the Throwable class in the classes list located on the left.
5. Navigate through the API documentation to the documentation for the getLcdDisplay method in the IntelliBrain class.
6. Navigate through the API documentation to the documentation for the print method in the Display class.
7. Navigate through the API documentation to the documentation for the sleep method documentation in the Thread class.
8. Navigate through the API documentation to the documentation for the sleep method documentation in the Thread class.
9. Navigate through the API documentation to the documentation for the printStackTrace method documentation in the Throwable class.
10. Find and read the documentation on using the LCD display in the *IntelliBrain User Guide*.
11. Find the references to using the LCD display on the IntelliBrain API quick reference card ("IntelliBrainAPI.pdf" in "docs" folder on the CDROM).
12. Display the RoboJDE User Guide by clicking on the appropriate button on the tool bar.