

# Java Game: DotsAndBoxes

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## Description

DotsAndBoxes is a graphical Java 1.1 AWT (GUI) applet to play the pencil-and-paper game of “Dots and Boxes”, also known as “Lines and Boxes”. The game board is a rectangular grid. Dots are shown for the corners of the board squares. Players take turns drawing the lines that surround each square: top, left, right, and bottom. The player who completes a square by clicking on the fourth line gets that square. At the end of the game, the player with the most squares wins. You may run this program as a stand-alone application, or as an applet on the following web page:

Dots and Boxes, Lines and Boxes - by: Keith Fenske  
<http://www.psc-consulting.ca/fenske/dotbox2a.htm>

Your squares are shown in black and the computer's squares are shown in white. You may change the number of rows and columns. The difficulty level may be selected as “easy” (computer moves randomly) or “medium” (computer tries to complete squares with three lines, and avoids squares with two lines). More difficult levels have not been implemented, although the program does contain hooks for two additional levels called “hard” and “expert”. Some versions of “Dots and Boxes” force players to take particular moves, such as completing a board square if three lines are already present. This version has no such restrictions. As a result, not completing a board square can become a useful strategy towards the end of the game!

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## Installation

You must have the Java run-time environment (JRE) installed on your computer. DotsAndBoxes was developed with Java 1.4 and compiled for Java 1.1, so it should run on all later versions. For Macintosh computers, the version of Java is determined by your version of MacOS. For Windows, Linux, and Solaris, you can download the JRE from Sun Microsystems:

### Sun Java

JRE for end users: <http://www.java.com/getjava/>

SDK for programmers: <http://developers.sun.com/downloads/>

IDE for programmers: <http://www.netbeans.org/>

Once Java is installed, you need to put the program files for DotsAndBoxes into a folder (directory) on your hard drive. The name of the folder and the location are your choice, except it is easier if the name does not include spaces. Assume that files will go into a C:\JAVA folder. Then create the folder and unpack the Java \*.class files into this folder (if you received the program as a ZIP file). The files look something like this:

- dotbox2a.htm (4 KB, applet web page, external links don't work)
- dotbox2b.jar (11 KB, applet archive file, name must be lowercase)
- dotbox2c.txt (74 KB, same source code as text for web page)
- DotsAndBoxes2.class (17 KB, executable program)
- DotsAndBoxes2.doc (31 KB, this documentation in Microsoft Word format)
- DotsAndBoxes2.gif (11 KB, sample program image)
- DotsAndBoxes2.java (73 KB, source code)
- DotsAndBoxes2.manifest (1 KB, main class manifest for archive file)
- DotsAndBoxes2.pdf (69 KB, this documentation in Adobe Acrobat format)
- DotsAndBoxes2Board.class (2 KB, helper class for main program)
- DotsAndBoxes2Window.class (1 KB)
- ffcccc.gif (1 KB, web page background, name must be lowercase)
- GnuPublicLicense3.txt (35 KB, legal notice)
- make-dotbox2.bat (1 KB, compiles as Java 1.1 using Java 1.4 SDK)
- RunJavaPrograms.pdf (60 KB, more notes about running Java)

To run the program on Windows, start a DOS command prompt, which is Start button, Programs, Accessories, Command Prompt on Windows 2000/XP. Change to the folder with the program files and run the program with a "java" command:

```
c:
cd \java
java DotsAndBoxes2
```

The program name “DotsAndBoxes2” must appear exactly as shown; uppercase and lowercase letters are different in Java names. Should you find this program to be popular, you can create a Start menu item or desktop shortcut on Windows 2000/XP with a target of “java DotsAndBoxes2” starting in the “c:\java” folder. One complication may arise when trying to run this program. Java looks for an environment variable called CLASSPATH. If it finds this variable, then that is a list of folders where it looks for \*.class files. It won’t look anywhere else, not even in the current directory, unless the path contains “.” as one of the choices. The symptom is an error message that says:

```
Exception in thread "main" java.lang.NoClassDefFoundError: DotsAndBoxes2
```

To find out if your system has a CLASSPATH variable defined, type the following command in a DOS window:

```
set CLASSPATH
```

To temporarily change the CLASSPATH variable to the current directory, use the following command line:

```
java -cp . DotsAndBoxes2
```

To permanently change the CLASSPATH, you must find where it is being set. This may be in an old AUTOEXEC.\* file in the root directory of your system disk (usually the C:\ folder), or it may be in Control Panel, System, Advanced, Environment Variables on Windows 2000/XP.

## Removal or Uninstall

To remove this program from your computer, delete the installation files listed above. If the folder that contained the files is now empty, you may also delete the folder ... if you created the folder, of course, not the system. If you created desktop shortcuts or Start menu items, then delete those too. There are no configuration or preference files, and no information is stored in the Windows system registry. You don’t need an “uninstall” program.

## Restrictions and Limitations

Web page applets are obsolete and may run as stand-alone applications with the help of a wrapper (included), although this becomes less likely after Java 9 (2017). Rewriting for Java Swing or newer JavaFX is not an easy job.

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file: DotsAndBoxes2.doc 2019-03-30