

# Java Application: DriveSpeed

Written by: Keith Fenske, <http://kwfenske.github.io/>

First version: Monday, 31 October 2016

Document revised: Tuesday, 22 November 2016

Copyright © 2016 by Keith Fenske. Apache License or GNU General Public License.

## Description

DriveSpeed is a Java 1.4 graphical (GUI) application to test the speed of disk drives or flash drives. Large temporary files are written with all zero bytes, then read back. To get accurate results, files must be bigger than the amount of physical memory on your computer (RAM), and should be several times bigger, because your computer uses some of its memory as a “disk cache” to increase the apparent speed of drives. Large files minimize the effects of cache. There will be some variation in results, around ten percent over minutes and five percent over hours. Likely factors are:

1. Hardware speed of disk drive, motherboard, and connections. CPU speed is not a major concern for this program.
2. Java version and operating system (Linux, MacOS, Windows, etc).
3. Some file systems (NTFS) may be faster than others (FAT32). Newly formatted disks should be fully written once before testing.
4. Disk drives may slow down on continuous activity to reduce heat. Flash drives can get slower with usage. (Repeated testing may degrade flash drives.)
5. Other active programs consume CPU time and disk I/O, including screen savers, anti-virus products, and automatic updates.

When you run this program, choose your options, and click the “Drive Folder” button to select a folder (directory) where the program can write one or more temporary files. This can be anywhere on the drive to be tested, where you have write access. Click the “Start” button to begin. The first test is for writing only. The progress bar above the “Start” button shows how much data has been written. The “Write Speed” box in the bottom right-hand corner shows the current write speed, and the final average write speed. After writing is finished, the same file(s) will be read. Data is not checked for being all zero when read, because that would take extra time. The “Read Speed” box in the bottom left-hand corner shows the current read speed, and the final average read speed when finished.

The size of the data buffer is an option. You rarely need to change this, unless you suspect that the computer system is not doing well with a certain size. Buffer size is the number of bytes

read or written on each request to the system. Most computers handle a wide range of sizes with equal performance. The default buffer size is generally good.

Being prompted with a pop-up dialog box is an option, after writing finishes and before reading starts. If your drive is a removable device or on removable media, you can remove (eject) the drive by the normal procedure for your system, wait a few seconds, reinsert the drive, and continue. This clears the disk cache, and is important for USB thumb drives, which are often smaller than the amount of memory on your computer.

Don't use this program on compressed disks, because zeros are constant and highly compressible. Files with names similar to "ERASE123.DAT" are assumed to belong to this program and will be replaced or deleted without notice. See also the EraseDisk Java application.

## Apache License or GNU General Public License

DriveSpeed is free software and has been released under the terms and conditions of the Apache License (version 2.0 or later) and/or the GNU General Public License (GPL, version 2 or later). This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY, without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the license(s) for more details. You should have received a copy of the licenses along with this program. If not, see the <http://www.apache.org/licenses/> and <http://www.gnu.org/licenses/> web pages.

## Installation

You must have the Java run-time environment (JRE) installed on your computer. DriveSpeed was developed with Java 1.4 and should run on later versions. It may also run on earlier versions, but this has not been tested. You can download the JRE from Oracle (formerly Sun Microsystems):

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

SDK for programmers: <http://www.oracle.com/technetwork/java/>

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

Once Java is installed, you need to put the program files for DriveSpeed 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:

ApacheLicense20.txt (12 KB, legal notice)

DriveSpeed1.class (21 KB, executable program)

DriveSpeed1.doc (34 KB, this documentation in Microsoft Word format)

DriveSpeed1.gif (17 KB, sample program image)  
DriveSpeed1.ico (87 KB, icon for Windows)  
DriveSpeed1.jar (13 KB, archive file with same class files inside)  
DriveSpeed1.java (63 KB, source code)  
DriveSpeed1.manifest (1 KB, main class manifest for archive file)  
DriveSpeed1.pdf (73 KB, this documentation in Adobe Acrobat format)  
DriveSpeed1User.class (1 KB, helper class for main program)  
GnuPublicLicense3.txt (35 KB, legal notice)  
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 XP/Vista/7. Change to the folder with the program files and run the program with a “java” command:

```
c:  
cd \java  
java DriveSpeed1
```

The program name “DriveSpeed1” must appear exactly as shown; uppercase and lowercase letters are different in Java names. Some systems (Macintosh) will run a main “class” file by clicking on the class file name while viewing a directory in the file browser (Mac Finder). Many systems will run a “jar” file by clicking (or double clicking) on the jar file name (Windows Explorer). The command line is the only guaranteed way of running a Java program. Should you find this program to be popular, you can create a Start menu item or desktop shortcut on Windows XP/Vista/7 with a target of “java.exe DriveSpeed1” 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: DriveSpeed1
```

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 . DriveSpeed1
```

To permanently change the CLASSPATH, you must find where it is being set. This is in Control Panel, System, Advanced, Environment Variables on Windows XP/Vista/7.

## 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 hidden configuration or preference files, and no information is stored in the Windows system registry. You don't need an "uninstall" program.

## Graphical Versus Console Application

The Java command line may contain options for the position and size of the application window, and the size of the display font. See the "-?" option for a help summary:

```
java DriveSpeed1 -?
```

The command line has more options than are visible in the graphical interface. An option such as -u14 or -u16 is recommended because the default Java font is too small.

## Restrictions and Limitations

Read speeds will be meaningless if the total number of bytes written is smaller than the physical memory (RAM) on a computer, as data may actually be "read" from the computer's disk cache and not from the drive. FAT32-formatted volumes (i.e., USB thumb drives) have a maximum size of 4 GB per file, unlike exFAT or NTFS. Windows 2000/XP/Vista/7 tends to misallocate a few clusters when large FAT32 volumes are nearly full or files reach their maximum size; these show up later as "lost" single-cluster files in CHKDSK.

---

file: DriveSpeed1.doc 2021-12-20