



2<sup>P</sup>-1  
May Be Prime!

# Great Internet Mersenne Prime Search

## GIMPS

Finding World Record Primes Since 1996



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### Free Mersenne Prime Search Software Prime95 Version 30.19 build 20

You are using the

Any modern personal computer with Windows, Mac OS X, Linux, or FreeBSD can participate. The [How it Works](#) page answers many questions you may have before downloading the software. You must also agree to the [GIMPS free software license](#).

- [1. Download Software](#)
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**Latest version: 30.19 build 20** - see the latest [WhatsNew.txt](#) file for a full list of changes. Recent changes include:

- Huge improvements to stage 2 of ECM when lots of memory is available.
- Warning: prime.txt and local.txt files are automatically combined into one file. Consider backing up these files before installing.
- Warning: upgrading in the middle of P-1 or ECM stage 2 may restart stage 2 from scratch

[Older version history](#)

### Setup Instructions for New Users

Joining GIMPS is usually as simple as downloading and running the program, answering a few questions, and the program does the rest.

There are **cash awards** for discovering a new Mersenne prime!

- If you have not done so, [create your UserID](#). It's optional, but required to [check your account details](#), [computer status and performance statistics](#) and to assign computers to your use
- Download the appropriate free program for your OS (see below for [GPU software](#)) and proceed to Step 3:

Operating System	Version	Released	Size	Download	Notes / Checksums
Windows: 64-bit	30.19b20	2024-06-02	8.4MB	<a href="#">p95v3019b20.win64.zip</a>	MDS: 7a4ac1f3ff0045951fe6ad66e36c7929 SHA1: 51a5849e8652b69909cce28f1d5f5697d96c1571 SHA256: d9475f2ff3f4a6a701abc49a86a66126cb48abd10bda6fa87039d98fa8756bca
Windows: 32-bit	30.19b20	2024-06-02	7.1MB	<a href="#">p95v3019b20.win32.zip</a>	MDS: 52e4620151b6992c8139b57e5541f16bd SHA1: 2824aa9af9c7bdc3f502624292be701229e96 SHA256: a77c9297bd80dfcb7e2e7e6e89db674126c06a2fe8e769dc06da2e66e8516
Linux: 64-bit	30.19b20	2024-06-02	5.6MB	<a href="#">p95v3019b20.linux64.tar.gz</a>	MDS: 83481a73b86a332d1f710bb7597b29 SHA1: da9917594bcf4bb47ac0852f4eadae669a08072e2 SHA256: 4ce2377e03deb4cf189523136e26401ba08f67857a128e420dd030d0cddca601
Linux: 32-bit	30.19b20	2024-06-02	4.5MB	<a href="#">p95v3019b20.linux32.tar.gz</a>	MDS: 1dd02a33c2a05b2bdaedfa0e734d8251 SHA1: 1d14ca11958c5a2323322ad7f06bcd5f2603f1fd5 SHA256: 2b7e5d8447246cbb4fabebfd85999ce16a407e659b3bb5142314023e9f0d11e1
Mac OS X	30.19b20	2024-06-02	4.3MB	<a href="#">p95v3019b20.MacOSX.tar.gz</a>	Command line version, requires Intel CPU, Mac OS X 10.9 (Mavericks) or later MDS: 820167eeea2b5468a6a16a08ad3b26ff SHA1: 2dc404c679a0e8feeb3afdc565e10086faeb3fc9 SHA256: 3e5a05b1849b501e35f9def06c7253a13a3baaf9a54a1c69ba41cd3d3326a
FreeBSD 12: 64-bit	30.19b20	2024-06-02	5.9MB	<a href="#">p95v3019b20.FreeBSD12-64.tar.gz</a>	Requires FreeBSD 12.0 MDS: 90d4bb391784808a9e171ea75a45574 SHA1: 586028811b417b9a7cb4f323b9fad5d25823aa46 SHA256: 156f64014cb4ea280966b24b979286c03c5cfff82b3407361bcd701457af87c6
Windows Service: 64-bit	30.19b20	2024-06-02	6.7MB	<a href="#">p95v3019b20.win64.service.zip</a>	This is for administrators that want the extra security of running a traditional GUI service. You will still need to download the standard windows executable to connect. This program is for Windows Server experts only. MDS: d0ba13acc52ee58913be4501aa1d77ee SHA1: 18898748a375e5f5d65e27ba36b8f9cb391903873 SHA256: dccf1c6f35e04bc16f01acdf1567371d3b140909590eaf2ae303cb09cd301dd
Windows Service: 32-bit	30.19b20	2024-06-02	5.7MB	<a href="#">p95v3019b20.win32.service.zip</a>	This is for administrators that want the extra security of running a traditional GUI service. You will still need to download the standard windows executable to connect. This program is for Windows Server experts only. MDS: a60ea0f345ccf4b6c750cf320aba7f734 SHA1: 0808e8f50a9f750e1c7807b9aa4ad8d7b3693b34 SHA256: fca3b084b54c31f5d287ef76728722fea617e918d18d6dd1878c9bb09b0b6f
Source code	30.19b21	2024-09-14	37.7MB	<a href="#">p95v3019b21.source.zip</a>	for Windows, Linux, FreeBSD, and Mac OS X MDS: b94656a5be4011daacc13850cd3a4ccc SHA1: 76cabdcbe4b3d0d14faa4f0cfd674757d879298 SHA256: bdc843a547a9f91dc67084a3efbc90858a77db075ecd77b188b23e5ac2ce2a

### GPU Software

Some Mersenne-related software has been written for NVIDIA and AMD GPUs, including:

- primality test (PRP): [PRPLL-NTT](#)
- trial-factoring (TF): [mfaktc](#) (NVIDIA) / [mfakto](#) (AMD)

All GPU software communicates with PrimeNet using [AutoPrimeNet](#). See the [Quick Start Guide](#) for setup instructions.

Visit the [Mersenne GPU Computing Forum](#) for more info

If you have a recent discrete videocard powered by AMD or NVIDIA GPU, it's potentially more powerful than your CPU at prime-testing (or factoring) Mersenne numbers.

### Legacy Operating Systems

Mac OS X, GUI version	29.8b7	2020-03-19	5.0MB	<a href="#">p95v298b7.MacOSX.tar.gz</a>	Requires Intel CPU, Mac OS X 10.9 (Mavericks) or later MDS: 5a1180a25218f1d077b8da0ce9ff43cf SHA1: 5a93d5f45dad09b0520176f9baead7c2d4356 SHA256: 3a0e228ea35bd96824163c7f5ab8e21502a33ae647752de3e5aab0f88fc7c52e
Mac OS X pre-Mavericks	27.9	2012-12-12	5.1MB	<a href="#">p95v279.MacOSX.zip</a>	Requires Mac OS X 10.3 to 10.8 and an Intel CPU. MDS: 0390ae2ff344a7082927482d82e62f59 SHA1: 5108298fba1f5dbba3d972519cd0eccc576c1 SHA256: c44e3bdae50d3360ec58a0eff47ccfd7f5bd5d316f69e2761da4737d5560d8
FreeBSD 11+: 64-bit	30.7b9	2021-11-15	7.1MB	<a href="#">p95v307b9.FreeBSD11-64.tar.gz</a>	Requires FreeBSD 11.0 MDS: a80718f5d985c3a0e0f76323969ffcaf SHA1: 767e890fb914e5a81b0ee0c0d9b4624408caf4a SHA256: 750a36c6e52d33db7c6765ea45412a255aeab967b99642d3847cb87c7e844a5
FreeBSD 10: 64-bit	28.7	2015-08-10	5.3MB	<a href="#">p95v287.FreeBSD10-64.tar.gz</a>	Requires FreeBSD 10.0

Operating System	Version	Released	Size	Download	Notes / Checksums
					MD5: 5dd21b471946fcdcb4858a9fa50fe718b SHA1: 5143e7e355f8fdcbce5b3629cc9cd8d4e9bd04592 SHA256: 0a04bb01524e7c10edce501f57e902b3ce9f82cda0e39aaae8bfaa1af95ab416
FreeBSD 8: 64-bit	27.9	2012-12-12	4.5MB	<a href="#">p95v279.FreeBSD64.tar.gz</a>	Requires FreeBSD 8.0. May work on later versions. MD5: c6b1c04e79bb1b2e8366a81ddea0887c SHA1: 0f2972edb728a017b3bfe7da5cb7fddad7ed785c SHA256: 5ab9feddeb53fca9d9684119fae7ac271de3d85a4dd3c3f1fd26ab97ff71c05a
FreeBSD 7: 32-bit	26.6	2011-04-08	4.0MB	<a href="#">mprime266-FreeBSD.tar.gz</a>	Requires FreeBSD 7.0. May work on later versions. MD5: d7e78a458b0c7ebb6db57ff88835739 SHA1: b283278dea4887494ebb7357992981ece8d7f3e08 SHA256: d4c2c044cfa45311dd7f2c41574f59a8519c989fde0ca723505dea12b2ff1fd
Windows XP: 32-bit	29.8b6	2019-08-18	5.4MB	<a href="#">p95v298b6.win32.zip</a>	MD5: 4f7d1cc7904d5d9ccb26c8c00b6478a9 SHA1: 54dd8f9b4692d7a878626ac993562b83cb5587fb SHA256: cdd32b4c358869d3f588ae430bc67d9e88a5a6950002f864dad3c477c9202a
non-x86 OS	Unix and non-x86 users should check out <a href="#">Ernst Mayer's Mlucas page</a> .				

3. Create a directory and decompress the file you just downloaded. Windows 10, 8, 7, Vista, and XP have built-in unzip features. Other Windows users can choose from a variety of decompression programs. We use [7-zip](#). Linux and FreeBSD users should use the standard tar and gzip decompression utilities.

4. Start the program! Linux and FreeBSD users should run the program from the command line with a -m switch, i.e.

```
./mprime -m
```

Enter your optional userID created on the website in Step 1, and optionally name your computer. We recommend Windows users select **Options » Start at Bootstrap or Start at Logon**.

That's all you need to do! The program contacts a central server called PrimeNet to get some work to do. Usually the program and PrimeNet know the best work to assign, but it's up to you! You can administer your account and computers on your userID's [account page](#). Once you complete a workunit you can track your standings on the [competitive stats pages](#) the server updates every hour (see Top Producers in the menu, left, for more stats). You can monitor each of your computers' progress, even remote-control the work assignments they request using your userID's [CPUs page](#)!

Linux and FreeBSD versions can also be set up to run every time you restart your computer. Ask for help at [the Mersenne Forum](#).

### CPU Stress / Torture Testing

Prime95 has been a popular choice for stress / torture testing a CPU since its introduction, especially with overclockers and system builders. Since the software makes heavy use of the pro integer and floating point instructions, it feeds the processor a consistent and verifiable workload to test the stability of the CPU and the L1/L2/L3 processor cache. Additionally, it uses all of a multi-CPU / multi-core system to ensure a high-load stress test environment.

From the most recent "[stress.txt](#)" file included in the download:

Today's computers are not perfect. Even brand new systems from major manufacturers can have hidden flaws. If any of several key components such as CPU, memory, cooling, etc. are not up to spec, it can lead to incorrect calculations and/or unexplained system crashes.

Overclocking is the practice of increasing the speeds of the CPU and/or memory to make a machine faster at little cost. Typically, overclocking involves pushing a machine past its limits and then backing off just a little bit.

For these reasons, both non-overclockers and overclockers need programs that test the stability of their computers. This is done by running programs that put a heavy load on the computer. Though not originally designed for this purpose, this program is one of a few programs that are excellent at stress testing a computer.

The [Prime95 Wikipedia page](#) has an excellent overview on using Prime95 to test your system and ensure it is working properly. The tips presented there should be helpful regarding how to torture test and provide a solid guideline on how long to run the Prime95 stress test.

### Performing a stress test is simple:

1. **Download the software** and unzip the files to your desired location.
2. Run the Prime95 executable and select "Just Stress Testing" when asked.
3. The default options are sufficient to do a well balanced stress test on the system.

### Upgrade Instructions for Existing Users

1. **Download the appropriate program** for your OS
2. Upgrade the software. Stop and exit your current version, then install the new version **overwriting the previous version**. You can upgrade even if you are in the middle of testing an
3. Restart the program.
4. Read [WhatsNew.txt](#)

### Questions and Problems

Please consult the [readme.txt](#) file for possible answers. You can also search for an answer, or ask for help in the [GIMPS forums](#). Otherwise, you will need to address your question to one of people who wrote the program. Networking and server problems should be sent to [GIMPS admin](#). Such problems include errors contacting the server, problems with assignments or userids on the server's statistics page. All other problems and questions should be sent to [George Woltman](#), but please consult the forums first.

### Disclaimers

See GIMPS [Terms and Conditions](#). However, please do send bug reports and suggestions for improvements.

### Software Source Code

If you use GIMPS source code to find Mersenne primes, you must agree to adhere to the [GIMPS free software license agreement](#). Other than that restriction, you may use this code fit.

The source code for the program is highly optimized Intel assembly language. There are many more-readable FFT algorithms available on the web and in textbooks. The program is also cc non-portable. If you are curious anyway, you can [download all the source code](#) (37.7MB). This file includes all the version 30.19b21 source code for Windows, Linux, FreeBSD, and Mac OS updated: 2024-09-14.

The GIMPS program is very loosely based on C code written by Richard Crandall. Luke Welsh has started a web page that points to Richard Crandall's program and [other available source](#) you can use to help search for Mersenne primes.

### Other available freeware

At this time, Ernst Mayer's [Mlucas](#) program is the best choice for non-Intel architectures. Luke Welsh has a web page that points to [available source code](#) of mostly historical interest you can help search for Mersenne primes.