

## PrimeGrid's Sierpiński/Riesel Base 5 Problem

On 8 April 2025, 12:49:49 UTC, PrimeGrid's Sierpiński/Riesel Base 5 Problem project eliminated  $k=67612$  by finding the Mega Prime:

$$67612 \cdot 5^{5501582} + 1$$

The prime is 3,845,446 digits long and enters "The Largest Known Primes Database" (<https://t5k.org/primes>) ranked 92<sup>nd</sup> overall. 27  $k$ 's now remain in the Sierpiński Base 5 Problem.

The discovery was made by Kai Presler of Australia using 8 cores of an AMD Ryzen 9 7945HX with 16GB RAM, running Linux Mint 21.3. This computer took about 1 hour, 24 minutes to complete the probable prime (PRP) test using PRST. Kai Presler is a member of team [H]ard|OCP.

The PRP was confirmed prime on 8 April 2025, 20:19:10 UTC, by an AMD Ryzen 9 7950X3D @ 4.20GHz with 128GB RAM, running Debian 12.5. This computer, using 4 cores, took 3 hours and 44 minutes to complete the primality test using LLR2.

Credits for the discovery are as follows:

1. Kai Presler (Australia), discoverer
2. PrimeGrid, et al.
3. Srsieve, sieving program developed by Geoff Reynolds
4. PRST, primality program developed by Pavel Atnashev

Entry in "The Largest Known Primes Database" can be found here:  
<https://t5k.org/primes/page.php?id=140585>

Using a single PC would have taken years to find this prime. This timely discovery would not have been possible without the thousands of volunteers who contributed their spare CPU cycles. A special thanks to everyone who contributed their advice and/or computing power to the search -- especially to all the sievers who work behind the scenes to make a find like this possible.

PrimeGrid's Sierpiński/Riesel Base 5 Problem will continue to search for additional primes to eliminate the remaining primeless bases. To join the search please visit PrimeGrid: <https://www.primegrid.com>

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## **About PrimeGrid**

PrimeGrid is a distributed computing project, developed by Rytis Slatkevičius and currently managed by Tyler Bredl, Scott Brown, Michael Goetz, Darren Li, Dao Heng Liu, Reginald McLean, Rytis Slatkevičius, Roman Trunov, and Christian Wallbaum.

PrimeGrid utilizes BOINC to search for primes with the primary goal of bringing the excitement of prime finding to the "everyday" computer user. Simply download the software and let your computer do the rest. Participants can choose from a variety of prime forms to search. With a little patience, you may find a large or even record-breaking prime.

## **BOINC**

The Berkeley Open Infrastructure for Network Computing (BOINC) is a software platform for distributed computing using volunteered computer resources. It allows users to participate in multiple distributed computing projects through a single program. Currently BOINC is being developed by a team based at the University of California, Berkeley led by David Anderson.

This platform currently supports projects from biology to math to astronomy. For more information, please visit BOINC: <https://boinc.berkeley.edu>

For more information about PrimeGrid and a complete list of available prime search projects, please visit: <https://www.primegrid.com>