PrimeGrid's
The Riesel Problem

On 13 December 2017, 07:13:55 UTC, PrimeGrid's The Riesel Problem project eliminated k=273809 by finding the mega prime:

$$273809*2^{8932416}-1$$

The prime is 2,688,931 digits long and will enter Chris Caldwell's "The Largest Known Primes Database" (http://primes.utm.edu/primes) ranked 29th overall. This is PrimeGrid's 15th elimination. 49 k's now remain.

The discovery was made by Wolfgang Schwieger of Germany using an Intel(R) Core(TM) i7-6700K CPU @ 4.00GHz with 32 GB RAM running Linux. This computer took about 2 hours and 14 minutes to complete the primality test using multithreaded LLR. Wolfgang is a member of the SETI.Germany team.

The prime was verified on 15 December 2017, 11:39:55 UTC, by Christian Geffcken of Switzerland using an Intel(R) Core(TM) i5-3437U CPU @ 1.90GHz with 8 GB RAM running Microsoft Windows 7 Professional. This computer took about 41 hours and 47 minutes to complete the primality test using LLR.

Credits for the discovery are as follows:

1. Wolfgang Schwieger (Germany), discoverer
2. PrimeGrid, et al.
3. Srsieve, sieving program developed by Geoff Reynolds
4. LLR, primality program developed by Jean Penné

Entry in "The Largest Know Primes Database" can be found here:
http://primes.utm.edu/primes/page.php?id=124053

Hans Ivar Riesel, a Swedish mathematician, showed in 1956 that there are an infinite number of positive odd integer k's such that k*2^n-1 is composite (not prime) for every integer n>=1. These numbers are now called Riesel numbers. He further showed that k=509203 was such one.

It is conjectured that 509203 is the smallest Riesel number. The Riesel Problem consists in determining that 509203 is the smallest Riesel number. To show that it is the smallest, a prime of the form k*2^n-1 must be found for each of the positive integer k's less than 509203. For more information about The Riesel Problem, please visit Wilfrid Keller's **The Riesel Problem: Definition and Status** (http://www.prothsearch.com/rieselprob.html).

Using a single PC would have taken years to find this prime. So this timely discovery would not have been possible without the hundreds of volunteers who contributed their spare CPU cycles. A special thanks to everyone who offered their advice and/or computing power to the search - especially Sean Faith and Brian Carpenter who provided support information from the previous Riesel Sieve effort.

The Riesel Problem project will continue to seek primes for the 49 remaining k's. To join the search please visit PrimeGrid: http://www.primegrid.com

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About PrimeGrid

PrimeGrid is a distributed computing project, developed by Rytis Slatkevičius and currently managed by Iain Bethune, James Breslin, Scott Brown, Ulrich Fries, Charley Gielkens, Michael Goetz, Roger Karpin, Rytis Slatkevičius, and Van Zimmerman.

PrimeGrid is hosted by RackSpace, and their generous contributions have helped make this project possible.

PrimeGrid utilizes BOINC and PRPNet 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: http://boinc.berkeley.edu

PRPNet

PRPNet is a client/server application written by Mark Rodenkirch that is specifically designed to help find prime numbers of various forms. It is easily ported between various OS/hardware combinations. PRPNet does not run each PRP test itself, but relies on helper programs, such as LLR, PFGW, phrot, wwww, and genefer to do the work.

For more information, please visit PrimeGrid's PRPNet forum thread: http://www.primegrid.com/forum_thread.php?id=1215

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