PrimeGrid's
The Riesel Problem

On 4 October 2014, 22:32:24 UTC, PrimeGrid's The Riesel Problem project eliminated k=502573 by finding the mega prime:

$$502573*2^{7181987}-1$$

The prime is 2,162,000 digits long and will enter Chris Caldwell's "The Largest Known Primes Database" (http://primes.utm.edu/primes) ranked 20th overall. This is PrimeGrid's 14th elimination. 50 k's now remain.

The discovery was made by Denis Iakovlev of Russia using an Intel(R) Core(TM) i5-4570 CPU @ 3.20GHz with 8 GB RAM running Microsoft Windows 7 Professional. This computer took about 19 hours and 40 minutes to complete the primality test using LLR. Denis is a member of the Russia team.

The prime was verified on 5 October 2014, 11:48:03 UTC, by Russell Mathers of the United Kingdom using an Intel(R) Core(TM) i7-3960X CPU @ 3.30GHz with 16 GB RAM running Microsoft Windows 7 Professional. This computer took about 18 hours and 46 minutes to complete the primality test using LLR.

Credits for the discovery are as follows:
1. Denis Iakovlev (Russia), 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=118597

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.net/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 50 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, Lennart Vogel, and John Blazek, which utilizes BOINC and PRPNet to search for primes. PrimeGrid's primary goal is to bring 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