6. The Great Internet Mersenne Prime Search is a distributed computing initiative to calculate Marsenne primes. Mersenne prime numbers are prime numbers that are one less than a power of 2,

2n-1.

GIMPS relies primarily on the Lucas-Lehmer primality test, an algorithm that is specialized to testing Mersenne primes. The Lucas-Lehmer test takes Mp = 2p-1 and makes p an odd prime. A trial division algorithm is used to determine if p is prime since p is exponentially smaller than Mp.

GIMPS has found a total of of fourteen Mersenne primes as of April 2014, twelve of which were the largest known prime number at their respective times of discovery.1

M48 is the most recently discovered Mersenne prime. It is the prime produced by M5788561 and has 17,425,170 digits. It was discovered on January 25, 2013. A standard word processor layout would require 4,647 pages to display it.1

Primes are verified before they are announced. A false positive was reported in 2003, when the verification of M40 failed.

1 "Great Internet Mersenne Prime Search." *Wikipedia*. Wikimedia Foundation, n.d. Web. 15 Oct. 2015.

The 44th Mersenne Prime was announced on September 11, 2006. It was announced less than a year after the 43rd Mersenne Prime and was discovered by GIMPS. M44 was flagged prime by Dr. Curtis Cooper and Dr. Steven Boone, who were also the discoverers of M43 on December 25, 2005.1

M44 is 232,582,657 -1 and has 9,808,358 decimal digits.2

The 46th Mersenne Prime was announced on August 23, 2008. M46 was discovered by the discoverer of M45, by Edson Smith.3

M46 is 237,156,667 -1 and has 12,978,189 decimal digits.

The 44th prime was a “lightning strikes twice” instance because the team that discovered it also discovered the 43rd. The 46th prime was lightning striking twice because the 45th and 46th were found and announced at the same time.

1 "MathWorld Headline News." *MathWorld News: 44th Mersenne Prime Found*. N.p., n.d. Web. 15 Oct. 2015.

2 "Mersenne Prime Discovery - 2^32582657-1 Is Prime!" *Mersenne Prime Discovery - 2^32582657-1 Is Prime!* N.p., n.d. Web. 15 Oct. 2015.

3 "MathWorld Headline News." *MathWorld News: 45th and 46th Mersenne Primes Found*. N.p., n.d. Web. 15 Oct. 2015.