How to Build Mersenne Primes

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Abstract - We uee Euclid's formula for PERFECT NUMBERS to develop MERSENNE PRIMES in a very simple way amenable to computers.

A number N is perfect if the sum of the factors of N inclu=

ding 1 and N IS EQUAL TO 2N. EUCLID has given a formula for PERFECT NUMBERS as

PN = 2^(N-1){2^N -1} where (2^N -1) is a prime.

Incidentally (2^N - 1) is given the name MERSENNE NUMBER and if it works out to be a PRIME then N should necessarily be a prime and is given the name MERSENNE PRIME. We consider prime values only for N chosen from list generated using MUTHKUR's THEOREM which states that (taken from my Ph.D thesis)

THEOREM : If there is a higher MERSENNE prime then that corresponding prime exponent is the sum of lower MERSENNE PRIME EXPONENTS including 2 which is also a MPE.

Proof: Let Mp1,Mp2,Mp3,.....Mpk be a set of Mersenne Primes.

σ(Mp1.Mp2.Mp3.....Mpk) = σ(Mp1).σ(Mp2).σ(Mp3)....σ(Mpk)

= 2^p1 .2^p2 .2^p3 .... 2^pk = 2^(p1+p2+p3+...+pk) -1 + 1

= σ(MP) where P=p1+p2+p3+.....+pk is also a prime.

Hence the Theorem.

The formula

PN = 2^(N-1){2^N -1} = 2^(2N-1) - 2^(N-1)

and this involves only powers of 2 which a computer can handle very easily.

LET N=2 PN= 8-2 = 6 which is perfect.

LET N=3 PN = 32 - 24 =28 which is perfect.

LET N=5 PN = 2^9 -2^4 =512-16 = 496

Keep on dividing 496 by 2 successively till we reach an odd number, 31 in this case, and add 1 to it and again continue division by 2 successively. If the process reaches 2 and finally 1 then we arrive at a MERSENNE PRIME. Otherwise NOT. Here 5 is a Mersenne prime exponent and 31 is a Mersenne prime. By this, the cumbersome method of testing an odd number with lakhs of digits in it for primality gets reduced to division by 2 successively in a most simple way with definite conclusion whether it is mersenne prime or not.

Let N=7 PN= 2^13 - 2^6 = 8192 -64 = 8128 which is PERFECT.

(1+2+4+8+16+32+64+127+254+508+1016+2032+4064+8128 = 16256)

Hence 7 is a Mersenne Prime Exponent and 127 is a Mersenne Prime.

Let N=11 PN = 2^21 - 2^10 = 2097152 - 1024 = 2096028 =4.9.58223

Hence 11 is not a Mersenne Prime Exponent.

Let N=13 PN = 2^25 - 2^12 = 33554432 - 4096 = 33550336 = 2^12.8191

and 8191 is a prime. Hence 13 is a Mersenne Prime Exponent.

Let N=17 PN= 2^33-2^16 = 8587869056 = 65536.131071

and 131971 is a prime.Hence 17 is a Mersenne Prime Exponent.

Let N=19 PN= 2^37 - 2^18 =137438691328 = 262144.524287

and 524287 is a prime.Hence 19 is a Mersenne Prime Exponent.

This process continues. Finding next higher Mersenne Prime Exponent is half way through for people with super computer facilities and the like.

And in conclusion, I request "The Electronic Frontier Foundation of America "and " GIMPS " to provide me a Scholarship and a Prize money for this theoretical investigation to persue my research further in this field.

I am a senior citizen 88 years aspiring for lifetime achievement award having

1. 17th century mathematics proof for FERMAT'S LAST THEOREM.

2. PROOF - Infinitude of Mersenne Primes and in turn that of Perfect Numbers.

3. Discovery of " COSINE TRISECTION QUARTICS " connected with trisection of angles.

4. A straight line involving Mersenne Primes,Fibonacci numbers

   and Lucas numbers.

5. Developing BIMAGIC SQUARES using staggered arithmetic progressions based on HINDU TANTRA SHASTRA specially BHUVANESWARI KAKSHAPUTI TANTRA.

6. EX-IN identity wherein sum of four squares is equal to sum of eight other squares in six different ways using "in-radius of a Pythagorean triangle is an integer " is made use of.

7. NEW METHOD OF FACTORIZATION.

8. Overcoming CARDAN's Irreducibility

9. Recretional Mathematics --a Study of the numbers 123456789 & 12345679.

10. prime factors of 100000....000001

11. Factorization problem is on hand with successful results