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Introduction:

Mersenne Number: -

Mersenne Number is a prime number which is obtained from the following condition.

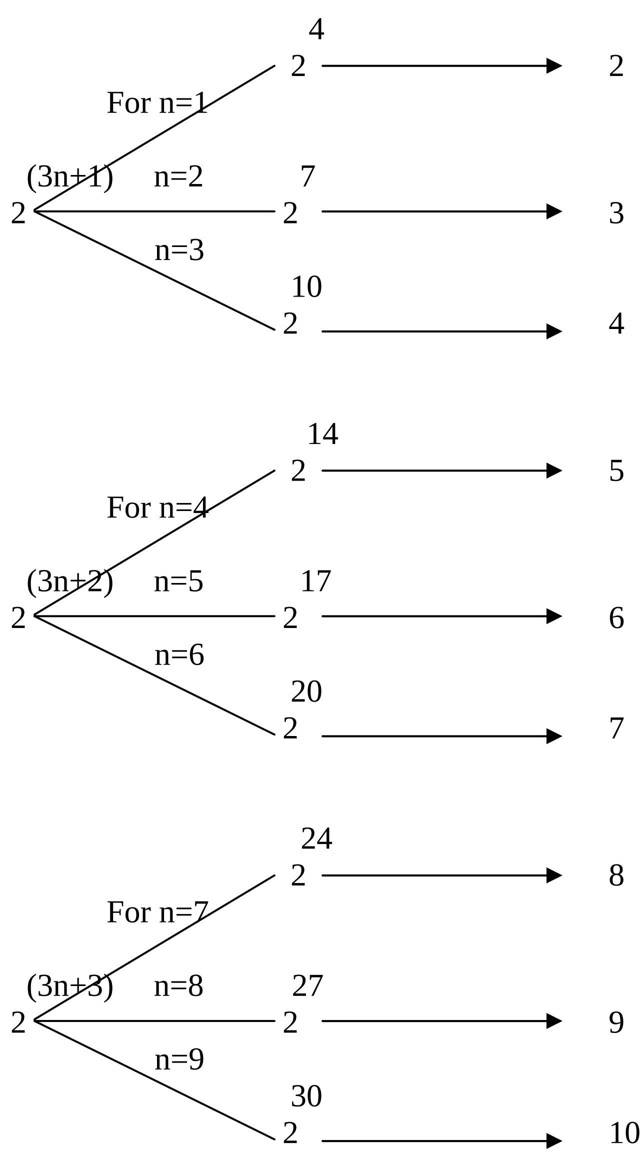
i.e., $M_p=2^p-1$; where M_p=Mersenne Prime Number; p=prime Number;

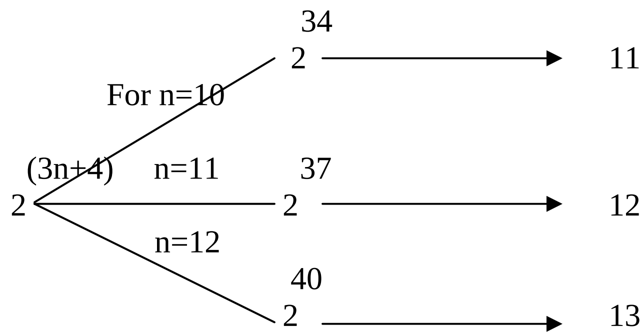
i.e.; we can generate a prime number from another prime number.

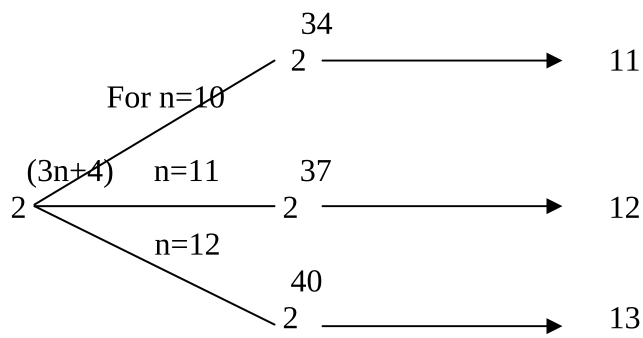
I have noticed that recently in May24, 2004; The "GIMPS" project work unit found the '41st' largest Mersenne prime number. I also know that "Great Internet Mersenne Prime Search" is the-world famous project work unit to find out the largest prime numbers in the world from the last decade.

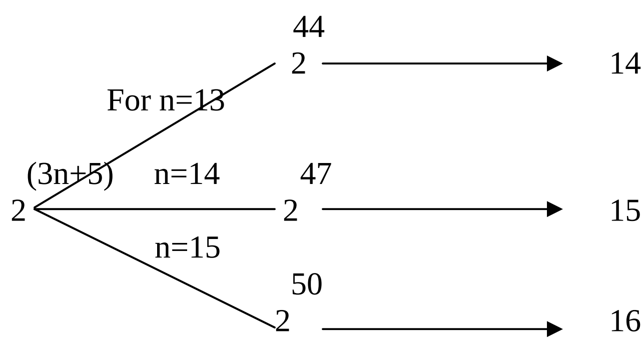
The analysis has shown us that numbers follow a sequence as shown below:

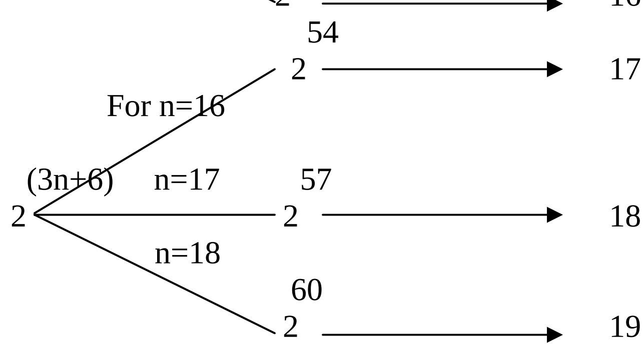
The sequence from 1 to 100:: No. of digits: (n+1)

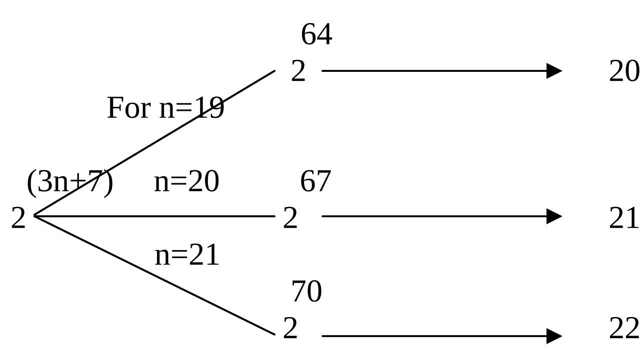


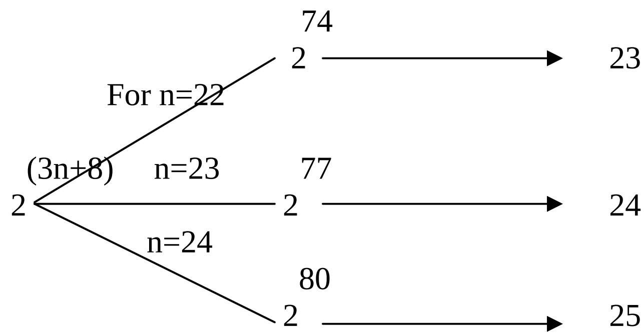

(3n+4)
2
For n=10
n=11
n=12
34
2
37
2
40
2
11
12
13

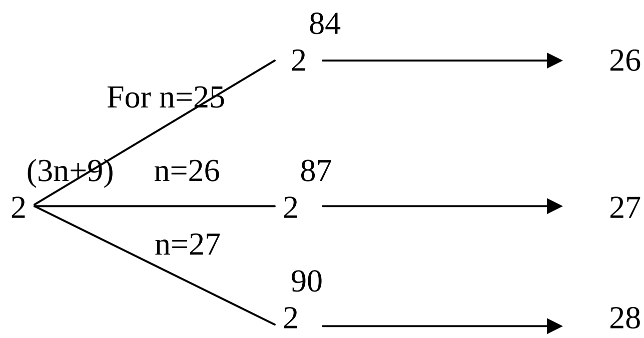

(3n+4)
2
For n=10
n=11
n=12
34
2
37
2
40
2
11
12
13

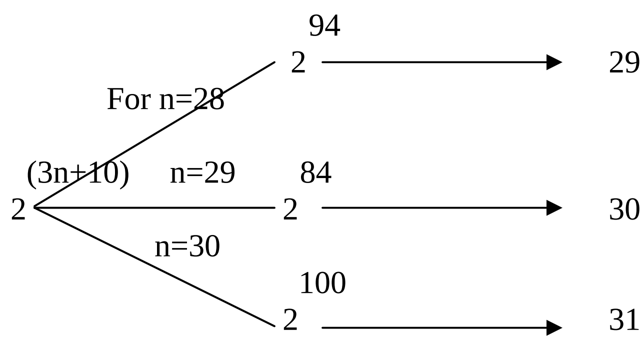

(3n+5)
2
For n=13
n=14
n=15
44
2
47
2
50
2
14
15
16


(3n+6)
2
For n=16
n=17
n=18
54
2
57
2
60
2
17
18
19


(3n+7)
2
For n=19
n=20
n=21
64
2
67
2
70
2
20
21
22



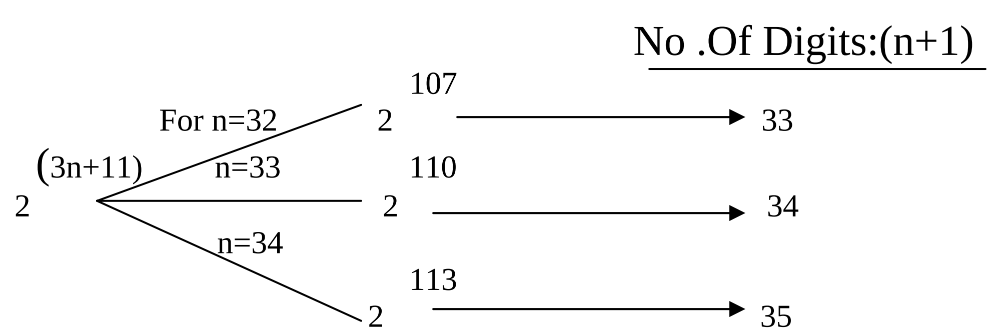


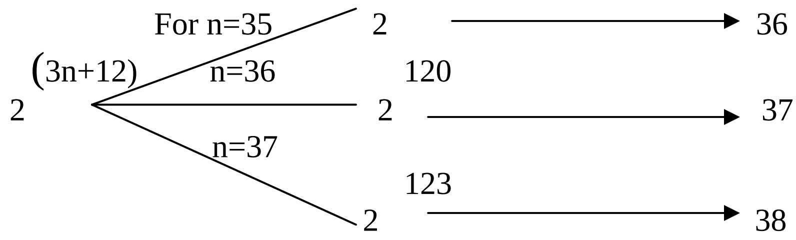


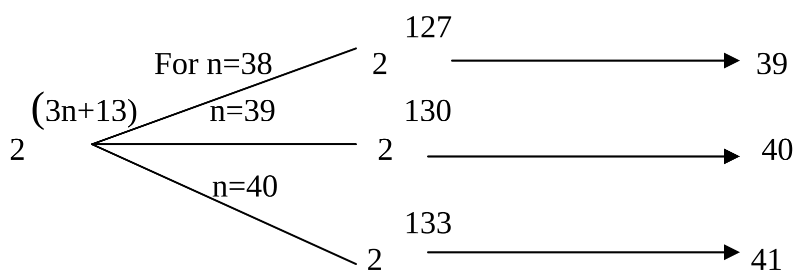
NOTE:

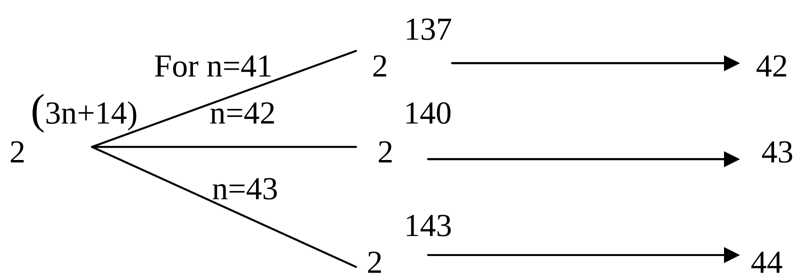
The exceptional case is that the last changing (DIGIT) position in the every 100 no's.(except 1-100) (This is shown with arrow&star marks).

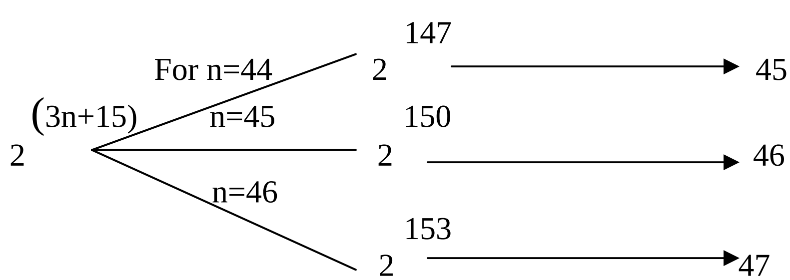
The sequence from 100 to 200::

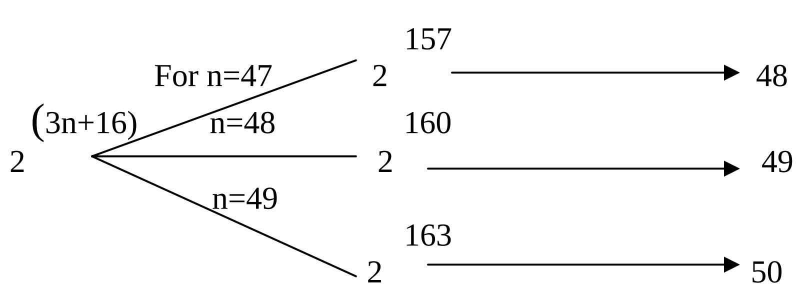



(3n+12)
2
For n=35
n=36
n=37
2
120
2
123
2
36
37
38


(3n+13)
2
For n=38
n=39
n=40
127
2
130
2
133
2
39
40
41


(3n+14)
2
For n=41
n=42
n=43
137
2
140
2
143
2
42
43
44


(3n+15)
2
For n=44
n=45
n=46
147
2
150
2
153
2
45
46
47


(3n+16)
2
For n=47
n=48
n=49
157
2
160
2
163
2
48
49
50

$2^{(3n+17)}$

For n=50: 2^{167} → 51

n=51: 2^{170} → 52

n=52: 2^{173} → 53

$2^{(3n+18)}$

For n=53: 2^{177} → 54

n=54: 2^{180} → 55

n=55: 2^{183} → 56

$2^{(3n+19)}$

For n=56: 2^{187} → 57

n=57: 2^{190} → 58

n=58: 2^{193} → 59

$2^{[(3n+20)]-1}$

n=59: 2^{196} → 60

Please see the note

The sequence from 200 to 300::

No Of Digits(n+1)

$2^{(3n+20)}$

For n=60: 2^{200} → 61

n=61: 2^{203} → 62

n=62: 2^{206} → 63

$2^{(3n+21)}$

For $n=63$: $2^{210} \rightarrow 64$

$n=64$: $2^{213} \rightarrow 65$

$n=65$: $2^{216} \rightarrow 66$

$2^{(3n+22)}$

For $n=66$: $2^{220} \rightarrow 67$

$n=67$: $2^{223} \rightarrow 68$

$n=68$: $2^{226} \rightarrow 69$

$2^{(3n+23)}$

For $n=69$: $2^{230} \rightarrow 70$

$n=70$: $2^{233} \rightarrow 71$

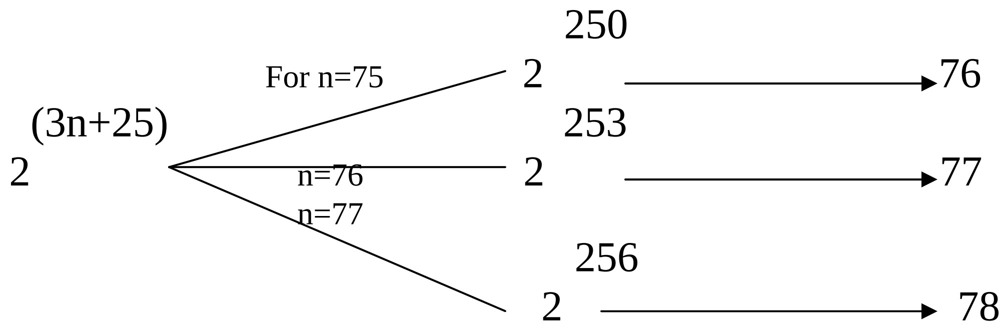
$n=71$: $2^{236} \rightarrow 72$

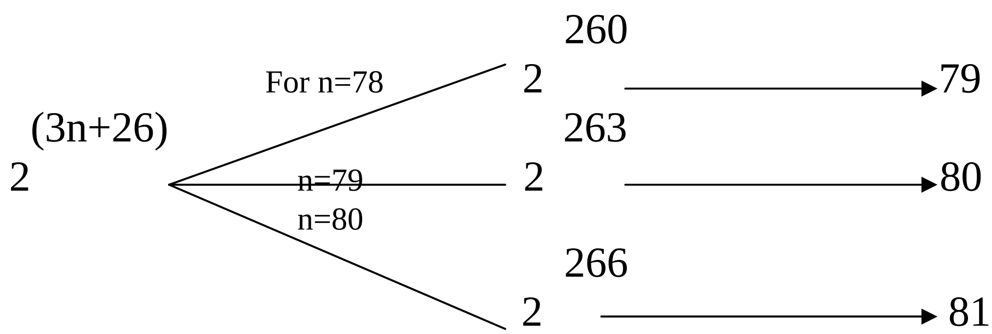
$2^{(3n+24)}$

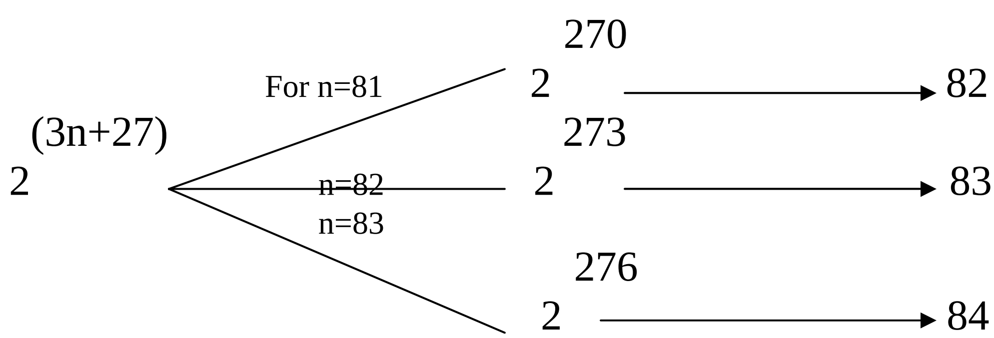
For $n=72$: $2^{240} \rightarrow 73$

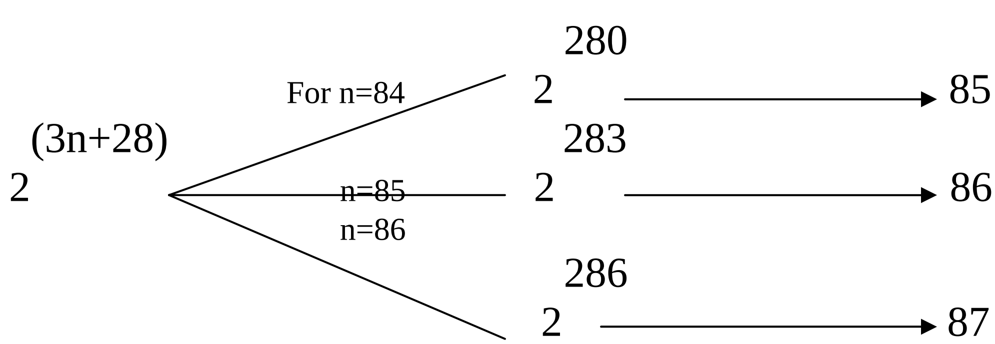
$n=73$: $2^{243} \rightarrow 74$

$n=74$: $2^{246} \rightarrow 75$


(3n+25)
2
For n=75
250
2
76
n=76
253
2
77
n=77
256
2
78


(3n+26)
2
For n=78
260
2
79
n=79
263
2
80
n=80
266
2
81


(3n+27)
2
For n=81
270
2
82
n=82
273
2
83
n=83
276
2
84


(3n+28)
2
For n=84
280
2
85
n=85
283
2
86
n=86
286
2
87

$2^{(3n+29)}$

- For n=87: 2^{290} → 88
- n=88: 2^{293} → 89
- n=89: 2^{296} → 90

$2^{[(3n+30)]-1}$

- n=90: 2^{299} → 91

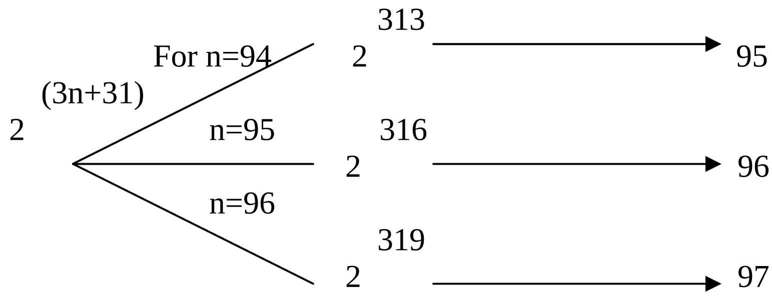
Please see the note.

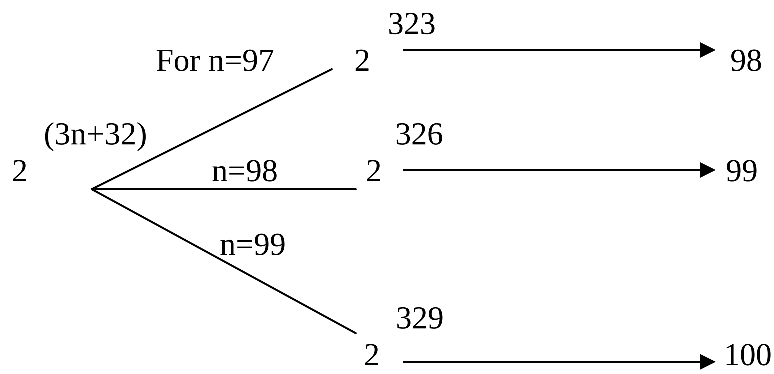
The sequence from 300 to 332::

No .Of Digits(n+1)::

$2^{(3n+30)}$

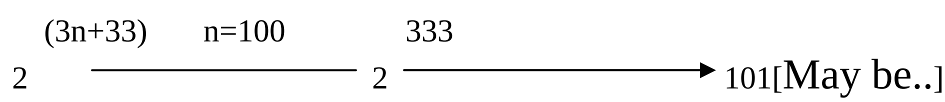
- For n=91: 2^{303} → 92
- n=92: 2^{306} → 93
- n=93: 2^{309} → 94





Sir,

I came to know that 2^{332} has 100 digits[in decimal number view].



I think , 2^{333} will have 101 digits.

Applications:

It may be used for find out the no of digits in particular mersenne Prime number.[without counting].

Examples:

1. The number of digits in $(2^{17} -1)$ is ?

Sol) we assume that 2^{17} is in the form of $2^{(3n+k)}$.

This implies to, $3n+k=17$

NOTE 1)::Here k=P+1,where p=[(3n+k)/10].{ Even though you can subtract '1' from any number which is in the form of 2^n there is no change in no of digits}.

In this problem (3n+k)=17

Therefore p=17/10=1[you can't take modulas value].

Then k=p+1=1+1=2.

i.e, 3n+2=17 => n=5.

Therefore no of digits in 2^{17} is =n+1=6..,

2).No of digits in $(2^{127} -1)$ is ?

sol) 3n+k=127 , p=127/10=12 => k=p+1

=> k=13.

3n+13=127 => n=38.

Therefore no of digits in 2^{127} is=n+1=38+1

=39..,

Note:

Here one exceptional case is to be observed. When you evaluate the Value of 'n', if it is a float values you can ignore the floating-point value.

Examples: 1) The no of digits in $(2^{13} -1)$ is?

sol) 3n+k=13, p=13/10=1 =>k=p+1

=>k=2

Therefore, 3n+k=13 => n=3.666----.

Now we can ignore the floating point value.

- ⇨ n=3
- ⇨ No. Of digits=n+1=4.

So, we anticipate that the cyclic process of the sequence follows and hence, in this regard,we would like to try our principle for the other prime numbers also.

Hence sir, we request you to send the no. of digits from 2^{333} to at least 2^{3330}.

This would highly help us to carry the research further.

Thanking you and expecting the reply at the earliest.

Yours faithfully,

Mr.B.Jaya subba Reddy.

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