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> # "
> # Goldbach's Weak Conjecture is equivalent to all odd numbers greater than 9 are the sum of 3
  odd prime numbers.
> # This 3 primes problem was proven in 2013 by Helfgott.
> # We will shine a light on his efforts.
> # His proof is over 50 pages and involves mathematical 'major arcs'.
> # Here we consider only the sum of two prime numbers. This is called the 'strong Goldbach
  conjecture'.

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>
> # Goldbach Partition written gp
> gp := proc (n :: integer) :: integer;
  description "Return the number of ways that n can be written as the sum of two primes.";
  local a, b, c, d, temp, counter;
  counter := 0;
  for b from 2 to  $\frac{n}{2}$  do
    for c from 2 to  $\frac{n}{2}$  do
      temp := ithprime(b) + ithprime(c);
      if n = temp then counter := counter + 1; end if;
    end do;
  end do;
  return counter;
end proc;

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gp := proc(n::integer)::integer;
  local a, b, c, d, temp, counter;
  description "Return the number of ways that n can be written as the sum of two primes.";
  counter := 0;
  for b from 2 to 1/2 * n do
    for c from 2 to 1/2 * n do
      temp := ithprime(b) + ithprime(c); if n = temp then counter := counter + 1 end if
    end do
  end do;
  return counter
end proc

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3
(2)
> for e from 2 to 20 by 2 do
  print(e, gp(e))
end do
2, 0
4, 0
6, 1
8, 2
10, 3

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12, 2

14, 3

16, 4

18, 4

20, 4

(3)

> # for example 6 is only $3 + 3$, given only odd prime numbers. Also, 8 is $5 + 3$ and $3 + 5$, so $gp(8)$ is 2. Similarly, 10 is $5 + 5$, $3 + 7$ and $7 + 3$. and $gp(10)$ is 3.

> # Thus we have built a data table.

> # Next to share this.

> # Matt C. Anderson

> # see the Online Encyclopedia of Integer Sequences (oeis.org) serial number A002372.

> # oeis.org slash A002372 begins 0,0,1,2,3,2,3,4.

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