The Atkins prime sieve is the most recently invented and most complicated sieve that we researched. It works by first executing the operation mod60 on every number. The program then separates each number into one of four lists based on the outcome of the mod60 function. If the outcome of the operation is divisible by 2, 3 or 5 then the number is immediately listed as not prime, this works because the only primes 60 is divisible by are 2, 3 or 5. If the result of the operation is 1, 13, 17, 29, 37, 41, 49, or 53 then all the solutions to the quadratic equation 4x2 + *y*2 = *n* must be found where n is the number in question and x and y must be integers. If the result of the operation is 7, 19, 31, or 43 then all the solutions to the quadratic equation 3*x*2 + *y*2 = *n* must be found where n is the number in question and x and y must be integers. If the result of the operation is 11, 23, 47, or 59 then all the solutions to the quadratic equation 3*x*2 − *y*2 = *n where x>y* must be found where n is the number in question and x and y must be integers. The number n is prime if and only if the number of solutions to its quadratic equation is odd and the number is not divisible by a perfect square. The program excludes all numbers which are divisible by perfect squares by marking off all multiples of the square of number once the number is found to be a prime.

Though the sieve of Atkins has been proven to theoretically grow in complexity slower than the sieve of Eratosthenes. It is not widely used because when implemented in a computer it underperforms compared to some optimized sieve of Eratosthenes.