PRIME - An Integer Factoring Program

This program is designed to test an integer number ($<8388607 = 2^{23}-1$) to determine if it is prime or composite; if composite all its prime factors are returned. With this restriction on the size of the number, the greatest number of distinct prime factors is seven. To increase the speed of factor determination a table of the first 418 prime factors is included in the routine.

The program is part of the global system and may be called by responding to SYS? with PRIME. The routine then responds with INTEGER FACTORING PROGRAM, MAX N=8,388,607 followed by NUMBER=; after typing the number, the factorization is begun by hitting the space bar. If the number is prime, PRIME is printed after the number; if composite the prime factors with their exponents following the ↑ (if ≠ 1) are printed out after a check is first made to insure that the product of factors does indeed yield the original number.

To stop the program the user can respond to NUMBER= by a carriage return, space bar, or typing 0. A sample of the use of the program follows:

SYS? PRIME

INTEGER FACTORING PROGRAM,   MAX N=8,388,607

NUMBER = 8388607 ⌐= 47 *   178481   HIT SPACE BAR

NUMBER = 4194304 = 2↑ 22

NUMBER = 510510   = 2 * 3 * 5 * 7 * 11 * 13 * 17

NUMBER = 8388593 PRIME   (LARGEST PRIME ≤ LIMIT)

NUMBER = 8388608 TOO LARGE

NUMBER = 745631.3 NOT INTEGER

NUMBER = -647381 = 7 * 23 * 4021   (NOTE: SIGN DISREGARDED)

NUMBER = 21600 = 2↑ 5 * 3↑ 3 * 5↑ 2

NUMBER =

SYS? Q