good hash table primes

(Result)

In the course of designing a good hashing configuration, it is helpful to have a list of prime numbers for the hash table size.

The following is such a list. It has the properties that:

1. each number in the list is prime
2. each number is slightly less than twice the size of the previous
3. each number is as far as possible from the nearest two powers of two

Using primes for hash tables is a good idea because it minimizes clustering in the hashed table. Item (2) is nice because it is convenient for growing a hash table in the face of expanding data. Item (3) has, allegedly, been shown to yield especially good results in practice.

And here is the list:

lwr	upr	% err	prime
2^5	2^6	10.416667	53
2^6	2^7	1.041667	97
2^7	2^8	0.520833	193
2^8	2^9	1.302083	389
2^9	2^{10}	0.130208	769
2^{10}	2^{11}	0.455729	1543
2^{11}	2^{12}	0.227865	3079
2^{12}	2^{13}	0.113932	6151
2^{13}	2^{14}	0.008138	12289
2^{14}	2^{15}	0.069173	24593
2^{15}	2^{16}	0.010173	49157
2^{16}	2^{17}	0.013224	98317
2^{17}	2^{18}	0.002543	196613
2^{18}	2^{19}	0.006358	393241
2^{19}	2^{20}	0.000127	786433
2^{20}	2^{21}	0.000318	1572869
2^{21}	2^{22}	0.000350	3145739
2^{22}	2^{23}	0.000207	6291469
2^{23}	2^{24}	0.000040	12582917
2^{24}	2^{25}	0.000075	25165843
2^{25}	2^{26}	0.000010	50331653

2^{26}	2^{27}	0.000023	100663319
2^{27}	2^{28}	0.000009	201326611
2^{28}	2^{29}	0.000001	402653189
2^{29}	2^{30}	0.000011	805306457
2^{30}	2^{31}	0.000000	1610612741

The columns are, in order, the lower bounding power of two, the upper bounding power of two, the relative deviation (in percent) of the prime number from the optimal middle of the first two, and finally the prime itself.

Happy hashing!
