ON DAYKIN'S ALGORITHM FOR FINDING THE G.C.D.

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In a recent issue of the Fibonacci Quarterly, Daykin [1] has given an algorithm for finding the greatest common divisor of two positive integers. The process can be obtained by changing the signs in Euclid's algorithm (using subtraction in Euclid's algorithm instead of addition, as possibly Euclid may have done [2]) and taking numbers modulo 10^k, where k is the number of digits in the larger of the two numbers whose g. c. d. is being obtained. It appears, then, that the number of additions required is the sum of the quotients in Euclid's method; also, that any modulus (larger than the numbers whose g. c. d. is being obtained) may be used in place of 10^k.

To illustrate this, we have Daykin's example and, on the right, the modification of Euclid's as suggested above. To find (2847, 1168):

2847	(+8832)	-2847	(+1168)
1679	(+8832)	-1679	(+1168)
511		-511	
8832	(+511)	-1168	(+511)
9343	(+511)	-657	(+511)
9854		-146	
511	(+9854)	-511	(+146)
365	(+9854)	-365	(+146)
219	(+9854)	-219	(+146)
73		-73	
9854	(+73)	-146	(+73)
9927	(+73)	-73	(+73)
0		0	

Hence (2847, 1168) = 73.

REFERENCES

1. D. E. Daykin, "An Addition Algorithm for Greatest Common Divisor," Fibonacci Quarterly, Vol. 8, No. 3 (Oct., 1970), pp. 347-349.
2. Donald E. Knuth, The Art of Computer Programming, Addison-Wesley Pub. Co., Vol. 2, pp. 293-337.