Some examples for the Euclidean algorithm

a	b	q	r
284	220	1	64
220	64	3	28
64	28	2	8
28	8	3	**4**
8	4	2	0
67890	12345	5	6165
12345	6165	2	**15**
6165	15	411	0
123456789	951	129817	822
951	822	1	129
822	129	6	48
129	48	2	33
48	33	1	15
33	15	2	**3**
15	3	5	0

Here are three examples with the initial choices of **(*a*, *b*) = (284,220), (67890,12345)** and **(123456789,951).** One finds ***q*** and ***r*** by long division. At the next line, take the new ***a*** to be the previous ***b*** and the new ***b*** to be the previous ***r***. Eventually the iteration of this process will yield a value of **0** for the remainder ***r***, at which point the iteration stops, and the greatest common divisor ***d*** will be the remainder from the next to last iteration. For the three examples, the greatest common divisors are **4, 15** and **3** respectively.

One can now work backwards to write $d = sa + tb$ for suitable integers ***a*** and ***b***:

$4 = 28 - 8*3,\ 8 = 64 - 28*2,\ 28 = 220 - 64*3,\ \ 64 = 284 - 220$ ***imply***

$28 = 220 - 64*3 = 220 - (284 - 220)*3 = 220*4 - 284*3$

$8 = 64 - 28*2 = (284 - 220) - (220*4 - 284*3)*2 = 7*284 - 9*220$

$4 = 28 - 8*3 = (220*4 - 284*3) - 3*(7*284 - 9*220) = 31*220 - 24*284$