Illustration of the Euclidean Algorithm

Description of the Euclidean Algorithm.

Input: Two nonnegative integers a, b, not both zero. Without loss of generality, let's assume $a \geq b$.

Output: The gcd $d = (a, b)$ and two integers x, y such that $ax + by = d$.

Steps:

If $b = 0$, then set $d = a$, $x = 1$, and $y = 0$. Stop.

Otherwise (if $b > 0$) find integers n and r such that $a = nb + r$, $0 \leq r \leq b - 1$. Carry out the Euclidean Algorithm on the pair of integers b, r to find $d = (b, r)$ and integers x_1, y_1 such that $bx_1 + ry_1 = d$. Set $x = y_1$ and $y = x_1 - ny_1$.

See the next page for an example.

Computing that $(180, 152) = 4$ (read down the first column) and $180(11) + 152(-13) = 4$ (read down the second column).

	180
	152

	180
	152
1	28

	180
	152
1	28
5	12

	180
	152
1	28
5	12
2	4

	180
	152
1	28
5	12
2	4
3	0

	180	
	152	
1	28	
5	12	
2	4	1
3	0	0

	180		
	152		
1	28		
5	12		0
2	4	1	1
3	0	0	

	180			
	152			
1	28			1
5	12		0	−2
2	4	1	1	
3	0	0		

	180				
	152				−2
1	28			1	11
5	12		0	−2	
2	4	1	1		
3	0	0			

	180					11
	152				−2	−13
1	28			1	11	
5	12		0	−2		
2	4	1	1			
3	0	0				