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[http://webhome.idirect.com/~totton/soroban/GCD\\_LCM/](http://webhome.idirect.com/~totton/soroban/GCD_LCM/)

This is an alternative method to calculate the greatest common divisor (GCD) of two number. It needs a few simple rules. To find GCD(a,b) these rules are,

1. If a and b both are even then 2 is a common factor. Divide a and b by 2.
2. If a or b is even ( but not both), divide even number by 2.
3. If both a and b are odd subtract the lower number from the largest one and divide the quotient by 2.
4. Continue until a = b.

If, after calculating  $a=b=1$  and 2 is not common factor, there is not GCD(a,b)

**For example calculate GCD( 207,92)**

.....a.....b  
0000207000000000092 : Setting task

.....a.....b  
0000207000000000046 :  $92/2=46$

.....a.....b  
0000207000000000023 :  $46/2=23$

.....a.....b  
0000092000000000023 :  $(207-23)/2=92$

.....a.....b  
0000046000000000023 :  $92/2=46$

.....a.....b  
0000023000000000023 :  $46/2=23$ , now  $a=b=23$  so,  $GCD(207,92)=23$

**For example calculate GCD( 198,75)**

.....a.....b  
0000019800000000075 : Setting task

.....a.....b  
0000009900000000075 :  $198/2=99$

.....a.....b  
0000001200000000075 :  $(99-75)/2=12$

.....a.....b  
0000000600000000075 :  $12/2=6$

.....a.....b  
00000030000000000075 :  $6/2=3$

.....a.....b  
00000030000000000036 :  $(75-3)/2=36$

.....a.....b  
00000030000000000018 :  $36/2=18$

.....a.....b  
00000030000000000009 :  $18/2=9$

.....a.....b  
00000030000000000003 :  $(9-3)/2=3$ . Now,  $a=b=3$ , so  $\text{GCD}(198,75)=3$

**Note! If 2 is common factor of a and b this goes a bit different.**

**For example calculate GCD(18,12)**

x.....a.....b  
00000180000000000012 : Setting task.

x.....a.....b  
20000090000000000006 :  $18/2=9$ ,  $12/2=6$ , 2 is common factor. Set it on rod x.

x.....a.....b  
20000090000000000003 :  $6/2=3$

x.....a.....b  
20000030000000000003 :  $(9-3)/2=3$ . Now, 2 and 3 are common factors, so  $\text{GCD}(18,12)$  is  $2*3=6$ .

- Hannu Hinkka

Tinyurl:  
<http://tinyurl.com/q6jzru>