# CoCoALib - Feature #1723

# New fn CoprimePart, OddPart: naming question

14 Feb 2023 21:11 - John Abbott

Status:	Closed	Start date:	14 Feb 2023
Priority:	Normal	Due date:	
Assignee:	John Abbott	% Done:	100%
Category:	New Function	Estimated time:	1.80 hour
Target version:	CoCoALib-0.99850	Spent time:	1.75 hour
Description			

# Description

I am considering adding two new functions:

- OddPart(N) or maybe OddFactor(N) which returns N/2<sup>k</sup> where k is chosen so that the value is odd
- CoprimePart(N,b) or CoprimeFactor(N,b) which returns N/gcd(N,b^infinity)\*

In some sense these functions are like "ideal saturation".

Obviously OddPart(N) = CoprimePart(N,2). So does it make sense even to have a separate function OddPart? Which names do you prefer?

Which order for the arguments of CoprimePart(N,b) or CoprimePart(b,N)?

Note that the similar function FactorMultiplicity(b,N) has the args in the order "small factor" then "big number" (but this is actually contrary to our guidelines).

## History

### #1 - 14 Feb 2023 21:18 - John Abbott

I thought of OddPart first (because I needed it somewhere). Then I found I wanted the more general version, but had trouble thinking of a good, mnemonic name. Inspired by OddPart (which seemed natural to me at the time), I thought of CoprimePart but admit that the name is not so mnemonic. I did also wonder about saturate (or similar), but that frankly sounds weird.

Note that CoprimePart(b,N) is not in general the same as N/b^FactorMultiplicity(b,N): for example N =  $1800 = 2^{3} \times 3^{2} \times 5^{2}$  and b =  $10 = 2^{5}$  give CoprimePart = 9 and FactorMultiplicity(b, N) = 2 because b^3 does not divide N.

Comments? Suggestions? Ideas?

## #2 - 20 Feb 2023 21:54 - John Abbott

- Status changed from New to In Progress

- % Done changed from 0 to 10

Since I need the fn for something else, I'll proceed with CoprimePart. But I still hope to get feedback, and perhaps a better idea/name!

### #3 - 27 Feb 2023 12:09 - Anna Maria Bigatti

#### John Abbott wrote:

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But I still hope to get feedback, and perhaps a better idea/name!

I prefer **CoprimeFactor**. That makes me guess what it does. I find "Part" a bit vague.

## #4 - 27 Feb 2023 20:15 - John Abbott

- % Done changed from 10 to 40

Thanks for the feedback! I must agree that it is probably easier to guess what the fn does if it is called **CoprimeFactor**.

I've already changed the code... must still do the doc (or even write the doc?)

#### #5 - 27 Feb 2023 20:17 - John Abbott

Oops! I had meant to include Nico Mexis as a watcher for this issue. I have just added him. Let's see if he has any good suggestions.

#### #6 - 27 Feb 2023 20:48 - Nico Mexis

A quick thought I had about that: Two separate functions (or at least a if  $(b == 2) \{...\}$  else  $\{...\}$  inside CoprimePart) might be a good idea. The implementation for b=2 could benefit by just utilizing bitshift operations since you only need to bit-shift N to the right until N&1 != 0.

Apart from that, I would agree that CoprimeFactor might be a bit more logical. However, ChatGPT will also suggest the name OddPart itself when prompted.

## #7 - 28 Feb 2023 15:19 - Nico Mexis

After looking a bit further into this, if b is prime, then CoprimePart(b,N) seems to usually be called **b-free part of N**. However, then the only function name I could think of would be BFreePart(B,N) or something like that and it does not look that great...

#### #8 - 06 Mar 2023 20:56 - John Abbott

- Assignee set to John Abbott
- % Done changed from 40 to 70

I have added *b-free part* as a keyword (or similar). The fn name I have kept as CoprimePart, as it seems a reasonable compromise. Will check in soon.

### #9 - 06 Mar 2023 23:14 - John Abbott

- % Done changed from 70 to 90

## #10 - 07 Mar 2023 20:27 - John Abbott

- Status changed from In Progress to Closed

- % Done changed from 90 to 100
- Estimated time set to 1.80 h