

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			
I am considering adding two new functions:			
<ul style="list-style-type: none">• OddPart(N) or maybe OddFactor(N) which returns $N/2^k$ where k is chosen so that the value is odd• CoprimePart(N,b) or CoprimeFactor(N,b) which returns $N/\gcd(N,b^\infty)$*			
In some sense these functions are like "ideal saturation".			
Obviously $\text{OddPart}(N) = \text{CoprimePart}(N,2)$. So does it make sense even to have a separate function OddPart ? Which names do you prefer?			
Which order for the arguments of $\text{CoprimePart}(N,b)$ or $\text{CoprimePart}(b,N)$?			
Note that the similar function $\text{FactorMultiplicity}(b,N)$ 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 $\text{CoprimePart}(b,N)$ is not in general the same as $N/b^{\text{FactorMultiplicity}(b,N)}$:
for example $N = 1800 = 2^3 * 3^2 * 5^2$ and $b = 10 = 2 * 5$ give $\text{CoprimePart} = 9$
and $\text{FactorMultiplicity}(b, N) = 2$ 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:

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!

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