CoCoALib - Bug #1719

FactorINT has got worse

18 Dec 2022 22:21 - John Abbott

Status:	Closed	**Start date:**	18 Dec 2022
Priority:	Normal	**Due date:**	
Assignee:	John Abbott	**% Done:**	100%
Category:	Improving	**Estimated time:**	4.25 hours
Target version:	CoCoALib-0.99880	**Spent time:**	4.25 hours

Description

The following test case now works definitely worse: it does not find all factors even with a time limit of 500s

```
/**/ N := 7335701525182455855723732507566255591134481346601986023037611611157687476400397907172094
1762623763937861202360049099856072236665625776728227130818063874713608876427074977365482448409767 7
3093512649283106676189969670190715605688315055912996396673593245518232763892972100400856716833568 4
2319268396798510128707839918660731651742944976182635483631384847979486107394446898018107511016560 9
1000559651460133898507451075021543893024508741305022079614770115972625681471201243034594916908288 4
9908828745308275669259461308044180759930396368758713605923927490677298863777414581578501341219505 6
7909549916726565397848350058686540214069105764188760584468853383349892739951103124613301580381750 7
2536806944873071790026250317208092353795274352735482800693276300683383005813384999248229159152454 8
6140139505259602149876786972689769371022298961965922357000181046354668804277833471217857459846845 2
3358075173076499827180279652949273573698343711529875229825990875365483702750885670859290649584291 8
8357670053413520801796770348828032190554726108183529387006677035995830258197922794283501823832810 9
5849245392896777547053856830502336977655992832081662287448775999978850447270548949893972501978640 6
0072413943048908893072281613818181255952564156500184276607648975880782796071856116659;
/**/ facs := FactorINT_TimeOut(N,150);
/**/ len(facs.factors);
--> 164 or 146??
/**/ TimeFrom(0);
--> 203.014
/**/ indent(facs);
```

Fix it!

Related issues:

Related to CoCoA-5 - Feature #1718: FactorINT with time-out	**Closed**	**16 Dec 2022**

History

#1 - 18 Dec 2022 22:24 - John Abbott

With the current impl on 127 factors are found, and they are all small enough to be split easily.
So why weren't they split?

I guess there should be a priority of composites still to factorize, and the remaining time should "shared" among them (somehow). The current recursive approach could soak up all the time just trying to spit one factor [which has supposedly been checked to be non prime]

Too late/tired to investigate now.

#2 - 18 Dec 2022 22:24 - John Abbott

- Related to Feature #1718: FactorINT with time-out added

#3 - 22 Dec 2022 11:18 - John Abbott

- Status changed from New to In Progress

- % Done changed from 0 to 10

I now have a simpler case:

```
N:=247791785944581739801301490935121039934579377242586087632913196488565691086949771704341604678953965644848613
255206002904696132271823245244297341106055140426571436941804751621633237213366590207876556514469529961738642003
205240903166519898987791573464612160928820311447243577699504315279381041379805020577653410356076373452127317542
712872617850416789935682534600486610638479668107575729740859589136302820960943572348440781583273904876520605461
745834958204698846679168105326967615596337173883897725500982366670904945336447236139484335909224625975210006
424970052329750496284041467999849356023268907689315561144393069893490828305045902428170300866707044870638391726
523593031045407984564584577896295982661600067137457974854069039430186771628107;
```

It seems that FactorINT is unable to factorize it, but FactorINT_PollardRho(N,1000000) finds a factor instantly.
I wonder what is going on.

#4 - 29 Dec 2022 20:57 - John Abbott

- Assignee set to John Abbott

- % Done changed from 10 to 50

It'd be nice to blame someone else for the "poorly organized" code...

Now it seems to work better. But the revised code still need tidying!
Maybe I'll check in soon what I have... and tidy it later (hah!)

#5 - 29 Dec 2022 21:16 - John Abbott

On some inputs which have many small factors, the code spends much more time inside IsProbPrime than actually computing factors.
Need a strategy to test for primality not too often...

#6 - 09 Mar 2023 22:37 - John Abbott

- Status changed from In Progress to Feedback

- Target version changed from CoCoALib-0.99850 to CoCoALib-0.99880

- % Done changed from 50 to 90

The current code works a lot better.
I suppose I should find time sooner or later to **implement the idea in comment 5** (but that is low priority for CoCoALib).

#7 - 22 Apr 2024 20:00 - John Abbott

- Status changed from Feedback to Closed

- % Done changed from 90 to 100

- Estimated time set to 4.25 h

The current impl is good enough. It behaves well enough on the two "big" test examples listed above. If we really want to offer good integer factorization, we should use an external library. But we should do that only if there is genuine demand... there are other more pressing issues!
Closing!