

CoCoA-5 - Bug #755

Find out how to compile statically on linux

31 Jul 2015 15:59 - Anna Maria Bigatti

<b>Status:</b>	Closed	<b>Start date:</b>	31 Jul 2015
<b>Priority:</b>	Normal	<b>Due date:</b>	
<b>Assignee:</b>	John Abbott	<b>% Done:</b>	100%
<b>Category:</b>	Release	<b>Estimated time:</b>	11.66 hours
<b>Target version:</b>	CoCoA-5.3.0	<b>Spent time:</b>	11.70 hours
<b>Description</b>			
many libraries are compiled dynamically. Not good for a released binary..			
<b>Related issues:</b>			
Related to CoCoA-5 - Design #1146: Use Flatpak and/or Snap on Linux?		<b>New</b>	<b>08 Jan 2018</b>
Related to CoCoA-5 - Bug #1442: CoCoAInterpreter: executable size		<b>Closed</b>	<b>10 Mar 2020</b>
Related to CoCoA-5 - Support #1445: Automatic way to produce statically linke...		<b>New</b>	<b>12 Mar 2020</b>

History

#1 - 17 Feb 2016 10:41 - Anna Maria Bigatti

- Target version changed from CoCoA-5.1.3/4 Jan 2016 to CoCoA-5.2.0 spring 2017

#2 - 13 Jun 2016 20:56 - John Abbott

Until we resolve this issue I would suggest making publicly available a minimal version of CoCoA-5 which does not depend on any external dynamic libraries. Last week I was embarrassed to find out that the compiled CoCoA-5 we distribute did not work on my linux box here in Kassel (because libblas was missing, and I could not find out quickly how to install it).

I do realise that this will make it a bit more confusing for Linux users who want to install CoCoA-5: they have to decide between two versions (probably without really understanding what the difference is).

In fact, I would be tempted to make the version which needs libblas less immediately obvious; amongst other things it contains extensions which do not interest me (at the moment, anyway).

#3 - 14 Jun 2016 09:42 - Anna Maria Bigatti

John Abbott wrote:

In fact, I would be tempted to make the version which needs libblas less immediately obvious; amongst other things it contains extensions which do not interest me (at the moment, anyway).

On this I totally agree: the CoCoA functions using libblas are not even documented!  
I had not realized that libblas was not in linux by default.  
I'll try and make a 5.1.4 without libblas.

#### #4 - 03 Oct 2016 12:29 - John Abbott

I record that on 2016-05-20 Logar sent the following email (in italian) which says that the critical linux package to install (for having libblas) is called **libopenblas-base**.

```
> Cara Anna,  
> dopo qualche tentativo, ho visto in rete sul sito:  
> http://packages.ubuntu.com/precise/libblas.so.3gf  
> che il pacchetto si trova in 3 pacchetti diversi. Ho provato ad installare  
> il terzo, cioe' libopenblas-base (i due precedenti diceva che non li trovava)  
> e ora cocoa funziona!!
```

In any case, as already hinted above, it seems best to make the distributed executable **without libblas** (possibly adding a note that we can make a version with libblas for those who really need it???)

#### #5 - 13 Oct 2016 13:08 - John Abbott

- Status changed from New to In Progress  
- % Done changed from 0 to 10

Since the fns which depend on libblas are not documented, perhaps all public versions should be without them (not just the Linux executable). I would prefer that all the different executables be as similar as possible (in terms of functions available).

#### #6 - 05 Nov 2016 17:44 - John Abbott

A recent email from Michael Wheat reports that installing **libopenblas** is not sufficient (at least not for him).

With luck Anna will make a blas-free Linux executable on Monday (hint, hint!)

#### #7 - 18 Nov 2016 22:14 - John Abbott

Michael Wheat reports that Anna's compilation (without libblas) works fine for him.

Does that mean we can make progress with this issue?

#### #8 - 29 Nov 2016 23:19 - John Abbott

Has the blas-free version been put on the website?

#### #9 - 30 Nov 2016 23:35 - John Abbott

I have built what seems to be a portable 32-bit executable of CoCoAInterpreter on the Linux VM (on my old MacBook). The only thing missing is readline.. apparently it is not on the VM.

#### #10 - 26 Apr 2017 15:56 - Anna Maria Bigatti

- Target version changed from CoCoA-5.2.0 spring 2017 to CoCoA-5.2.2

**#11 - 20 Dec 2017 18:25 - Anna Maria Bigatti**

for Anna: remember readline.a!!!!

**#12 - 08 Jan 2018 14:51 - John Abbott**

- Related to Design #1146: Use Flatpak and/or Snap on Linux? added

**#13 - 16 Jan 2018 15:37 - Anna Maria Bigatti**

- % Done changed from 10 to 20

Readline done, but still this contains some other dynamic library.  
Final (sad) decision: no readline in the linux binary release.

**#14 - 16 Jan 2018 15:37 - Anna Maria Bigatti**

- Target version changed from CoCoA-5.2.2 to CoCoA-5.2.4

**#15 - 16 Jan 2018 15:42 - John Abbott**

- Target version changed from CoCoA-5.2.4 to CoCoA-5.2.2

- % Done changed from 20 to 70

Another external library which causes trouble is **libreadline**.

On my current linux box the system installed readline library was a shared one, but I could install a static one too.

The CoCoAInterpreter executable using the static **libreadline.a** did not work on another linux box because of a version incompatibility in libtinfo.so.

**Our solution** is to release CoCoAInterpreter without readline. We may make an alternative version with readline which the "adventurous" can try.

Another possibility would be to make a linux distribution with both executables. The script could then try first to run CoCoAInterpreter-readline, and if that fails then to run CoCoAInterpreter-no-readline. This would make the distribution file rather large (but would anyone care?)

**#16 - 16 Jan 2018 15:43 - John Abbott**

- Target version changed from CoCoA-5.2.2 to CoCoA-5.2.4

**#17 - 30 Jul 2018 14:11 - John Abbott**

- Target version changed from CoCoA-5.2.4 to CoCoA-5.3.0

**#18 - 17 Feb 2020 15:10 - John Abbott**

- Assignee set to John Abbott

- % Done changed from 70 to 90

I propose:

- make Linux binaries **without** libblas
- make two binaries: the default one with readline, and another one without (in case the user has trouble with incompatible readline)

We should try to make sure that we use a fairly recent version of readline.

#### #19 - 20 Feb 2020 16:53 - John Abbott

Now I wonder if it may not be better to have the version **without** readline being the default: it is less likely to complain about a missing library, and anyone who uses CoCoA-5 inside Emacs (or some other GUI) does not need readline.

Undecided... :-/

#### #20 - 06 Mar 2020 15:11 - John Abbott

I am now fairly convinced that:

- **default Linux version** should be **without readline**
- ideally we also make available a version with readline (but this is perhaps less urgent/important)

If CoCoA-5 is to be used inside any "fancy interface" (e.g. emacs, vim, GUI) then the readline capability is not needed; and I suspect most people will want to use CoCoA-5 inside such an interface. The readline version is useful only for those who wish to use CoCoA-5 directly from a terminal.

#### #21 - 06 Mar 2020 19:35 - John Abbott

Sometimes I engage brain before writing, sometimes I don't... (sigh)

When I build CoCoA-5 on my current Linux box, I explicitly link with a static version of libreadline.a; there can still be further problems with (dynamic) libraries that libreadline itself depends on... maybe I can link explicitly with static versions of those?

I was surprised to see that a minimal CoCoA-5 executable is already about 32Mbytes; with all external libraries linked in, that becomes more than 80Mbytes! Wow! 8-O

Perhaps the easy solution is to make a release with both, and decide at launch-time which to use: *i.e.* try with libreadline first, if that fails, use the version without. That will make quite a large distribution file (since each executable is over 80Mbytes).

#### #22 - 10 Mar 2020 15:14 - John Abbott

libreadline on my Ubuntu machine depends on the **tinfo** library; I have a static version at **/usr/lib/x86\_64-linux-gnu/libtinfo.a**

Florian reported that the pre-released version of 5.3.0 did not work directly on his computer, and that he had to install an old version of the dynamic library for tinfo. Using the static version should avoid that problem, but another may pop up in its place...

#### #23 - 10 Mar 2020 15:15 - John Abbott

- Related to Bug #1442: CoCoAInterpreter: executable size added

#### #24 - 10 Mar 2020 15:56 - John Abbott

It seems that I must specify both libtermcap and libtinfo statically (and in that order!). On my Ubuntu box they are in:

- **/usr/lib/x86\_64-linux-gnu/libtermcap.a**
- **/usr/lib/x86\_64-linux-gnu/libtinfo.a**

**NOTE** external library dependencies can be seen by running **readelf -d ./CoCoAInterpreter | fgrep NEEDED**

**#25 - 10 Mar 2020 16:21 - John Abbott**

I have just found on StackOverflow that one can use gcc to find where libraries are:

```
$ gcc -print-file-name=libtinfo.a  
/usr/lib/gcc/x86_64-linux-gnu/7/../../../../x86_64-linux-gnu/libtinfo.a
```

This gives me some hope that we could create an automatic scheme which links (most) libraries statically; this is probably useful only for public releases...

**REFERENCE** <https://stackoverflow.com/questions/4156055/static-linking-only-some-libraries>

**#26 - 12 Mar 2020 13:32 - John Abbott**

- *Related to Support #1445: Automatic way to produce statically linked CoCoAInterpreter added*

**#27 - 20 Mar 2020 12:18 - John Abbott**

- *Status changed from In Progress to Closed*

- *% Done changed from 90 to 100*

- *Estimated time set to 11.66 h*

I think this issue has run its course, so I'm closing it.

The important points are:

- comment 24 (all of it)
- comment 25 (esp. the StackOverflow reference)
- the "illegal instruction" bug in issue [#1443](#)
- any future work about this should be in issue [#1445](#)