Installation instructions for NCAlgebras

This system has been successfully installed on Linux (specifically Ubuntu) as well as Mac OS X up through El Capitan. We have yet to get it installed on a Windows machine, except through a Linux VM.

1. Regardless of your platform, the first thing to do is install Macaulay2. This can be done by following the instructions located at `www.macaulay2.com`.

2. Install Common Lisp. On a Linux machine this is usually accomplished via the package manager built into your distribution. For example, on Ubuntu the command `sudo apt-get install clisp` should do the trick.

   On a Mac, one must first install homebrew. Instructions for installing homebrew are on their webpage `brew.sh`. This installation may also require you to install the XCode Command Line Developer Tools. Instructions how to accomplish this are located here.

3. Download the Bergman system here. Extract the `tar.gz` file to a directory accessible by all the users that wish to use the system. In what follows, I will call the location of this directory `<bergmanroot>`.

4. Open a terminal, and navigate to the `<bergmanroot>` directory. Here, the instructions for Linux and Mac diverge a bit

   - In Linux, change to the directory `<bergmanroot>`/scripts/clisp/unix. Execute the command `./mkbergman -auto`. This will build the bergman executable. Move to step 5.
   - On a Mac, things are a bit more complicated. Change to the directory `<bergmanroot>`/auxil/clisp. Edit the file `bmtail-cl.lsp` in a text editor. You will see the lines

     ```
     ;;(SAVEINITMEM "lispinit.mem" :INIT-FUNCTION...
     (SAVEINITMEM "bergman.exe" :INIT-FUNCTION ...
     ```

     in the file. In Common Lisp, `;;` indicates a comment. Switch the lines that are commented; that is, place `;;` on the front of the second line and take the `;;` off the first line. Save your changes.
   - Now go to the `<bergmanroot>`/scripts/clisp2.29/unix/ directory and execute the command `./mkbergman -auto`.
   - Finally, change directory to `<bergmanroot>`/bin/clisp/unix. In a text editor edit the `bergman` file there. This is a shell script which loads the necessary files to start the bergman executable. However, there is a change that must be made to this file as well. Here, # denotes a comment. By default the third line is active and the second is commented. Switch these around by uncommenting the second line and commenting out the third line. This ends the 'special steps' required to install Bergman on a Mac.

5. Add a symbolic link from the path to the bergman executable script to /usr/local/bin.

6. Add the line `"export BERGMANPATH=<bergmanroot>"` to your init file for your shell.

7. Download NCAlgebra.m2 and NCAlgebraDoc.m2 from here and place them in a fresh directory. In this directory, create a directory called NCAlgebra, and move the NCAlgebraDoc.m2 file into the NCAlgebra directory. Alternatively, clone the git repository using the command `git clone https://github.com/Macaulay2/Workshop-2014-Berkeley.git` which contains the guaranteed most recent version. (If you are unfamiliar with github then it is probably best to download the files from the website.

8. Change to the directory containing NCAlgebra.m2, and start Macaulay2. Run the command `installPackage "NCAlgebra"` at the Macaulay2 prompt.

9. Test your installation by running the commands:

```
needsPackage "NCAlgebra"
R = fourDimSklyanin(QQ,{a,b,c,d})
hilbertBergman(R,DegreeLimit => 6)
```

10. Enjoy!