Computational Algebraic topology: Lecture 2

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Literate Python Programming

Introduction to Literate Programming

Donald Knuth. "Literate Programming (1984)" in Literate Programming. CSLI, 1992, pg. 99

I believe that the time is ripe for significantly better documentation of programs, and that we can best achieve this by considering programs to be works of literature. Hence, my title: "Literate Programming."

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Let us change our traditional attitude to the construction of programs:

- Instead of imagining that our main task is to instruct a computer what to do,
- let us concentrate rather on explaining to human beings what we want a computer to do.

The CWEB System of Structure Documentation

Donald Knuth. Addison-Wesley. 1994. pag. 1

The philosophy behind CWEB is that an experienced system programmer, who wants to provide the best possible documentation of his or her software products, needs two things simultaneously:

- a language like TeX for formatting,
- and a language like C for programming.

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Neither type of language can provide the best documentation by itself; but when both are appropriately combined, we obtain a system that is much more useful than either language separately.

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1. The structure of a software program may be thought of as a "WEB" that is made up of many interconnected pieces
2. To document such a program we want to explain each individual part of the web and how it relates to its neighbors.

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The typographic tools provided by TeX give us an opportunity to explain the local structure of each part by making that structure visible,

and the programming tools provided by languages like C make it possible for us to specify the algorithms formally and unambiguously.

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- in terms of small sections
- and their local interrelationships

Daniel Mall. "Recommendation for Literate Programming"

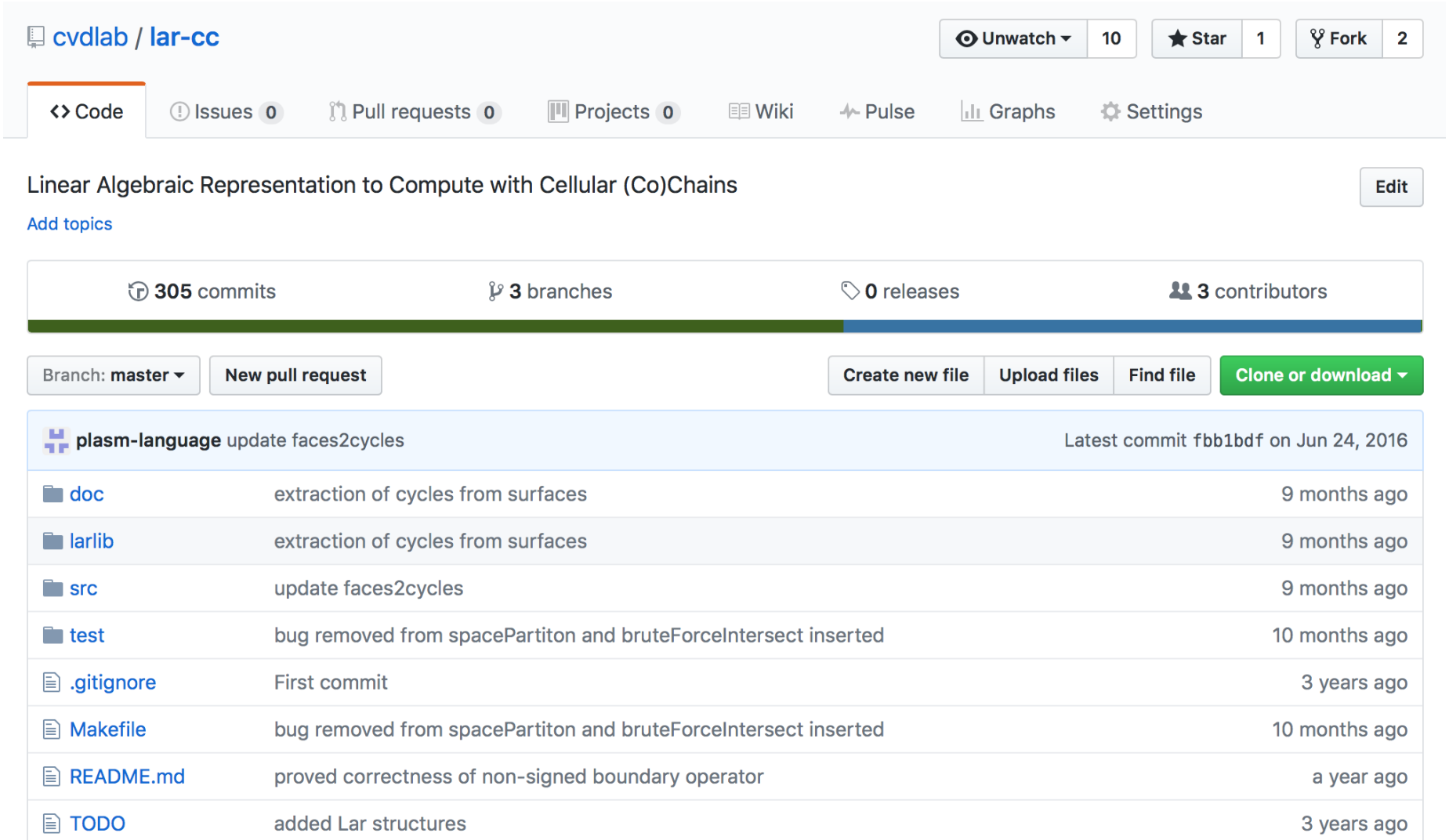
The key features of literate programming are the organization of source code into small sections and the production of a book quality program listing.

- Literate programming is an excellent method for documenting the internals of software products especially applications with complex features.
- Literate programming is useful for programs of all sizes.
- Literate programming encourages meaningful documentation and the inclusion of details that are usually omitted in source code such as the
  - description of algorithms,
  - design decisions,
  - and implementation strategy.

LarLib Literate Programming Environment

Remote repository

LINK: https://github.com/cvdlab/lar-cc



Literate programming environment

Grab the environment description: frame.pdf

Figure 2: The literate programming environment for `_larlib_`

Template to add YOUR module

1. Clone the repository on the local machine

   $ git clone https://github.com/cvdlab/lar-cc.git

1. Grab the file: template.tex and complete by updating some fields:
   - Title <- moduleName
   - TheAuthor <- yourName
   - Date <- theDate
   - template (bib.bib file)
2. of course, save as `moduleName.tex` within the `src/tex/` folder of local repository

Literate programming for Julia

Slide_1

Slide_2

Slide_3

References