



Recent developments in WeBWorK

an online homework system

EAMS 2020

Michael Gage
University of Rochester

Previously...

- A PDF of slides of my 2016 WeBWorK talk:
 - “The WeBWorK on-line homework system and its academic community”
 - can be found at <https://eams.ncl.ac.uk/archive/2016/wp-content/uploads/2016/09/slides-mike-gage.pdf> — there is also video
- We changed servers some years ago so links beginning in hosted2.webwork.rochester.edu or devel3.webwork.rochester.edu should now begin with <https://demo.webwork.rochester.edu> and most of them will work.
- WeBWorK is similar to ImathAS which David Lippman described to you Wednesday.

Outline of talk

You've already heard about the activities at RMU and at CityTech in NYC and you will hear more on Monday from Jake Medina. I'll present some pointers to other recent and ongoing WW developments.

- Extending WeBWorK to work in many languages (localization or internationalization) including 4 byte character languages such as Hebrew and Chinese.
- Embedding WeBWorK questions into HTML pages and OER textbooks. Collaborations with PreTeXt (pretextbook.org), LibreTexts (libretexts.org)
- Community building: “The Webwork Project” organization and board.

Languages: Hebrew

Here are three examples where not only the labels and buttons are translated but where WeBWorK problems have been constructed in a language other than English.

- Hebrew:
 - Lead implementer: Nathan Wallach, Technion University
 - Sample: https://demo.webwork.rochester.edu/webwork2/hebrew_language_webwork/
 - Example questions from Nathan's calculus course (now being taught)

- French (Canada)
 - Lead implementer: Julie Tremblay, collège de Bois-de-Boulogne and other contributors.
 - Sample: https://demo.webwork.rochester.edu/webwork2/french_language_course
 - They have created a WeBWorK course hosting site in french (Canada) <http://math.ccdmd.qc.ca/> maintained by the “Centre collégial de développement de matériel didactique”
 - They have many French WW questions stored in a library repository at <https://github.com/CCDMD>

Language: Spanish

- Lead: Enrique Acosta, Colombia ()
- Sample: [https://demo.webwork.rochester.edu/webwork2/
spanish_language_course](https://demo.webwork.rochester.edu/webwork2/spanish_language_course)
- Experimental host for Spanish WW courses: [http://
webwork.grupolema.org/webwork2](http://webwork.grupolema.org/webwork2)
 - Example course [http://webwork.grupolema.org/webwork2/
EjemploDiferencial/](http://webwork.grupolema.org/webwork2/EjemploDiferencial/)
- [Spanish tutorial](#) for WeBWorK
- Enrique's github account <https://github.com/enriqueacosta/> which contains a library of Spanish WW problems.

Other languages:

- <https://demo.webwork.rochester.edu/public/language> contains links to Chinese, Turkish, and Hungarian sample courses where the labels have been partially translated.
- Our plan is to keep the language libraries separate but roughly parallel.
- Enrique's workflow for constructing the .po dictionary which translates the labels and buttons uses a spreadsheet
- Another possibility is to use Transifex.com to build the .po dictionary
- Contact Enrique if you are interested in helping to design the best workflow for translators or in helping with a translation.

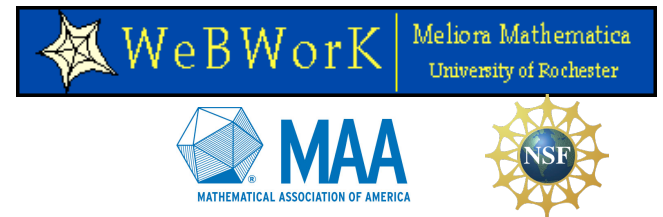
Embedding questions in HTML

- Simplest example using iframe: https://demo.webwork.rochester.edu/public/features/05embedded_questions/

```
<iframe width="800" height="400"  
src="https://demo.webwork.rochester.edu/webwork2/html2xml?  
  &answersSubmitted=0&  
  &sourceFilePath=Library/Union/setSeriesTaylor/ur_sr_9_6.pg&  
  &problemSeed=123567&  
  &courseID=daemon_course&  
  &userID=daemon&  
  &course_password=daemon&  
  &showSummary=1&  
  &displayMode=MathJax&  
  &problemIdentifierPrefix=102&  
  &language=en&  
  &outputformat=sticky">  
</iframe>
```

- You can use any modern webwork site to render the problem. Just create a course (“daemon_course”) with a user (“daemon”) which has TA_proctor privileges.
- You can reach any question in the OPL.

Embedding questions in PreTeXt



- PreTeXt <https://pretextbook.org>
 - Founder: Robert Beezer, U. of Puget Sound
 - High level XML textbook markup that is a superset of TeX
 - Write once read anywhere: HTML, PDF, eBooks, braille.
 - Aims to automatically give OER authors the quality production values associated with commercial textbooks.
- Matt Boelkins, Grand Valley State U. — ActivePreludeToCalculus — formatted using PreTeXt
 - <https://activecalculus.org/prelude/sec-changing-aroc.html> (sec 1.3.4)

- Alex Jordan, Portland Community College
 - Chief developer of PreTeXt + WeBWorK
 - Example chapter: <https://pretextbook.org/examples/webwork/sample-chapter/html/section-4.html>
 - Example from workbook: <https://spot.pcc.edu/math/orcca/ed2/html/section-solving-one-step-equations.html#xOK>
 - References:
 - Guide for a PreTeXt author who wants to use WeBWorK in their project: <https://pretextbook.org/doc/guide/html/webwork-source.html>
 - The flagship book for PTX-WW integration: <https://spot.pcc.edu/math/orcca/ed2/html/frontmatter.html>

Embedding: [LibreTexts.org](https://libretexts.org)



- Founder: Delmar Larsen, Dept of Chemistry, UC Davis
- Hosts OER textbooks from all STEM subjects, not just math
- Their goal is to gather all open source textbooks and allow for mix and match selections (Remix) to create a customized text for an instructor's class.
- It will use MyOpenMath (David Lippman) and WeBWorK for embedded homework questions in much the same way as PreTeXt. The project is still under construction.
- Advanced features

The WeBWorK Project



- The umbrella organization “The WeBWorK Project” has been formed with a board, a bank account (but not yet non-profit status) to help shepherd, coordinate and support individual WW initiatives past WW’s development via NSF grants
 - <https://demo.webwork.rochester.edu/public/thewebworkproject/>
- We have revamped our support wikis, forums and so forth. The apps had not been updated in over 10 years! We are still working on simplifying the content. Search now works much better!!

WeBWorK working sites

- The important WeBWorK sites:
 - wiki: <https://webwork.maa.org/wiki>
 - demo and overview site: <https://demo.webwork.rochester.edu/public>
 - blog aggregator (planet): <https://webwork.maa.org/planet>
 - forums (moodle): <https://webwork.maa.org/forums>
 - bugzilla: <https://bugs.webwork.maa.org>
 - github: <https://github.com/openwebwork>
 - webwork2, pg and webwork-open-problem-library are the principal repos.
 - check out the pull requests, issues, wikis and projects in each section to see what is currently under construction.
 - Docker — webwork on your laptop: <https://github.com/openwebwork/webwork2/wiki/Docker-newbie-instructions>
- Thank you.