



Getting Started with WeBWorK

Michael Gage

May 2009

Contents

1	The Goal	3
1.1	It increases the effectiveness of traditional homework	3
1.2	It increases the efficiency of traditional homework by:	3
1.3	Key features:	3
2	Sources for information	3
2.1	Online at http://webwork.maa.org	3
2.2	Email	4
2.3	Hosting courses	4
3	The WeBWorK roles:	4
3.1	System Administrator	4
3.2	Administrator:	4
3.3	Instructor:	4
3.4	Student:	5
3.5	Homework problem author	5
4	Testimonials	6
5	Tutorial	7
5.1	Tutorial plan	7
5.2	Login as a student:	7
5.2.1	Problem 1 - example of equation and numerical answers	8
5.2.2	Problem 2 - graph example	8
5.3	Login as instructor	8
5.3.1	Problem 3 - adaptive equation answers	9
5.3.2	Problem 1 again - view code	9
5.3.3	Problem 4 -answers with units	9
5.3.4	Problem 5 - graph problems	11
5.3.5	Problem 6 - interactive problem using javaScript	11

5.3.6	Problem 7 - interactive problem using LiteApplet	11
5.3.7	Problem 9 - uses a java applet to display 3D images	11
5.3.8	Problem 8 - a problem we'll delete	11
5.3.9	Add a student to the course.	13
5.3.10	Change a student to an instructor	14
5.3.11	Add many students	14
5.3.12	Import a homework set	15
5.3.13	Assign the "Introduction" set to the practice users	16
5.3.14	Create a new empty homework set	16
5.3.15	Use library browser to add problems	17
5.4	Other ideas for practice	17
6	Scoring Tools	18
6.1	Downloading WeBWorK scores	18
7	Email	18
8	File Manager	19
8.1	Standard files used by WeBWorK	19
9	Course Configuration	20
10	Timeline	20
11	WeBWorK Team	20

Getting Started with WeBWorK

A brief introduction to what the online homework system WeBWorK does followed by a tutorial on how to get started using it.

1 The Goal

Make homework more effective and efficient and promote active learning by students.

1.1 It increases the effectiveness of traditional homework

1. Providing students with immediate feedback on the validity of their answers and giving students the opportunity to correct mistakes while they are still thinking about the problem. As one student said, “I can fix my mistakes while [the] problem is fresh in my mind.”
2. Providing students with individualized versions of problems which means that instructors can encourage students to work together; yet each student must develop an answer to his or her own version of the problem.

1.2 It increases the efficiency of traditional homework by:

1. Providing automatic grading of assignments.
2. Providing information on the performance of individual students and the course (or section or recitation) as a whole.

1.3 Key features:

1. Using WeBWorK, instructors can ask most questions typically found in mathematics and other scientific textbooks as well as more advanced interactive questions.
2. Students persist with WeBWorK. At Rochester we find almost all students complete each homework set until most problems are correct.

2 Sources for information

2.1 Online at <http://webwork.maa.org>

The central WeBWorK website is hosted by the Mathematics Association of America (MAA) at <http://webwork.maa.org>. This site is in wiki format and any WeBWorK user is welcome to signup to help update the information. In the left margin of the wiki is a link to active forums where one can ask questions. All questions are welcome from newbie questions to advanced discussions. Most questions are answered within a day if not within a few hours.

You can see actual courses in use at the University of Rochester by logging in using the guest login: practice1 (password: practice1) at <http://webwork.rochester.edu/webwork2> – click on the course that interests you. You can also use practice2, practice3 and so forth. The actual content available in the courses will depend on how far the current semester’s course has progressed.

There is also a model calculus course on line which allows guests to inspect the code used to write the questions. This course closely follows the questions that have been used in the first semester calculus course at the University of Rochester. An effort has been made to rewrite the questions using the latest “best practices” code – in particular it uses MathObjects where possible – so this is a good source for hints on writing your own questions.

2.2 Email

If you can’t find what you need on the MAA website you can email Prof. Michael Gage (gage@math.rochester.edu) or Prof. Arnold Pizer (apizer@math.rochester.edu) at the University of Rochester.

2.3 Hosting courses

We can host moderate size courses on our servers at the University of Rochester for professors who would like to try out WeBWorK for a semester without going through the bother of installing it on their own servers. We also host courses for high schools and small institutions that don’t have direct access to unix servers.

3 The WeBWorK roles:

Often one person plays several roles in working with a WeBWorK server.

3.1 System Administrator

- Manages the server, installs Apache, mysql, WeBWorK, etc.
- Requires access to the unix webserver.

3.2 Administrator:

- Creates, deletes, archives and renames courses (normally this can be done from the web)
- For more information see <http://webwork.maa.org/wiki/Category:Administrators>

3.3 Instructor:

Manages courses

- Enrolls students in the course

- Creates homework sets and assigns them to students
- May view student progress in answering questions
- For more information see <http://webwork.maa.org/wiki/Category:Instructors>

3.4 Student:

- Answers questions in the homework sets
- Answers for each problem are automatically checked and the grade recorded.
- Usually students are allowed to correct any mistakes in their homework problem – the instructor can impose a limit on how many times a homework problem can be corrected.
- In this document we describe WeBWorK as a replacement for homework, where feedback and correction are the principal goals. This is usually how WeBWorK is used at the U. of Rochester. WeBWorK also has a “gateway quiz” model developed by Gavin LaRose which is used at the University of Michigan and several other institutions for quizzes and placement tests. This model gives a student a quiz with a number of questions (say 10) which they do without feedback. When they submit the quiz they are given feedback, but no opportunity to correct their errors. If their score is sufficiently high they pass and can go on to the next unit, or enter the appropriate course. (There are a number of other features: see http://webwork.maa.org/wiki/Gateway_Tests_and_Quizzes)
- For student help pages see <http://webwork.maa.org/wiki/Category:Students>

3.5 Homework problem author

- The instructors may create their own questions or they may choose questions from the problem library.
- There is already a large collection of problems for calculus, pre-calculus, linear algebra, differential equations and some probability and statistics available in the “National Problem Library”
- Questions are authored in PG, a language built on perl by adding macros. Formulas are written in LaTeX. The recently added MathObjects features make it easier to write and maintain WeBWorK questions. In general it is fairly easy to make small changes in existing problems or to create similar problems from a model. With more programming knowledge PG becomes a valuable, extensible platform for presenting mathematics and interpreting mathematical answers.
- For extensive information on authoring questions see <http://webwork.maa.org/wiki/Category:Authors>

- For “best practices” example questions see model calculus course
- For help on a particular type of question see http://webwork.maa.org/wiki/Category:Problem_Techniques

4 Testimonials

THE EDUCATIONAL ADVANTAGES OF IMMEDIATE FEEDBACK ARE EMPHASISED REPEATEDLY BY BOTH INSTRUCTORS AND STUDENTS

- *“I can fix my mistakes while the problem is fresh in my mind.”*
- *“WebWork is the only way that I can push myself to really do something about the homework.”*
- *“ I don’t have to wait for lecture to see if I’m doing it right.”*
- *“ It makes you want to redo it; after finding an answer, you feel accomplished, immediate feedback makes sure you have accomplished something.”*

TESTIMONIALS ABOUT WEBWORK FROM INSTRUCTORS:

- *“Our analysis shows that nearly all Rochester students complete each homework set until most problems are correct.”*
- *“The Calculus classes went very well. I can’t get over how important the ‘e-mail the instructor’ button is.”*
- a Rutgers study found the *“correlation between attempts and percentage of problems solved was a remarkable .944 suggesting that once students began a problem they persisted until they had solved it”*(Hirsch and Weibel, 2003)
- A three-part study at Virginia and Rochester reveals that WeBWorK *“spawned noticeable changes in persistence and determination when it came to working through assignments”*(Davison, 2004).
- *WeBWorK seems to cause students to work harder on their homework and it also encourages them to work together more closely than they would otherwise. It is most gratifying to walk through our study center and see groups of eager and animated students discussing the meaning of variables, equations, functions, derivatives, and integrals. Since WeBWorK has an easy and effective feedback mechanism it also encourages and intensifies interaction of the students with their instructor.* PETER ALFELD, UNIVERSITY OF UTAH

- *It is so valuable to center a mathematics course around students solving problems, instead of around students watching the instructor solve problems. One learns math only by doing it. Without instant grading of math homework, even if students do math homework assignments, they do not know if they have done them correctly. Being told immediately that their answer is wrong is a strong motivation for students to keep working on a problem. Engaging students to stick with a problem until they get it right is an extremely powerful strategy for good learning. The Rutgers study of WeBWorK's impact demonstrated this claim in spades.* ALAN TUCKER, SUNY-STONY BROOK
- *The WeBWorK project not only provides an extremely useful pedagogical tool, but as an open source project is not bound to one textbook or publisher, and so embodies the flexibility to be tailored to each adopter's needs. No commercial product can offer this kind of fine tuning. I have heard publishers pitch their products which have similar capabilities, but they inevitably pale by comparison.* TOM SHEMANSKE, DARTMOUTH
- *[We] have found WeBWorK to be a valuable support for courses in our undergraduate mathematics program. The response to the introduction of the homework is almost universally positive, both from students and faculty, and we will be using the homework in all of Calculus I this winter, serving another 2500 students per year. Once this is proven successful we will almost certainly extend its use to our entire introductory program, which enrolls over seven thousand students a year. In short, WeBWorK is likely in the next few years to have a significant impact on the education of almost all students who go through a standard mathematics course [here].* ROBERT MEGGINSON AND P. GAVIN LAROSE, UNIVERSITY OF MICHIGAN

There are more instructor comments at
<http://webwork.rochester.edu/webwork-summary.pdf>

5 Tutorial

5.1 Tutorial plan

One can practice using WeBWorK as a student and then add homework sets to a course as an instructor.

A tutorial course which can be used for experimentation while following this tutorial is at <http://webwork.rochester.edu/webwork2/maa101>. There is also a course labeled maa102, maa103 and so forth on that site. In addition there are “maa” courses at <http://hosted2.webwork.rochester.edu/webwork2/>

5.2 Login as a student:

Use `student1` as login name and `student1` as password.

Click on the link for the homework set **Introduction**.

5.2.1 Problem 1 - example of equation and numerical answers

Things to notice:

- When you enter an equation your entry is typeset. Enter $(x + 1) \wedge 3/10x$ in the first entry. Notice the denominator might not be what you expect
- Enter $x + 1) * 5$ – notice that the mismatched parentheses are highlighted
- Enter the correct answer as $ax + b$ and also $a(x + b/a)$ -both are accepted. –Each of you has a different a and b because of the randomizing behavior.
- Enter the numerical answers: notice that the question author can require the student to do the calculation or allow webwork to do the numerical calculation for them.

5.2.2 Problem 2 - graph example

Things to notice:

- Click on the graph for a larger view.
- In this example WeBWorK indicates which part of the answer is wrong – this feature can be turned on or off by the instructor.
- The problem grade is calculated every time you do a problem. The highest grade is retained.

5.3 Login as instructor

First click **logout** in the upper right corner and confirm to finish your session as a student.



Figure 1: Logout

Then use **profa** as login and **profa** as password to login again as an instructor which will give you more options.

5.3.1 Problem 3 - adaptive equation answers

Things to notice:

- Enter $\frac{\cos(x^3)}{3}$ or $\frac{\cos(x^3)}{3} + 1$ or $\frac{\cos(x^3)}{3} + \sin^2 x + \cos^2 x$ – each will be marked correct.
- WeBWorK uses numerical sampling – so two functions are equivalent if they agree on 5 random points. The number and domain of the points chosen can be adjusted. This criteria works surprisingly well.

5.3.2 Problem 1 again – view code

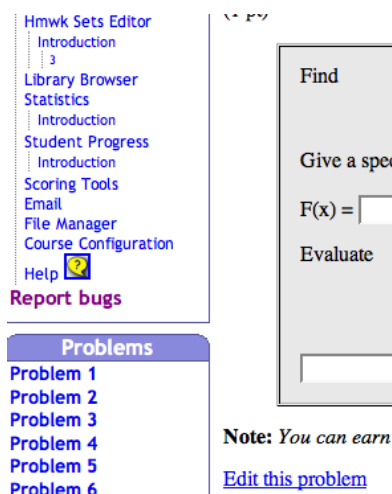


Figure 2: Problem links

- Click on the link to problem 1 which is lower down in the left margin (or navigate to problem 1 in some other way.) – see figure on next page
- Click on the link “Edit this problem” to open an editor for the code in a **new window**.
- We probably won’t have time to practice tweaking problems, however **note the links** at the top for obtaining various types of documentation for help. (See figure 3)

5.3.3 Problem 4 -answers with units

Close the PG editor window to return to problem 1.

Then click on the link in the left margin (or otherwise navigate to problem 4).

Things to notice:

Problem 1

Editing set *Introduction/problem 1* in file '[TMPL]/introduction/s2_2_1.pg'

[| Manpages](#) | [| macro list](#) | [| pod docs](#) | [| report problem bugs](#) |

```
##DESCRIPTION
##KEYWORDS('derivatives')
## Find a derivative of a polynomial, evaluate it at a point
##ENDDescription
DOCUMENT();          # This should be the first executable line in the problem.
loadMacros(
  "PGbasicmacros.pl",
  "PGchoicemacros.pl",
  "PGanswermacros.pl",
  "PGauxiliaryFunctions.pl"
);
TEXT(&beginproblem);
$showPartialCorrectAnswers = 1;
$a1 = random(2,7,1);
$b1 = random(2,12,1);
$c1 = random(1,40,1);
$x1 = random(1,5,1);
$x2 = random(1,5,1);...
```

View using seed and display mode

Add to set as

Save to [TMPL]/introduction/s2_2_1.pg and View

Create a copy at [TMPL]/introduction/s2_2_1.pg and use in set **Introduction/problem 1**

Select above then: in another window

Figure 3: PG editor

- Enter the answer with units: $\sqrt{x^2 + b^2}$ m
- Now enter it in centimeters: $\sqrt{x^2 + b^2} * 100$ cm
- Try some other correct and incorrect answers

5.3.4 Problem 5 - graph problems

- The graphic picture is generated “on the fly” as you request the problem. It is slightly different for each student.
- This problem is a bit more difficult than you might expect.
- The instant feedback keeps the student at the task until they get it.
- Notice that in this case the question has been set so that WeBWorK does not indicate which answer is wrong.
- As an instructor you can click the “show correct answer” checkbox to see what WeBWorK thinks is the correct answer.

5.3.5 Problem 6 - interactive problem using JavaScript

- The student MUST use the Newton quotient to calculate the derivative $f'(a)$ since there is no formula.
- Enter points x near a and click the $--f-->$ button to calculate $f(x)$
- Try some other correct and incorrect answers

5.3.6 Problem 7 - interactive problem using LiteApplet

(java applet) by Frank Wattenberg

- Move the pointer to obtain (x,y) coordinates
- Notice that in order to find the distance the student must also measure the legend on the map in order to calibrate the coordinates.

5.3.7 Problem 9 - uses a java applet to display 3D images

(created by Davide Cervone)

5.3.8 Problem 8 - a problem we'll delete

from the homework set

- Click on Instructor Tools/Hmwk Sets Editor/Introduction in the left margin.
- Find problem number 8 in the list and check the “delete” checkbox

Getting Started webhome devel-mysql Google local_webwork_prese... devel_webwork_prese... 165 pg_examples 162 TWiki

WebWork Logged in as gage. [Log Out](#)

WebWork → oman100 → Instructor Tools → Hmwk Sets Editor → Set Detail for set introduction

Set Detail for set Introduction

This set **Introduction** is assigned to all students. [Edit individual versions](#) of set Introduction.

Any changes made below will be reflected in the set for ALL students.

[Save Changes](#) | [Reset Form](#)

General Information	
Opens	02/26/2007 at 06:07am EST
Answers Due	06/02/2007 at 02:07am EDT
Answers Available	06/02/2007 at 02:07am EDT
Visible to Students	Yes
Assignment type	homework

Headers	Display Mode: None	Refresh Display
Set Header Edit it View it	introduction/setHeader.pg introduction/setHeader.pg	
Hardcopy Header Edit it View it	introduction/setHeader.pg introduction/setHeader.pg	

6 Edit it Try it <input type="checkbox"/> Delete it? <input type="checkbox"/> Mark Correct?	Weight 1 Max attempts unlimited	Source File introduction/prob5.pg
7 Edit it Try it <input type="checkbox"/> Delete it? <input type="checkbox"/> Mark Correct?	Weight 1 Max attempts unlimited	Source File introduction/liteApplet1.pg
8 Edit it Try it <input checked="" type="checkbox"/> Delete it? <input type="checkbox"/> Mark Correct?	Weight 1 Max attempts unlimited	Source File introduction/deleteProblem.pg
9 Edit it Try it <input type="checkbox"/> Delete it? <input type="checkbox"/> Mark Correct?	Weight 1 Max attempts unlimited	Source File introduction/setMVlevelsets/levels-3/levels-3.pg

Figure 4: Hmwk Editor

- At the bottom of the page click the “force problems to be numbered consecutively” checkbox
- Click the save button. Notice that there are now only 8 problems.
- Change the due date and the answer date at the top of the page. You can copy and paste the format
- Click the save button.
- Notice that the timezone is still Eastern Daylight Time (EDT). We’ll change that
- Click on the “Course configuration” link in the left margin
- Enter “Asia/Muscat” as the new timezone and click save.
- Finally click the “Homework Sets/ introduction” link in the top left to return to the main homework page.
- Notice that the time zones have changed.

The screenshot shows the 'Course Configuration' page for 'oman100'. The left sidebar contains a 'Main Menu' with links to 'Courses', 'Homework Sets', 'Password/Email', 'Grades', 'Instructor Tools', 'Classlist Editor', 'Hmwk Sets Editor', 'Library Browser', 'Statistics', 'Student Progress', 'Scoring Tools', 'Email', 'File Manager', 'Course Configuration', 'Help', and 'Report bugs'. The main content area has a breadcrumb trail: 'WeBWork → oman100 → Instructor Tools → Course Configuration'. Below the title 'Course Configuration', it says 'Changes saved.' and provides navigation links: 'General | Permissions | PG - Problem Display/Answer Checking | E-Mail'. A table titled 'General' contains the following settings:

What	Default	Current
Name of course information file	course_info.txt	course_info.txt
Theme (refresh page after saving changes to reveal new theme)	math	math
Inactivity time before a user is required to login again	1800	1800
Timezone for the course	America/New_York	Asia/Muscat

At the bottom of the configuration area is a 'Save Changes' button.

Figure 5: Course Configuration Editor

5.3.9 Add a student to the course.

- Click “Classlist editor” in the left margin
- Click “add $< n >$ student(s)” – you can change the number of students to add to 2
- Click “Take action” button

WebWork → oman100 → Instructor Tools → Classlist Editor

Classlist Editor

Result of last action performed: *showing all users*

Select an action to perform:

- Show in their
- Sort by .
- Edit
- Give new password to
- Import users from file replacing existing users and adding new users
- Export to .lst
- Add student(s).
- Delete *Deletion destroys all user-related data and is not undoable!*

Showing 8 out of 8 users.

Select	Login Name	Login Status	Assigned Sets	First Name	Last Name	Email Address	Student ID	Status	Section	Recitation	Comment	Permission Level
<input type="checkbox"/>	profa	inactive	1/1	Professor	A	none@math.rochester.edu	profa	Enrolled (C)				10
<input type="checkbox"/>	profb	inactive	1/1	Professor	B	none@math.rochester.edu	profb	Enrolled (C)				10
<input type="checkbox"/>	gage	active	1/1	Michael	Gage	gage@math.rochester.edu	gage	Enrolled (C)				10
<input type="checkbox"/>	sam	inactive	1/1	Sam	Hathaway	sh002i@math.rochester.edu	sam	Enrolled (C)				10
<input type="checkbox"/>	student1	inactive	1/1	Student	One	none@math.rochester.edu	student1	Enrolled (C)				0

Figure 6: Class List Editor

- Fill in the student data. The student's initial password is the same as the studentID.
- Select the sets to be assigned to the student.
- Click "Add Students" AT THE BOTTOM of the page.

5.3.10 Change a student to an instructor

- Click on the pencil next to future instructor (for example student2 at the bottom of the page).
- In the box all the way to the right change the permission level from 0 to 10
- Click the "Save changes" button
- Click the "Take action" button
- If only some students are shown choose the "Show all users" popup in the first line and then click "Take Action"

5.3.11 Add many students

- Click "Classlist editor" in the left margin
- Click "Import users from file demoCourse.lst ..."

- Notice that several “guest” or “practice” users have been added. These users’ grades are not permanently recorded. Students can use these accounts for practice if they are available.
- Notice that these “practice” users have not been assigned any sets (the column reads “0 out of 1”),
- You can assign a set to an individual student by clicking on the link in the “Assigned Sets” column.
- Class lists can be created from information provided by the registrar and then uploaded using the “File manager”. The format of the text files containing the classlists is important and somewhat delicate. They can be created using excel (.csv output) or by writing a perl or ruby script to convert files provided by the registrar. See for details

Showing 1 out of 1 sets.

Select	Edit Set Data	Edit Problems	Edit Assigned Users	Visible	Open Date	Due Date	Answer Date
<input type="checkbox"/>	Introduction	10	10/18	Yes	02/26/2007 at 03:07pm GST	06/02/2007 at 10:07am GST	06/02/2007 at 10:07am GST

Page generated at 10:13pm on Mar 22, 2007
WeBWork © 2000-2006 The WeBWork Project

Figure 7: Hmwk Sets Editor

5.3.12 Import a homework set

This imports a saved or precreated homework set from a set definition file (.def file).

- Click “Hmwk set editor” in the left margin
- Click “Import a single set from ...” and change “following file(s)” to setOrientation.def

- Choose “assigning this set to all current users”. You can leave the “set name” blank and the set will be called Orientation.
- Click “Take action” button

5.3.13 Assign the “Introduction” set to the practice users

- Click in the “Edit Assigned Users” column
- On the next page click on “Assign to All Current Users”
- Notice that this set has now been assigned to the practice users.
- Return to the Hmwk Sets Editor (click the link in the left margin).

5.3.14 Create a new empty homework set

Finally we can compose our own homework set from the library. First create an empty homework set.

- Click “Hmwk set editor” in the left margin if you are not on the homework editor page.
- Click “Create a new set named < *mySet* > as new empty set”. (You can use your own name for “mySet”.)
- Click “Take action” button
- Assign the set to yourself – (Click in the “Edit Assigned Users”, check profa, and click “Save” at the bottom of the page.)
- Click “Library Browser” link in the left margin

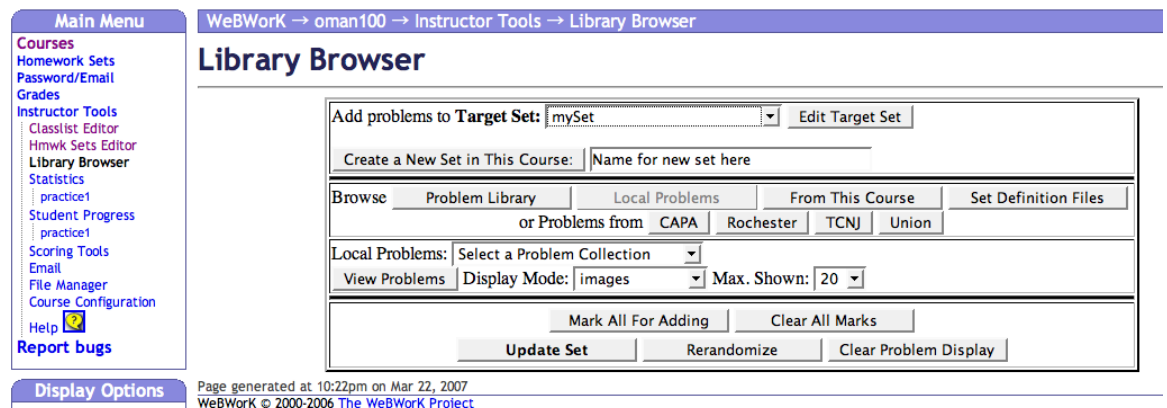


Figure 8: Problem Library Browser

5.3.15 Use library browser to add problems

to homework set

Choose problems from the library

- First choose “mySet” from the top popup button to be the “target” set for adding problems.
- Click “Problem Library”
- Select a problem collection (Subject/Chapter/Section)
- Click “View Problems” to see the problems in the collection
- Scroll down and select the problems to be added to the target homework set.
- Click “Update set” in the top section of the page
- Click “Homework sets” to return to the main page of the course. You’ll see additional sets.

5.4 Other ideas for practice

- Practice by adding the homework sets “Knoxville MAA 2006 cervone” and “2007 new orleans gage”
- Browse through the presentations in those two homework sets created by Davide Cervone and Mike Gage for presentation at national meetings.
- Add the homework set “set0” and practice editing the text for these problems. It’s a good idea to make only very slight changes and then view the result, particularly while you are experimenting. You can revert back to the original problem as long as you only view the problem and don’t “Save as”.
- I can restore the course so don’t worry about damaging it permanently by a mistake – and don’t count on any changes you’ve made lasting for a long period of time.
- Practice adding more problems from the “Problem library” using the Library Browser. There are also older libraries created by each university – most but not all of these problems are now in the national “Problem library” (NPL). The Union College problems are among the newest. They are good examples.
- While viewing problem 1 (or any problem with equations) choose the different display options in the lower left hand corner to see three different methods for displaying typeset mathematics. We have been using “images” mode.

6 Scoring Tools

6.1 Downloading WeBWorK scores

Despite its name the "scoring" capabilities for WeBWorK are pretty primitive. The main purpose is to allow the data collected from the WeBWorK homework to be downloaded in a convenient format so that it can be imported into an excel (or excel like) spreadsheet application for grading.

The format we use is .csv (comma separated variables) which can be read by most spread sheet applications.

- Select "Introduction" or any other set or sets in the scrolling list at top left. (Use "command" or "control" keys to select more than one item in the list). Click "score selected set(s)". You will see columns indicating the total score for each student for each problem set as well as columns indicating the total score for each student and the percentage of problems answered correctly. Click on the link "...totals.csv" to download the .csv file to your desktop computer.
- Check box "Pad fields" adds spaces which produce a nice display on an HTML page, but strictly speaking do not conform to the .csv standards. Excel ignores the spaces, but some other spreadsheets which are strictly compliant with .csv standards may not. Unchecking this box produces a .csv file that does not have the extra spaces added.
- To obtain more data check the "Record Scores for Single Sets" check box. This will produce two additional files for each set – the ending inscr.csv has scores for individual problems within a problem set, the set labeled ...ful.csv contains a record of the number of correct and the number of incorrect attempts on the problem made by the student. This option is not much used since it is usually more information than you want to know.
- The "Include Index" check box will include a "success index" calculated from the number of incorrect scores – it is roughly the inverse of the number of incorrect attempts in a problem set and for a given problem set gives some indication of how difficult a student found the set compared to his peers.
- When you score a problem set the result is saved to a .csv file on the WeBWorK server in the directory labeled "scoring". It can be downloaded to your desktop machine manually using the "File Manager" (see below). You can change the name of the file in the blank to the right of the "Scored selected sets..." button.

7 Email

This page allows you to send email to all of the students in your class or to a selected subset. It also has a "merge" facility which allows you to merge .csv

files uploaded to the scoring directory with the “File Manager” with an email message. This allows for individual reporting of grades.

8 File Manager

This page manages transferring files from your desktop machine to directories for your course on the WeBWorK server. You can only reach files in the directories for the course you are currently working with.

Typically transferring data is a two step process – one first exports the data from WeBWorK’s internal database using the “export” commands on the “Hmwk Sets Editor” page or the “Classlist Editor” page or use the scoring command on the “Scoring Tools” page. The exported data is stored in a text file on the WeBWorK server – usually in the “templates” directory (or the “scoring” directory). In the second step you use the “File Manager” to transfer this file to your desktop where it can be archived, edited or imported into a gradebook or spreadsheet. To transfer information from your desktop into WeBWorK you reverse the process – first uploading your files to the server, then importing those files to WeBWorK’s internal database.

8.1 Standard files used by WeBWorK

- The .def files are stored in the templates directory and contain a list of paths to the template files (.pg files) which define the problems in that homework set. They also contain lines at the top of the text file that define the open, due and answer dates for the homework set. These files are only used for transferring or archiving data – they must be imported into WeBWorK’s internal database before the homework sets can be used and any changes to the homework sets made through the web interface will not appear in the .def files until the homework set has been exported.
- The .pg files, usually stored in subdirectories of the templates directory, contain templates for problems that you have created or modified locally for your course. They can be downloaded for archival purposes. You can use the “Make archive” button to make an archive of a directory of files so that they can all be downloaded at once.
- The .lst files are text files encoded with csv (comma separated variables) that contain class list information. These files are imported/exported to WeBWorK’s internal database from the “Classlist Editor” page. Details on the formatting of this file is referenced from the context sensitive help icon (the yellow question mark) when viewing the “File Manager” web page.
- More information on file types is available via the context sensitive help icon (the yellow question mark) when viewing the “File Manager” web page.

- The links or aliases (with names ending in) allow the library browser indirect access to problem libraries that have been installed on the WeBWorK server. They can't be used or changed through the "File Manager".

9 Course Configuration

This page provides a web interface that allows you to change some of the preferences (such as the timezone or the preferred method of presenting typeset mathematics) from the web. The full set of preferences for webwork is set in the file `conf/global.conf` and can be overridden by entries in the `course.conf` file for a given course.

The `global.conf` file can be changed only by the system administrator with unix access to the server. The `course.conf` file can (currently) be changed using the "File Manager", but this needs to be done with extreme caution since a false entry can temporarily disable the WeBWorK course.

10 Timeline

- Fall 1996 - WeBWorK first used in classes at U of R .
- Spring 1999 - First NSF support for WeBWorK at U of R
- Fall 1999 - WeBWorK received ICTCM award for Excellence and Innovation with the Use of Technology in Collegiate Mathematics.
- Spring 2003 - WeBWorK 2 is first released.
- Summer 2004 - MSRI sponsors WeBWorK programming workshop.
- 2007 - More than 100 universities and colleges are using their own WeBWorK servers and more than 150 courses for other universities are being hosted on U of R servers.
- August 2007 - American Institute of Mathematics sponsors workshop on WeBWorK development and outreach.

11 WeBWorK Team

In addition to the original WeBWorK developers Prof. Michael Gage and Prof Arnold Pizer, the evaluator Dean Vicki Roth and the chief programmer Sam Hathaway there are many, many people have contributed and continue to contribute to the development of WeBWorK.

A partial list is at <http://math.webwork.rochester.edu/docs/credits.html>

Please join us. WeBWorK is open source. <http://webwork.maa.org>.