The Grader: Quick Start Guide

Manoj Thulasidas

***Abstract*—This document describes how to get started with the Grader for Lab Tests, AY2023-24, T2. Grader is designed to make the logistical part of grading the WAD lab tests as seamless as possible. It can validate the files uploaded by the students, display the files, help grade with rubrics displayed, attach comments to graded files, run auto-graders in batch, generate grading feedback for students based on the comments and the auto-grader outputs, help email the feedback reports to the students, and much more. If you want to use it, here are the quick start instructions.**

Since the WAD final exam also is online starting AY2023-24-T2, Grader was modified in April-May 2024 to be able to grade the finals as well. How the final-exam mode works will be described as separate section.

I. Quick Start: Lab Tests

Follow these steps to install and use Grader on your PC.

1) Unzip `Grader.zip` to your Document Root (`DR`).
2) Create a folder for the lab test, for example: `DR/LT2`. This folder will be called `$root`. It may be best to create a copy of the provided sample folder `DR/LT0`.
3) If you want to modify the way the Grader works, all the customizations can be done in `$root/config.php`. A sample `config.php` file, set up to grade Lab Test 2, is shown below:

```php
<?php
// Mode: LT (for lab test, default) or FT (final exam)
// If mode == FT, submission files will be extracted from
// an eLearn Quiz report (Attempt Details)
$mode = "LT";

// Exam details
$examShortName = trim(basename($root), " \n\t\t\0./");
$examLongName = "WAD Lab Test 2";

// Your sections
$sectionNames = ["G1", "G6", "G7"];

// Files where the eLearn Grade exports are stored
$csvFileNamePattern = "$root/csv/IS113-$examShortName-{sectionName}.csv";

// Location of subQuestion number and marks in the CSV file header
// Example:
//  LT1 Q1A Points Grade <Numeric MaxPoints:2 Weight:10 Category:Lab Test 1 CategoryWeight:20>
//    $subQuestionName = strtolower(trim($tokens[$locSubQ]));
//    $marks[$subQuestionName] = explode(":", $tokens[$locMarks])[1];
$locSubQ = 1;
$locMarks = 5;

// Rubric file: Ensure that its lines read like:
// "Q1A, 0.50, "Use of <h1></h1> for displaying the title."
// with the first column matching the grade items in the $csvFileNamePattern
$rubricFile = "$root/rubric.csv";

// Folders where the eLearn Assignments (student zip files) are stored/created
// Use {sectionName} and {studentName} as placeholders, if needed
$submissionFolderPattern = "$root/submissions/{sectionName}/";

// Will unzip the zip files to $answerFolderPattern/
$answerFolderPattern = "$root/answers/{sectionName}/{studentName}/";

// Folders where the emailed zip files are stored
$emailFolder = "$root/submissions/emails/";

// Solutions and resources
$solutionFolder = "$root/solutions/";
$resourceFolder = "$root/resources/";

// Questions to grade as an array (so that the instructors can divide the labor)
$gradeQuestions = [1, 2, 3];

// Autogradable question.
// Key = File being autograded
// Value = Array of files to be copied to the folder containing the autograded file
// The first one is expected to be the autograder, the rest helper files
$autoGrade = [
    "q3.php" => ["q3/q3-autograder.php", 'q3/lt2_q3_data/tour_data.csv']
];
/** AutoGrader options:
 *  The AutoGrader (meaning the value in $autoGrade above) should print
 *  out a string that can be exploded using the subQuestion names below.
 *      $marker = "$subQuestionName: ";
 * For each subQuestion, a rubric should be defined in rubric.csv
 *      $rubricName = "$subQuestionName-1";
 * so that the marks can be inserted into the database
 * and manual grading can be performed
 */
$autoGradeOptions = [
    'subQuestionNames' => ['q3']
];

// MySQL credentials: make $dbPass = ""; for WAMP
$dbUser = "root";
$dbPass = "root";
$dbName = "grader_test";
// No need to modify anything below this line
/* ========================================================== */
CFG::init();
HT::init();
```

4) Edit `$root/config.php` to modify:
   - The mode (Line 5). It should be `LT` for lab tests or `FT` for the finals.
   - Your sections in Line 12.
   - Your database details in Line 69. (`dbPass` should be left as an empty string on `WAMP` or as `root` for `MAMP`).
   - Other configuration variables, such as file locations, autograders etc. are described in the comments and/or in this items below.
5) Notice that the exam-specific config file uses the variable `$root`. It is defined in the master `config.php` in the Grader folder, which is, for example, `DR/Grader6/config.php`. An example of this master config file is shown below.

```php
<?php
// Folder where all your files for this lab/final test are.
// Grader expects to find a config.php there.
$root = realpath(__DIR__ . "/../LT2");

// Load the config from the folder being graded
require_once "$root/config.php";
```

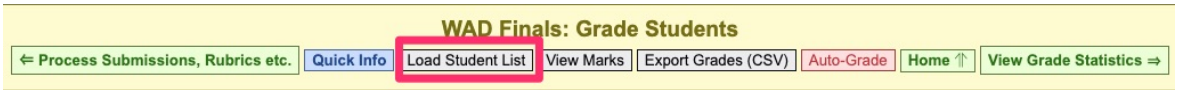

Fig. 1: Starting up the Grading process. Click on the highlighted button to see the student grading window.

6) Export your Grade Book for Lab Test to `CSV` files like `IS113-LT2-G2.csv`. This `$csvFileNamePattern` is specified in `$root/config.php` (Line 15).

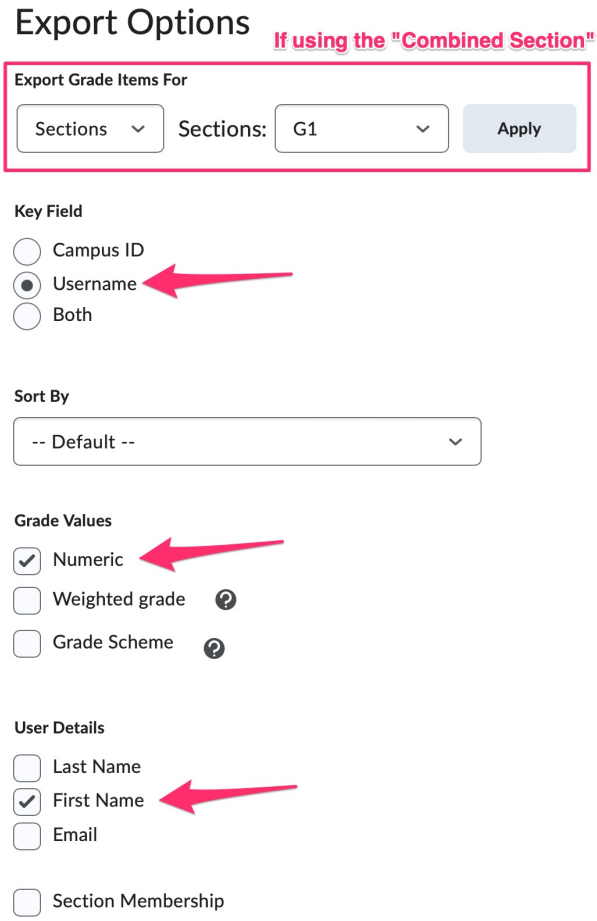

Fig. 2: Exporting the gradebook as a CSV file for the Grader to read in.

☐	Lab Test 1			20	20
☐	LT1 Q1	Numeric	-	6	30
☐	LT1 Q2A	Numeric	-	2	10
☐	LT1 Q2B	Numeric	-	6	30
☐	LT1 Q3A	Numeric	-	4	20
☐	LT1 Q3B	Numeric	-	2	10

Fig. 3: Grade components of LT1 (Lab Test 1).

7) Use the export options shown in Fig. 2 and include the grade items shown in Fig. 3.
8) Store these `CSV` files in `$root/csv` or as specified in `$root/config.php` (Line 15).
9) Download the files the students submitted as zip files, and store them in `$root/submissions/G1` etc. using the `$submissionFolderPattern` in `$root/config.php` (Line 32).
10) If there are emailed zip files, copy them over to `$emailFolder` as specified in `$root/config.php` (Line 38), with the emailed zip files containing the student id.
11) Open `localhost/Grader` in your browser and follow the online documentation.
12) One benefit of using the Grader is that you can verify the zip files downloaded from eLearn in no time by running it. It will make a neat summary of the errors encountered.

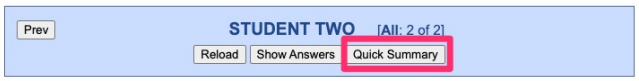

Fig. 4: The **Quick Summary** button in the student grading window.

Personalized Grading Feedback

One new thing in this version of Grader (v8) is the ability to generate and email personalized grading feedback reports to students. To do this,

1) Click on the **Grade Students** button in the main manu.
2) Click on the **Load Student List** button: Fig. 1.
3) When grading is finished, click on the Quick Summary button: Fig. 4.
4) You can also click on the **Summary** button from the list of students: Fig. 6.
5) You will see the grading report (Fig. 7) in a separate window or tab.
6) Click on the **Email `<examname>` Feedback** title (which it doesn't look like a button) to copy the content and open an email (Outlook) message window.
7) Paste the content (Control or Command V) and hover over the student email ID to validate it, followed by sending it.

Fig. 5: The **Summary** button in the student list.

Complications

If youhave two separate sets of tests, youhave some issues on how youcan use the Grader. First of all, you will have to

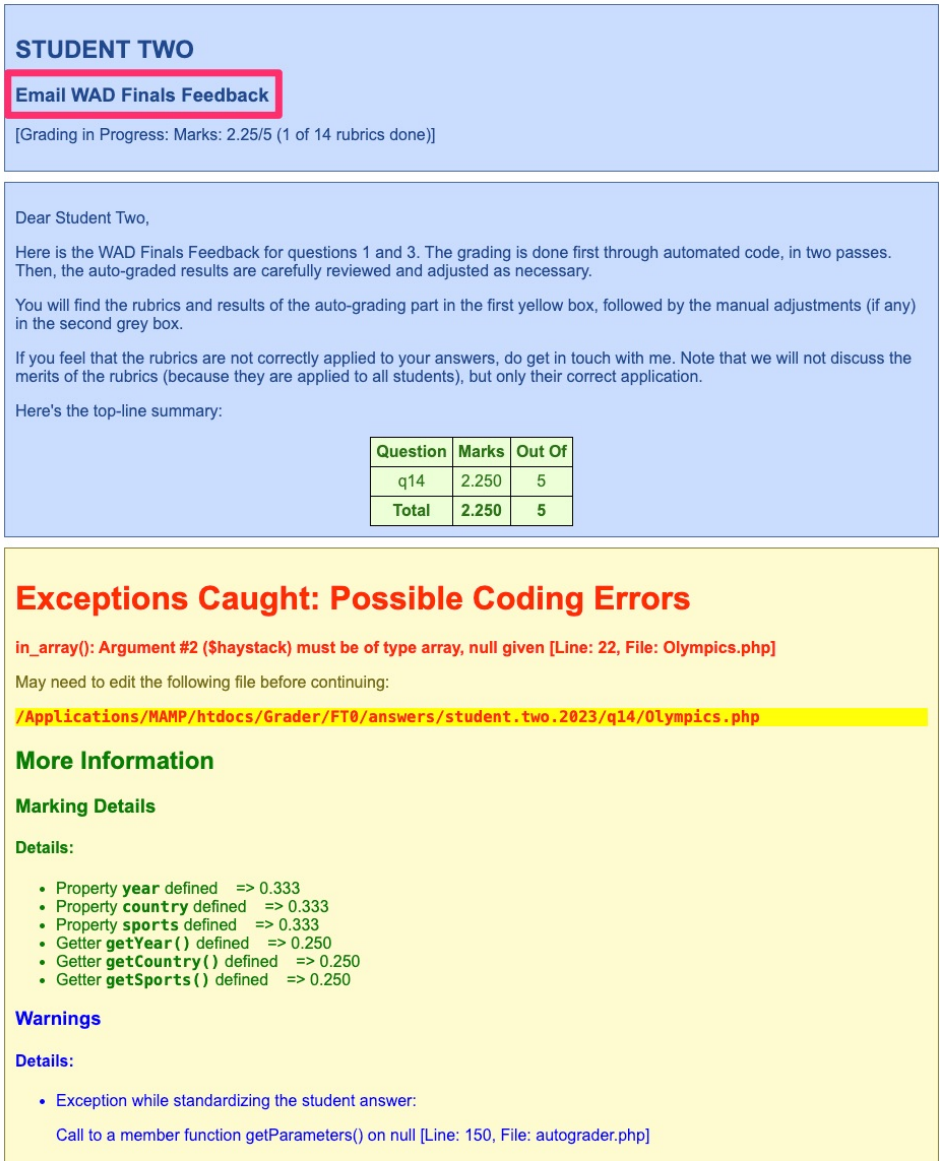

Fig. 6: The personalized grading report generated by the Grader. Click on the highlighted title to copy the content to the clipboard and open an email window.

create two exam folders (like `$root = "DR/LT2a"` and `$root = "DR/LT2b"`, for instance). In each of the exam folders, you will have a `$root/config.php`. In order verify the student uploads, you may want to edit your gradebooks `CSV` files (from Quick Start step (6)) to remove the ones that are taking the second version of the test.

II. Quick Start: Final Exam

Since the final exam is adminstered as an eLearn quiz, the answers can be downloaded as one huge file. The Grader can read this file, locate the answer of interest, create the submission files as though they were submitted by the students and reuse the rest of the workflow to help you grade it.

The work flow is fairly similar to that of lab tests. An example final-exam folder is `DR/FT0`. In order to use it, youdefine `$root` in the master `config.php` in the Grader folder as shown below:

```php
<?php
// Folder where all your files for this lab/final test are.
// Grader expects to find a config.php there.
$root = realpath(__DIR__ . "/../FT0");

// Load the config from the folder being graded
require_once "$root/config.php";
```

Within the final-exam folder (`DR/FT0`), youwill have a `$root/config.php`, which reads:

```php
<?php
// Mode: LT (for lab test, default) or FT (final exam)
// If mode == FT, submission files will be extracted from
// an eLearn Quiz report (Attempt Details)
$mode = "FT";

```

```php
// Exam details
$examShortName = trim(basename($root), " \n\t\t\0./");
$examLongName = "WAD Finals";

// eLearn Quiz report (Attempt Details) as CSV
$csvFileNamePattern = "$root/csv/IS113-$examShortName.csv";

// Rubric file: Ensure that its lines read like: (eg: see rubrics.csv)
// q14, 4, Auto-graded, q14/Olymbpics.php
// q14, -0.5, Syntax error, q14/Olymbpics.php
$rubricFile = "$root/rubric.csv";

// To reuse as much of the Grader as possible, in the "finals" mode,
// Grader will create zip files with the right names

// Folders where the eLearn Assignments (student zip files) are
      stored/created
// Use {sectionName} and {studentName} as placeholders, if needed
$submissionFolderPattern = "$root/submissions/";

// Will unzip the zip files to $answerFolderPattern/
$answerFolderPattern = "$root/answers/{studentName}/";

// Solutions and resources
$solutionFolder = "$root/solutions/";
$resourceFolder = "$root/resources/";

// LOCAL: Question number to be graded. Will populate $gradeQuestions with
      it.
$qNum = 14;
// Questions to grade as an array (so that the instructors can divide the
      labor)
$gradeQuestions = [$qNum]; // same as $qNum, but an array

// Auto-gradable questions and options.
// Key = File being auto-graded
// Value Array:
//   "grader"  => The Auto-Grader. It should print out a string that
//                can be exploded using the subQuestionName.
//                   $marker = "$subQuestionName: ";
//   "helpers" => The files to be copied to the folder containing
//                the auto-graded file
//   "subQuestionName": Need I say more?
// For each subQuestion, a rubric should also be defined in rubric.csv
//      $rubricName = "$subQuestionName-1";
// so that the marks can be inserted into the database
// and manual re-grading can be performed
$autoGradables = [
    "Olympics.php" => [
        "grader" => "q14/autograder.php",
        "subQuestionName" => "q$qNum"
    ]
];

// MySQL credentials: make $dbPass = ""; for WAMP
$dbUser = "root";
$dbPass = "root";
$dbName = "grader_test";
// No need to modify anything below this line
/* ========================================================== */
CFG::init();
HT::init();
```

1) Notice how the `$mode` is set in Line 5 to be `"FT"`.
2) You don't need the gradebook (Item (6) in the quick start for lab tests above). The corresponding variables (`$locSubQ` and `$locMarks`, which refer to the gradebook) do not need to be defined.
3) Instead, you will need to export the eLearn quiz and point to it in `$csvFileNamePattern` set to `"$root/csv/IS113-$examShortName.csv";` in Line 12. Use a report (details below) to generate it.
4) The most time-consuming part of the setup is to create an autograder. Use the autograder in `DR/FT0/solutions/autograder.php` as a sample to generate a good autograder.
5) Open `localhost/Grader` in your browser and follow the online documentation.
6) It is best to run the autograder to autograde all students (by clicking on the Auto-Grade button). Once it runs well enough, you can grade each student individually to finetune.

How to Generate the CSV File

To generate the CSV file from the eLearn quiz (in Item (3) above), follow the steps below:

1) Set up a report for the eLearn quiz as shown in Fig. 7.
2) Select "Attempt Details" as the report type.
3) Ensure that Instructors can access the report, and leave all other options as default.
4) Run it and export it as CSV. It is going to be a big file.
5) Move it to `$csvFileNamePattern` with the name matching the pattern.

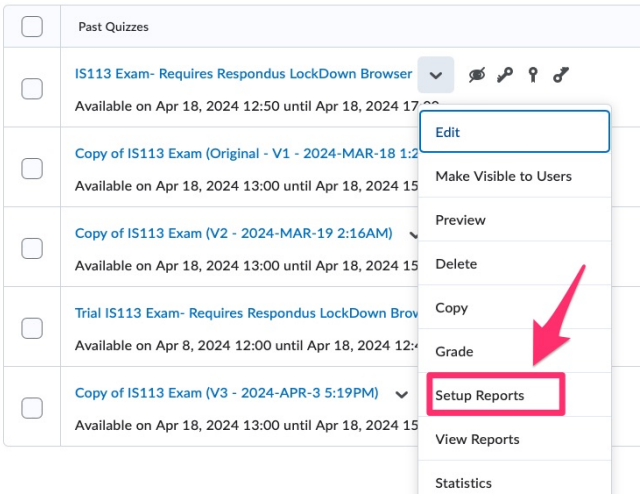

Fig. 7: Exporting the eLearn quiz (the final exam) as a CSV file: Setting up the report.

III. More Info

Much more detailed user manual and information about the Grader (but only on how it handles Lab Tests) can be found in `Grader.pdf`, a paper presented at EDUCON 2024.