Moodle Automated Testing

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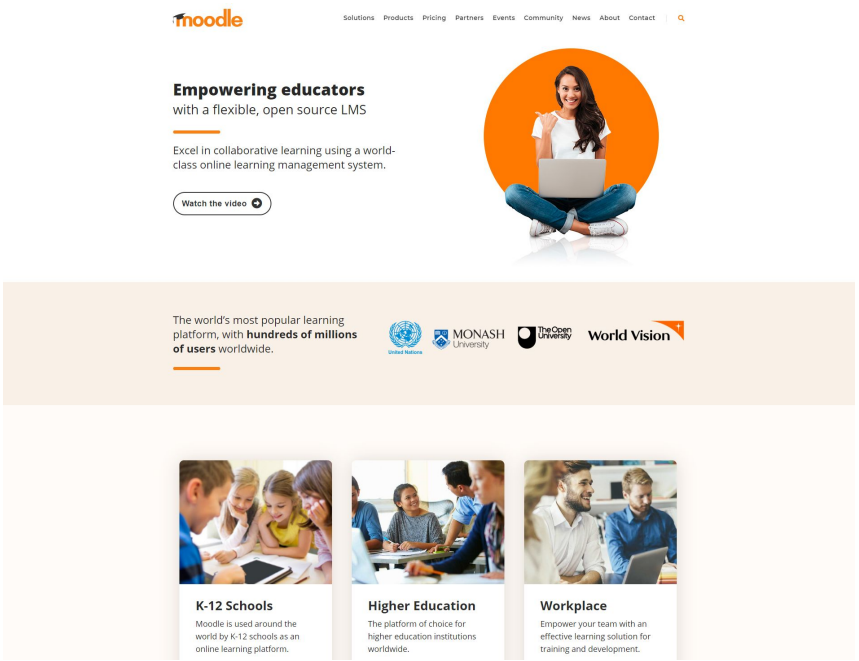
What is Moodle?

- Moodle is an open source learning management system (LMS)
- Moodle is used for e-learning
- Moodle is almost entirely written in PHP
- If you've used oaks then you know how it works



Project Goal

- The testing framework will be invoked by a single script “./runAllTests.sh”
- The project compares the results from the output of the method to the oracle
- Results from the tests will then be showcased in a web browser

Test Case Format

This is an example of a test case within our project

```
================================================================
# Testing number
# Requirement being tested
# Component being tested
# Method being tested
# Input for test cases
# Expected output (oracle)

================================================================

001
The tokenize method takes in a string and returns an array with the words indexed
projects/moodle/grade/grading/lib.php
tokenize
@@@
Array ( )
```

The Formating

The test case will follow a simple but very specific format. If the format is broken then the tests will not run.

Test Number

Requirement

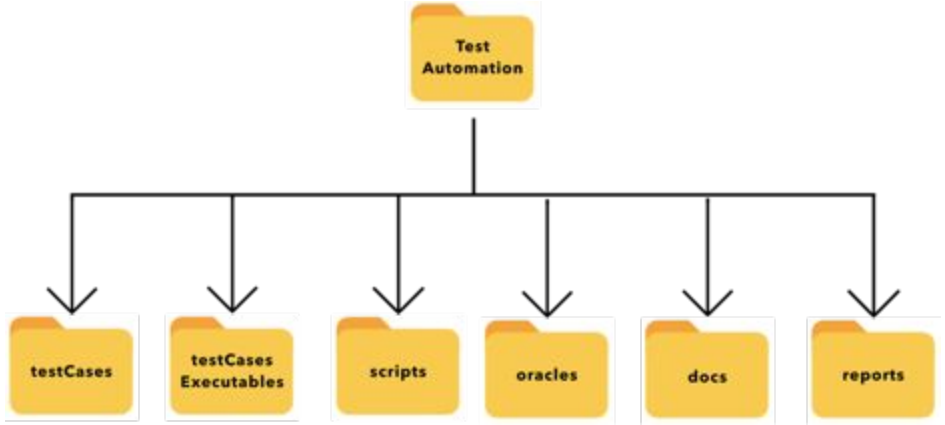
Component

Method

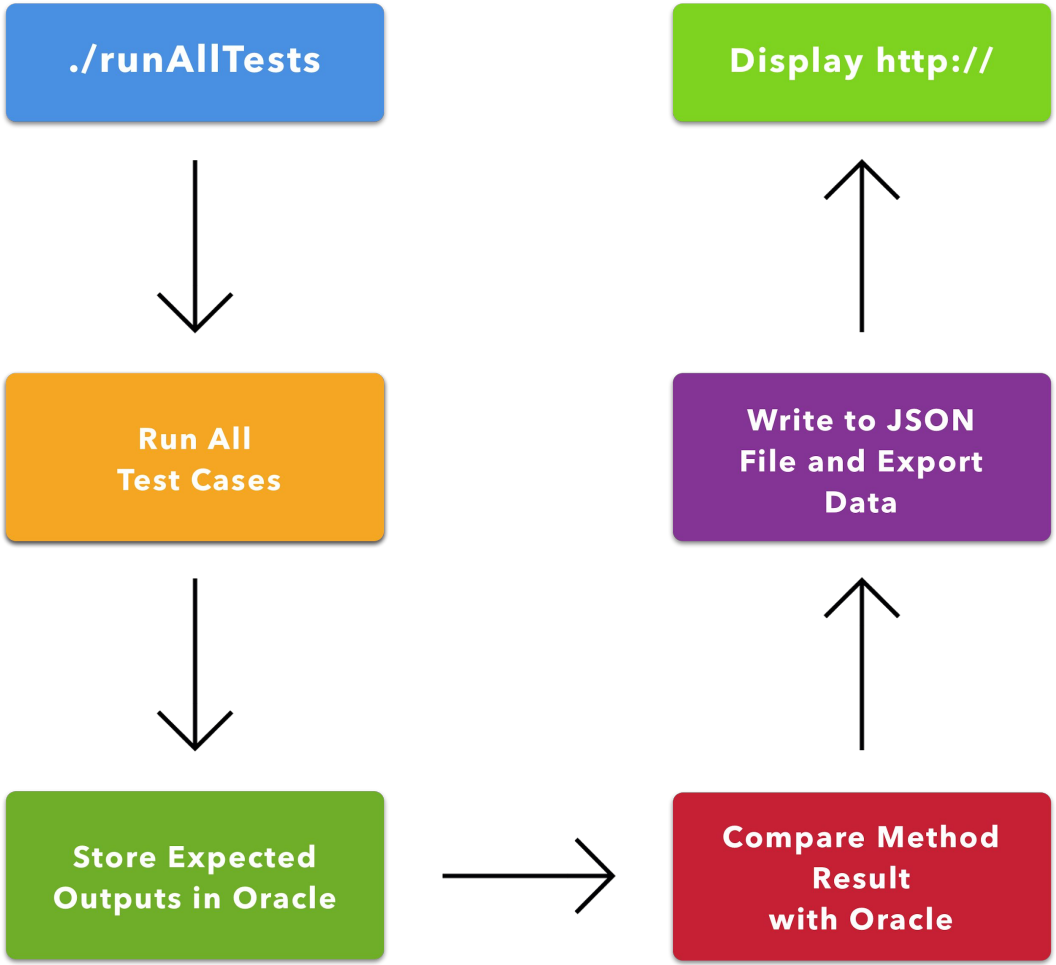
Input

Expected Output/Oracle

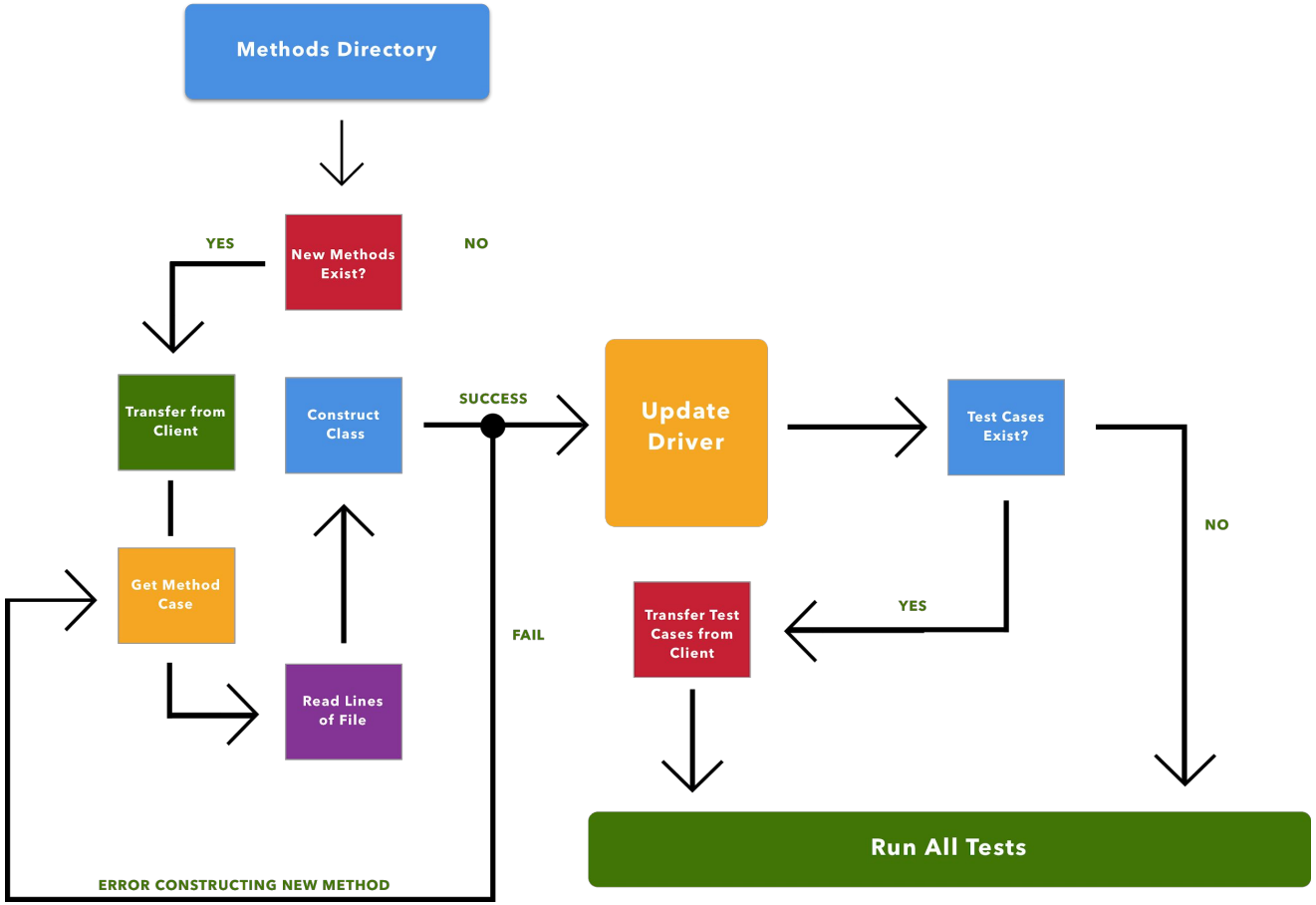
Automated Testing Directories

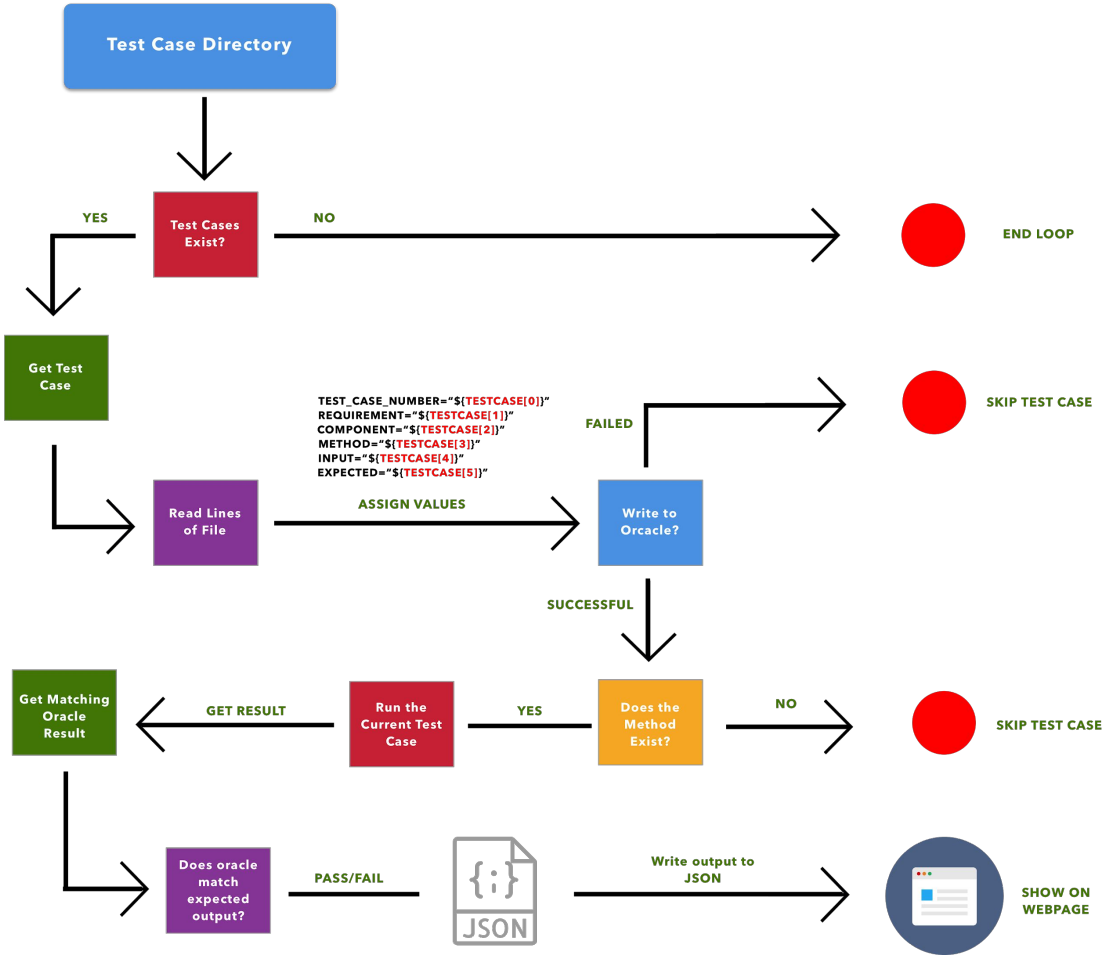


High Level Overview of Testing

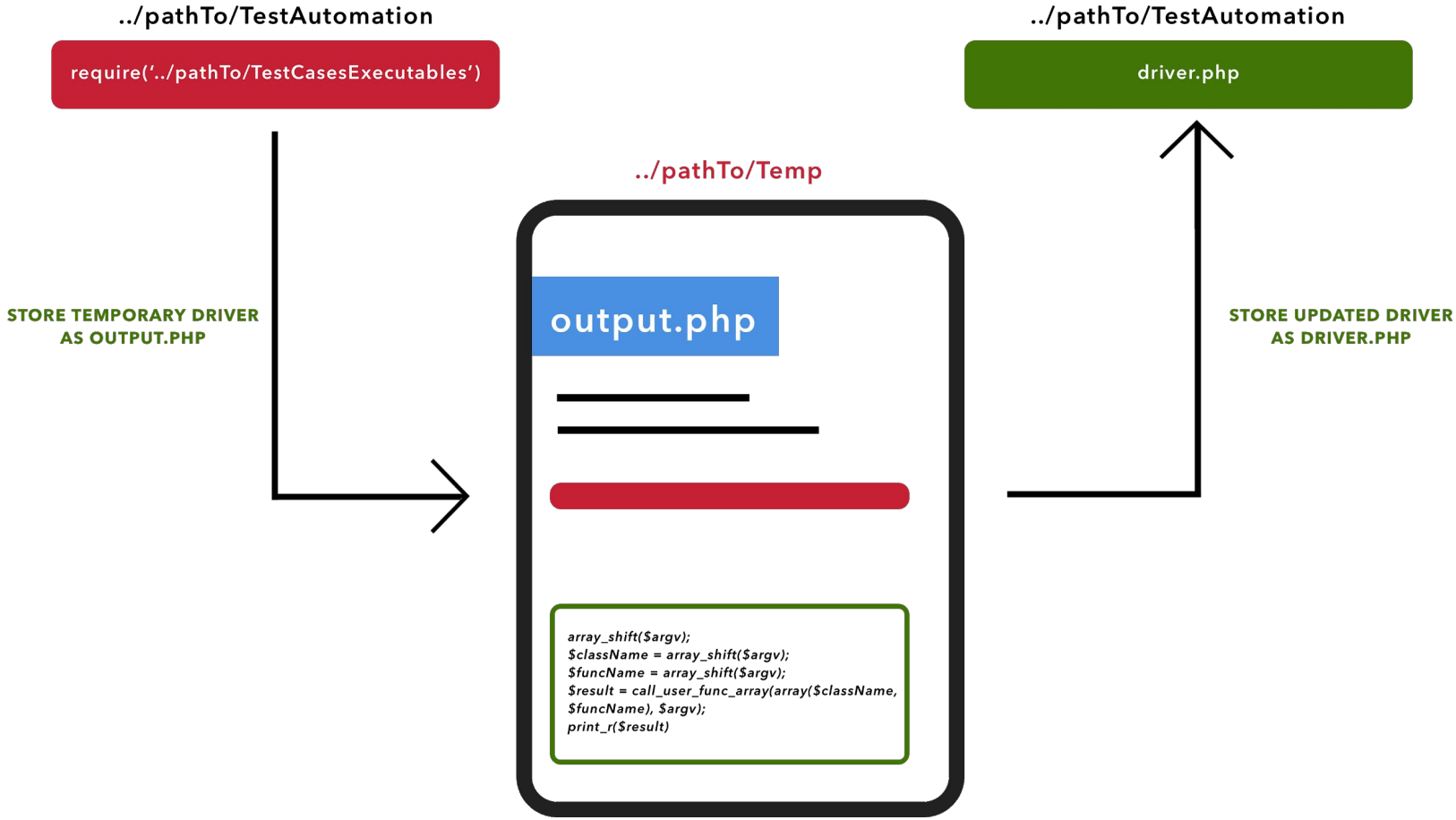

./runAllTests
Run All
Test Cases
Store Expected
Outputs in Oracle
Compare Method
Result
with Oracle
Write to JSON
File and Export
Data
Display http://

In Depth Overview of Testing


Methods Directory
New Methods Exist?
YES
NO
Transfer from Client
Construct Class
SUCCESS
Update Driver
Test Cases Exist?
NO
Get Method Case
Read Lines of File
FAIL
Transfer Test Cases from Client
YES
Run All Tests
ERROR CONSTRUCTING NEW METHOD


Test Case Directory
Test Cases Exist?
YES
NO
END LOOP
Get Test Case
TEST_CASE_NUMBER="${TESTCASE[0]}"
REQUIREMENT="${TESTCASE[1]}"
COMPONENT="${TESTCASE[2]}"
METHOD="${TESTCASE[3]}"
INPUT="${TESTCASE[4]}"
EXPECTED="${TESTCASE[5]}"
FAILED
SKIP TEST CASE
Read Lines of File
ASSIGN VALUES
Write to Orcacle?
SUCCESSFUL
Get Matching Oracle Result
GET RESULT
Run the Current Test Case
YES
Does the Method Exist?
NO
SKIP TEST CASE
Does oracle match expected output?
PASS/FAIL
JSON
Write output to JSON
SHOW ON WEBPAGE

Dynamic Driver Overview


../pathTo/TestAutomation
require('../pathTo/TestCasesExecutables')
../pathTo/TestAutomation
driver.php
../pathTo/Temp
STORE TEMPORARY DRIVER AS OUTPUT.PHP
output.php
STORE UPDATED DRIVER AS DRIVER.PHP
array_shift($argv);
$className = array_shift($argv);
$funcName = array_shift($argv);
$result = call_user_func_array(array($className, $funcName), $argv);
print_r($result)

The Client Side

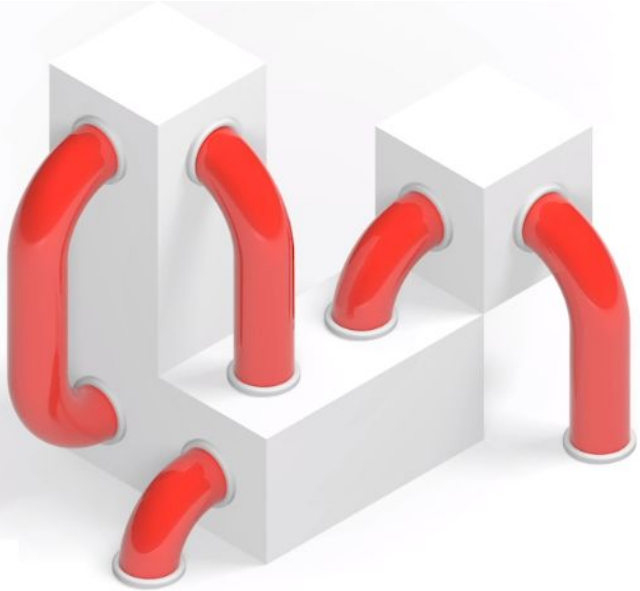
Test
Automation
{;}
JSON
Test
Automation
Client

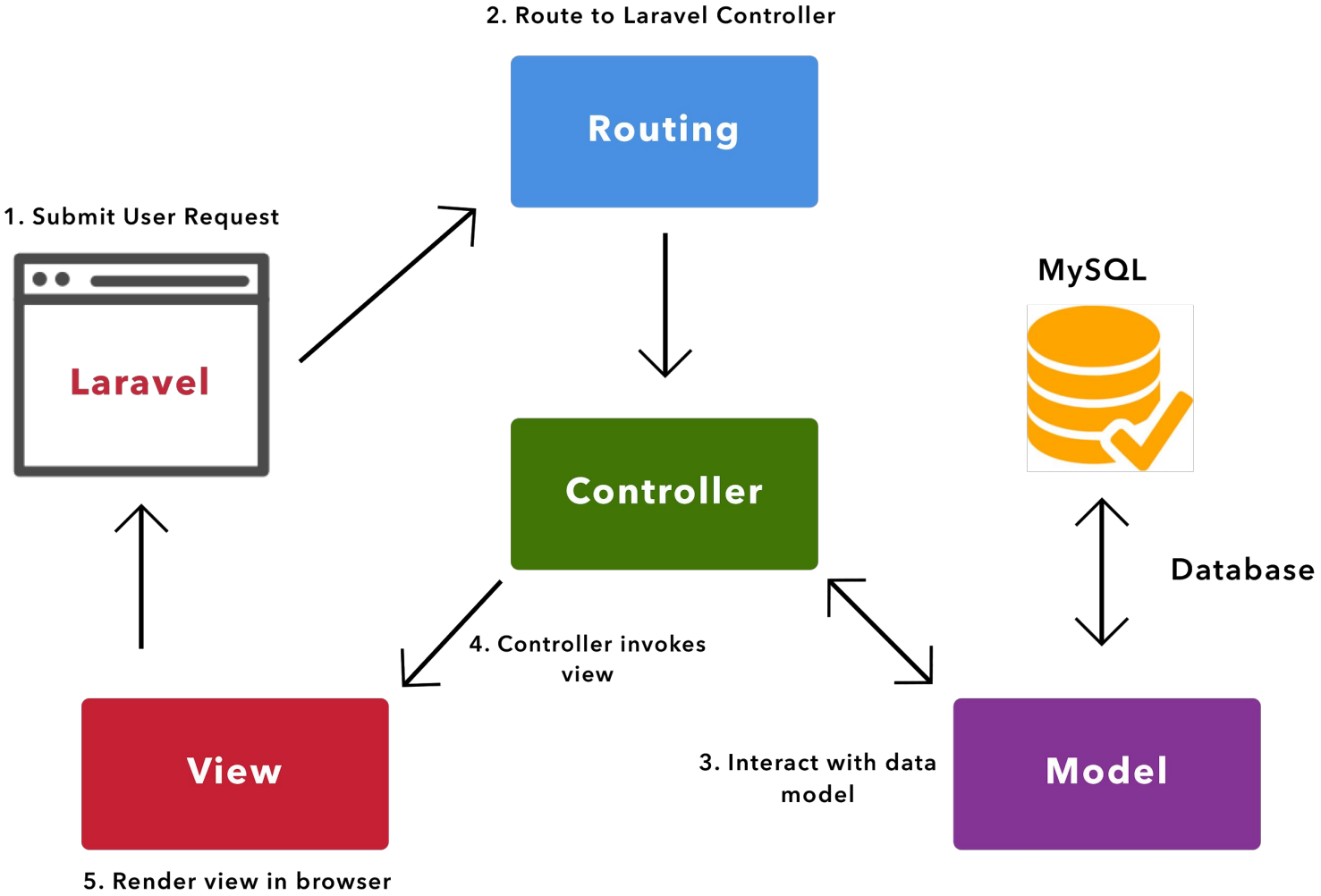
The PHP Framework for Web Artisans

Laravel is a web application framework with expressive, elegant syntax. We've already laid the foundation — freeing you to create without sweating the small things.

Documentation

Watch Laracasts




2. Route to Laravel Controller
Routing
1. Submit User Request
Laravel
MySQL
Controller
Database
4. Controller invokes view
View
3. Interact with data model
Model
5. Render view in browser

Demonstration of the Framework

Conclusion

Working with Moodle initially proved frustrating due to its size and complexity. Installing the software and it's necessary dependencies took longer than anticipated due to unforeseen errors. Once installed and properly set up, we needed to find testable methods. Many of the methods rely on objects instantiated during normal use such as grade, student, class, etc. Luckily the method we found, tokenize, does not depend on any built objects found within the running Moodle project. Finding this method took up a lot of the time in our project, due to the fact that almost every method or function depends on other objects already created inside Moodle. Once this method was found, it was easy for us to start creating our bash script and create the necessary drivers to finish the automated test.