Coding Challenge System

System Test Plan

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# Introduction

## Purpose

The purpose of this document is to describe the system test plan for the Coding Challenge System (CCS) and will specifically cover the testing of functional and non-functional requirements.

## Scope

The scope of this testing document will be to test the CCS project. It includes functional testing, usability testing, security testing, business cycle testing, scale testing and performance testing. More details on the projects can be found in the runbook mentioned in section 1.4.

## Target Audience

This document is intended for use as a reference by the development team, maintenance team to define which tests are to be run and executed from this.

The End User and Operational owner may optionally use this as a reference to understand what black-box testing has been performed as part of entrance criteria to downstream User Acceptance Testing (UAT) in environments where UAT is performed.

## Related documents

These documents contain information related to the information in this document.

| Document Short Name Reference | Document Title | Version (Optional) |
| --- | --- | --- |
| Runbook | [CCS\_Runbook](https://csazure.cegep-heritage.qc.ca:8080/F2021-DevProject/_git/Code%20Challenge?path=%2FDocumentation%2FReports) | 0.2.1 |

Table 1‑1 Related Documents

## Glossary

| Term/Acronym | Description |
| --- | --- |
| CCS | Coding Challenge System |

Table 1‑2 Glossary

# Setup and Test environment

The test environment that the CCS system is tested under is using the CSTEST server and the application will be accessible with a deployed version. You will need to be connected to the Heritage College network to use the deployed version of CCS.

# Tests

### Functional Tests

The purpose of functional testing is to validate our system against the functional requirements and specification. When writing functional tests, it’s important to cover the full functionality of the system to find out what functionalities work and not.

|  |  |  |
| --- | --- | --- |
| **Test ID** | **Purpose** | **Expected Result** |
| FN01 | Verify that student can continue the challenge who did not finish. | In the “Recent Challenges” tab of student home page, click “Continue” or “Try Again” button, it will access to this challenge page. |
| FN02 | Verify that creating a challenge that is set to inactive, a student cannot see it. | The student cannot see the challenge created. |
| FN03 | Verify that creating a challenge that is set to active, a student can see it. | The student can see the challenge created. |
| FN04 | Verify that if a teacher updates a challenge, the students can see the updated challenge. | The student should see the updated challenge. |
| FN05 | Verify that if a teacher deletes a challenge, the students cannot see the deleted challenge. | The student should no longer see the challenge deleted. |
| FN06 | Verify that the test cases under the ‘Function Data’ when creating a challenge shows up in the table under Testing Suite. | The test cases displayed in the table under Testing Suite. |
| FN07 | On the create/edit challenge page: verify when clicking on the ‘+’ in the parameter table, it updates the test case parameters by appending a new input field to the test case parameters list. | The user seeing the parameters and test case parameters correlating. |
| FN08 | On the create/edit challenge page: verify when clicking on the ‘x’ beside a parameter, it updates the test case parameters by appending a new input field to the test case parameters list. | The user seeing the parameters and test case parameters correlating. |
| FN09 | On the create/edit challenge page: verify when clicking on the ‘+’ in the test case table, it appends a new test case with the correct number of test case parameters. | The user seeing the parameters and test case parameters correlating. |
| FN10 | On the create/edit challenge page: verify when clicking on the ‘x’ beside a test case, it removes that test case and updates the test case numbers | The test case being removed and the test cases numbers are correctly incremented (1, 2, 3 …) |
| FN11 | Verify the Student’s ability to Search/Filter through Recent Challenges. | In Student home page Recent Challenges, the Student should be able to search/filter through the challenges they attempted. |
| FN12 | On the create/edit challenge page: verify when selecting a language, the data types are for the correct language. | The select box options for ‘Return Type’ and ‘Data Type’ are populated with the correct data types. |
| FN13 | On the teacher home page: verify when clicking on the difficulty title, the order toggles. | The challenges are ordered on the correct order by difficulty level. |
| FN14 | On the teacher home page: verify when searching for a challenge, there are results appearing on the page with the difficulty level, title, language, and the active state. | All the challenges matching the search input are displayed on the page with its difficulty level, title, language, and the active state. |
| FN15 | On the create/edit challenge page: verify when a running the code, it shows the output | The output of the run code displays in the output window |
| FN16 | On the create/edit challenge page: verify when running the code, the test case testing results shows if the test cases passes or not | The test case testing results table populating with what test pass/fail. |
| FN17 | On the student start challenge page: verify that when the student attempted a challenge the output is displayed and the test case results | The code output shows in the output window and the test cases results are displayed. |

**Table 3‑1 Functional Tests**

### Usability Tests

The purpose of usability testing is to see how easy it is to use a system. When writing usability tests, you are verifying that the ease of doing something in our system is correctly designed.

|  |  |  |
| --- | --- | --- |
| **Test ID** | **Purpose** | **Expected Result** |
| US01 | Verify when displaying the challenges on the teacher and student home pages it follows the same design. | Student and Teacher home page have similar designs when displaying the challenges. |
| US02 | Verify the teacher/student’s pages has a good navigation pane that is simple. | Teacher/Student pages includes a navigation pane and can easily be used. |
| US03 | Make sure the challenges have logos in Teacher and Student Home Pages that are descriptive. | All the challenges in Teacher and Student Home Pages have logos. |
| US04 | What fields are required in Create Challenge. | It should be clear what the users has to input to create a challenge. |

**Table 3‑2 Usability Tests**

### Business Cycle Tests

The purpose of business cycle tests is to evaluate the correlation between different user stories and how they impact each other. Essentially, you are going through a flow of functionalities and testing them.

|  |  |  |
| --- | --- | --- |
| **Test ID** | **Purpose** | **Expected Result** |
| BC01 | Verify that you can create a challenge and add a test case to the challenge and save it, and then remove the test case from the challenge and save it. | A challenge is created with a test case added, and the test case is removed while editing the challenge and saved. |
| BC02 | Verify that adding a lot of test cases works when adding no extra parameters works as intended. | When adding test cases, not adding any extra parameters, the test cases only have the one default parameter. |
| BC03 | Verify that adding a lot of parameters without adding test cases works as intended. | When adding parameters, not adding any test cases only adds input boxes to the existing test cases. |
| BC04 | Create a challenge with the title ‘calculation’, a language, difficulty level, description, example, function name, and return type | Challenge created and displayed on teacher and student home page with the title ‘calculation’, difficulty level, language, and active state |
| Challenge is available to student | Challenge ‘calculation ’added to the student home page |
| Edit that challenge ‘calculation to ‘advanced calculation’ | Challenge updated to the title ‘advanced calculation’ for the teacher and student |
| Updated challenge ‘advanced calculation’ is seen by teacher | The challenge ‘advanced calculation’ on the teacher home page is updated |
| Delete that challenge ‘advanced calculation’ | Challenge ‘advanced calculation’ is deleted |
| No longer displayed on the teacher home page | The challenge ‘advanced calculation’ on the teacher home page is removed |
| No longer displayed on the student home page | The challenge ‘advanced calculation’ on the student home page is removed |
| BC05 | Student starts the challenge ‘advanced calculation’ | Start challenge page is seen with the challenge title, description, example, challenge language the student wants to code in, code editor, and output window |
| student chooses to code in python | code editor is set to support python |
| Student codes the answer to the challenge and hits the attempt button | The output window appears with the result and the test cases results |
| Student sees that all the test cases pass | Bellow the output window, the test cases result all pass |
| Student directs to their home page | Challenge ‘advanced calculation’ is added to the student recent challenges with the difficulty level, name ‘advanced calculation’, status to complete, language with the python language completed icon (a check mark beside the icon), and action is set to ‘try again’ |
| BC06 | Teacher updates challenge ‘advanced calculation’ | Directed to edit challenge page |
| Teachers adds 1 parameter | 1 parameter is added to the parameter list with the data type input, name input, and default value input |
| For that parameter the teacher set data type to int, name as num, and default value as 0 | Parameter information entered is on the page |
| Teacher adds 1 test case | 1 test case is added to the test case parameter list ‘Test Case 1’, expected result input, and test case parameters inputs. |
| For that test case, the teacher enters ‘One’ for expected result and ‘1’ for the first test case parameter | Test Case information entered is on the page |
| Teacher updates the challenge | Directed to the teacher home page with a message “Successfully updated ' advanced calculation'” |
| BC07 | Teacher updates challenge ‘advanced calculation’ | Directed to edit challenge page |
| Teacher deletes the challenge by clicking on the Delete button | Modal is displayed with the number of students attempting the challenge, the last time the challenge was attempted, and a warning message if they are sure they want to delete the challenge |
| Teacher click on yes | Directed to the home with a message “Successfully deleted 'advanced calculation'” challenge |
| Student logs in to their account | Directed to student home page with challenge ‘advanced calculation’ not being there |

**Table 3‑5 Business Cycle Tests**

# Non-Functional Tests

### Security Tests

The purpose of security tests is to ensure certain pages cannot be access by unauthorized parties.

|  |  |  |
| --- | --- | --- |
| **Test ID** | **Purpose** | **Expected Result** |
| SE01 | Verify that the Teacher cannot view the student home page “/Student” route | Directs back to teacher home page |
| SE02 | Verify that the Teacher cannot view the start challenge page “/Challenge/Index/1” route | Directs back to teacher home page |
| SE03 | Verify that the Student cannot view the teacher home page “/Teacher” route | Directs back to student home page |
| SE04 | Verify that the Student cannot view the create challenge page “/Challenge/Create” route | Directs back to student home page |
| SE05 | Verify that the Student cannot view the edit challenge page “/Challenge/Edit/#” route | Directs back to student home page |
| SE06 | Verify that the Student cannot access the filter challenge title route “Challenge/ToggleTeacherChallengeOrder?teacherId=2203&ascending=False” route | Directs back to student home page |
| SE07 | Verify is no one is logged in, they cannot access student home page, “/Student” route | Directs back to the login page |
| SE08 | Verify is no one is logged in, they cannot access the start challenge page, “/Challenge/Index/1” route | Directs back to the login page |
| SE09 | Verify is no one is logged in, they cannot access the teacher home page “/Teacher” route | Directs back to the login page |
| SE10 | Verify is no one is logged in, they cannot access the create challenge page “/Challenge/Create” route | Directs back to the login page |
| SE11 | Verify is no one is logged in, they cannot access the edit challenge page “/Challenge/Edit/#” route | Directs back to the login page |
| SE12 | Verify is no one is logged in, they cannot access the filter challenge title route: “Challenge/ToggleTeacherChallengeOrder?teacherId=2203&ascending=False”. | Directs back to the login page |
| SE13 | Verify that it cannot use XSS to log in CCS web application. | Directs to Login page. Use https://cstest.cegep-heritage.qc.ca/Projects/CCS/Login? Username=1111111&Password= cs@123test! To test log in. |
| SE14 | A Teacher can not access other Teacher’s challenges | They are denied access |

**Table 4‑2 Security Tests**

### Compatibility Tests

The purpose of compatibility tests is to make sure an application is properly working across different browsers. The CCS application has been tested using the three main browsers (chrome, Microsoft edge, Firefox)

|  |  |  |
| --- | --- | --- |
| **Test ID** | **Purpose** | **Expected Result** |
| CO01 | Verify that the student home page is consistent in edge, Firefox, and chrome. | Pages are consistent. |
| CO02 | Test the web app on different devices (PC, laptop, mobile) and operating systems (Windows, MacOS, Linux, Android, iOS). | Test web application should not have any issues on other devices. |
| CO03 | Verify that the teacher home page is consistent in edge, Firefox, and chrome. | Pages are consistent. |
| CO04 | Verify that the student start challenge page home page is consistent in edge, Firefox, and chrome | Pages are consistent |
| CO05 | Verify that the teacher create challenge page is consistent in edge, Firefox, and chrome | Pages are consistent |
| CO06 | Verify that the teacher edit challenge page is consistent in edge, Firefox, and chrome | Pages are consistent |

**Table 3‑3 Compatibility Tests**

# Conclusion

### Test Results and Analysis

In conclusion, our group feels confident that we followed many of the best practices for design and functionality, but we lacked on the overall security of the application, as some pages are available that shouldn’t be, like the Create/Edit Challenge pages. With an overall pass rate of 56% and 48 total tests.

Approvals

This document has been read and approved by the following people, responsible for its implementation. Approval is indicated by an email showing approval. Those approving below indicate that the contents of this document are correct and complete and agree to their implementation:

| Title | Name | Approval |
| --- | --- | --- |
| Dev team member | Nahom Haile | Approved |
| Dev team member | Noah Loomis | Approved |
| Dev team member | Abraham Getachew | Approved |
| Dev team member | Arsen Hakobyan | Approved |
| Dev team member | Alexander Dionne | Approved |
| Dev team member | Emmanuelle Fontaine | Approved |
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History

| Version | Status | Date | Author | Reason for changes |
| --- | --- | --- | --- | --- |
| 0.0.1 | Complete | April 20, 2022 | Nahom Haile | Ran the group test cases against the deployed cstest version of CCS |
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