Sprint 7 Report

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Summary of Work Done

During the 7th sprint the team ensured that the EduSync application is functional, usable and aligned with the initial requirements. The application has undergone functional and non-functional testing and the README.md was updated to include sections about Code Quality and Testing. Some bugs and issues were identified, and critical ones were fixed. Overall, the user acceptance testing and heuristic evaluation confirmed that the frontend and backend integration is smooth, and the application meets the intended requirements.

Functional Task Details

During the 7th sprint the team further investigated and improved the codebase to lower the maintainability issues found in the last sprint even if the project already achieved the triple-A status from SonarQube. Unit testing was continuously conducted during the refactoring phase both locally and using the Jenkins pipelines. The coverage for the backend code being at 83% makes the system reliable and secure. While the JavaFX components were not unit-tested, manual and non-functional tests verified smooth frontend-backend integration.
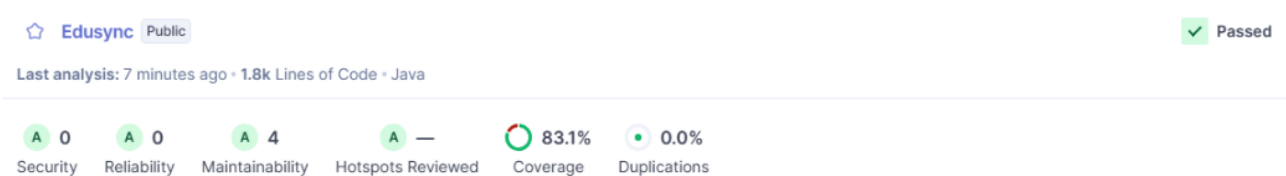

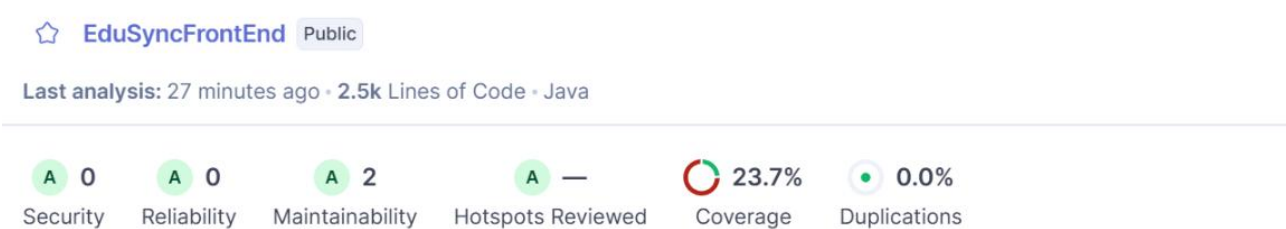Image 1. SonarQube results for backend
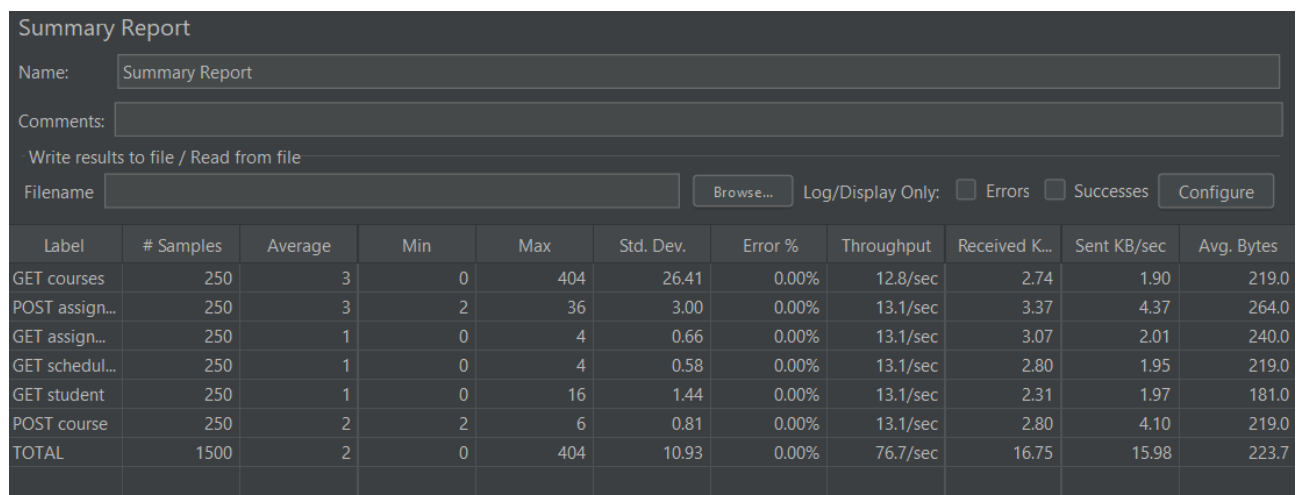

Image 2. SonarQube results for frontend

The project's Product Backlog was reviewed, and all user stories were confirmed to accurately describe the intended features and meet the project's requirements. Based on this review, no modifications were necessary.

During testing a NullPointerException occurred for users with no assignments or courses, and the issue was successfully fixed. Another NullPointerException arose after deleting courses with assignments as the course deletion did not include assignment deletion in the backend resulting in orphaned assignments causing the frontend to crash when trying to load data for the deleted courses. This issue was also successfully resolved.

Non-functional Task Details

Apache Jmeter was used as the performance testing tool to evaluate system behavior under stress. All team members conducted their own Heuristic evaluation, which was then combined to form one report. User acceptance testing was conducted following the plan which was made in sprint 6.

The project was developed using db4free, which is an external database service intended for small-scale development. Because db4free imposes strict rate limits and is not designed for heavy performance testing, a lighter JMeter configuration was used for it. The test plan executed 10 users, a 20-second ramp-up and 3 loops. The plan included a mix of GET and POST requests that would mimic the normal use of the application. To compare results under unrestricted conditions, the same test plan was conducted using a local database with 50 users, a 20-second ramp-up and 5 loops with the same endpoints resulting in low response times and high throughput indicating good performance.

Summary Report

Name: Summary Report

Comments:

Write results to file / Read from file

Filename: [Browse...] Log/Display Only: ☐ Errors ☐ Successes [Configure]

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received K...	Sent KB/sec	Avg. Bytes
GET courses	250	3	0	404	26.41	0.00%	12.8/sec	2.74	1.90	219.0
POST assign...	250	3	2	36	3.00	0.00%	13.1/sec	3.37	4.37	264.0
GET assign...	250	1	0	4	0.66	0.00%	13.1/sec	3.07	2.01	240.0
GET schedul...	250	1	0	4	0.58	0.00%	13.1/sec	2.80	1.95	219.0
GET student	250	1	0	16	1.44	0.00%	13.1/sec	2.31	1.97	181.0
POST course	250	2	2	6	0.81	0.00%	13.1/sec	2.80	4.10	219.0
TOTAL	1500	2	0	404	10.93	0.00%	76.7/sec	16.75	15.98	223.7

Image 3. Summary report of JMeter test with local database

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received K...	Sent KB/sec	Avg. Bytes
GET courses	30	108	45	777	147.02	0.00%	1.6/sec	0.32	0.23	209.0
POST assign...	30	215	108	334	67.27	0.00%	1.6/sec	0.42	0.54	265.0
GET assign...	30	56	45	110	13.97	0.00%	1.6/sec	0.40	0.25	257.0
GET schedul...	30	59	45	260	38.53	0.00%	1.6/sec	0.33	0.24	209.0
GET student	30	54	45	154	20.38	0.00%	1.6/sec	0.27	0.24	169.0
POST course	30	182	100	331	46.29	0.00%	1.6/sec	0.34	0.50	220.0
TOTAL	180	113	45	777	95.91	0.00%	9.1/sec	1.97	1.90	221.5

Image 4. Summary report of JMeter test with db4free service

Each team member conducted their own Heuristic evaluation, and these were finally put together to form a comprehensive Heuristic Report. The application was found to be intuitive and easy to use with simple language. Suggested improvements that would be most beneficial to implement were about form validation and error messages.

The user acceptance test was planned during the 6th sprint and during this sprint one test case was modified. The case was about editing schedules, but in the current UI it is not possible to edit schedules. The user may only delete and then add new schedules if they have entered wrong details. The test case was therefore updated to verify that changing the language works correctly in the delete confirmation windows.

Documentation Updates

The project architecture or technical specifications did not change based on the refactoring of code. The README.md was updated to include sections about Code Quality and Testing. UML diagrams were placed in the doc/diagrams directory. The diagrams were created as part of another course following the corresponding instructions. The activity diagram reflects all features of the application, and it was also placed in the README.md to clarify the features of the application. The sequence and activity diagrams illustrate the process of a student adding a course, rather than all the application features. The class diagram represents the frontend classes that interact with the backend services.

Future Plans

During the next sprint the team should finalize the documentation for the project and add the remaining diagrams to GitHub. The team should also prepare for the project presentation.

Appendices

Heuristic Report

https://github.com/nealukumies/edusync/blob/main/doc/HeuristicReport.pdf

User Acceptance Test
https://github.com/nealukumies/edusync/blob/main/doc/UserAcceptanceTest.pdf