



Hobby Web Application

Practical Project

By Anoush Lowton

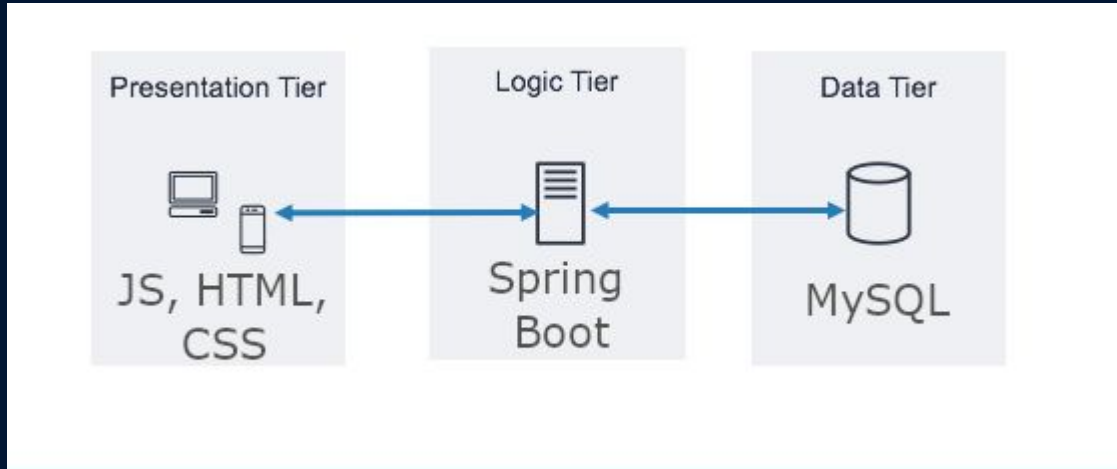
Technologies Learned

- Version Control System: **Git**
- Source Control Management: **GitHub**
- Project Management Board: **Jira**
- DBMS: **MySQL Server 8.0**
- Back-End Programming Language: **Java**
- API Development Platform: **Spring**
- Front-End Web Technologies: **HTML, CSS, JavaScript**
- Build Tool: **Maven**
- Static Analysis: **SonarQube**
- Unit/Integration Testing: **JUnit, Mockito**
- User-Acceptance Testing: **Selenium**



Approach

Design: Three-Tier Architecture



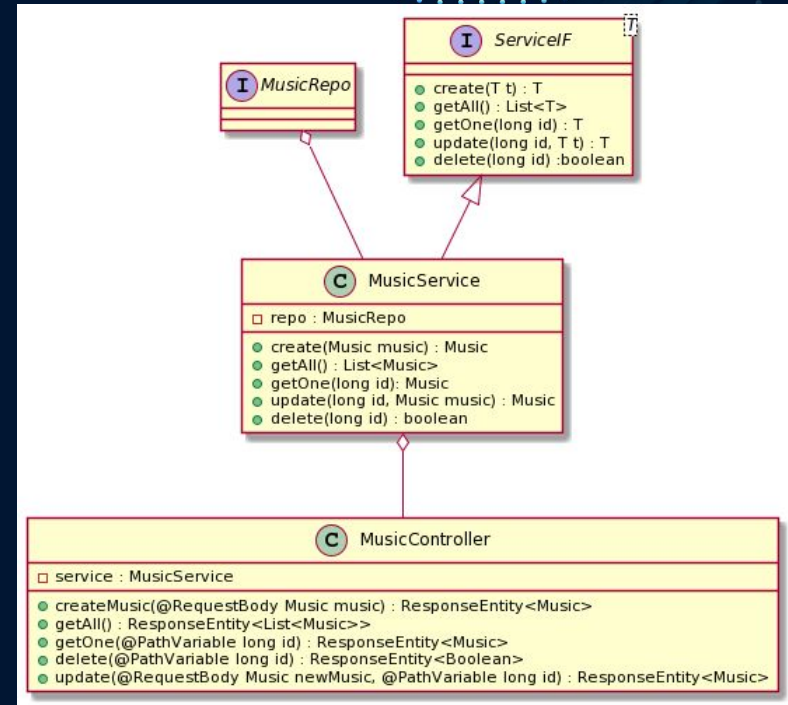
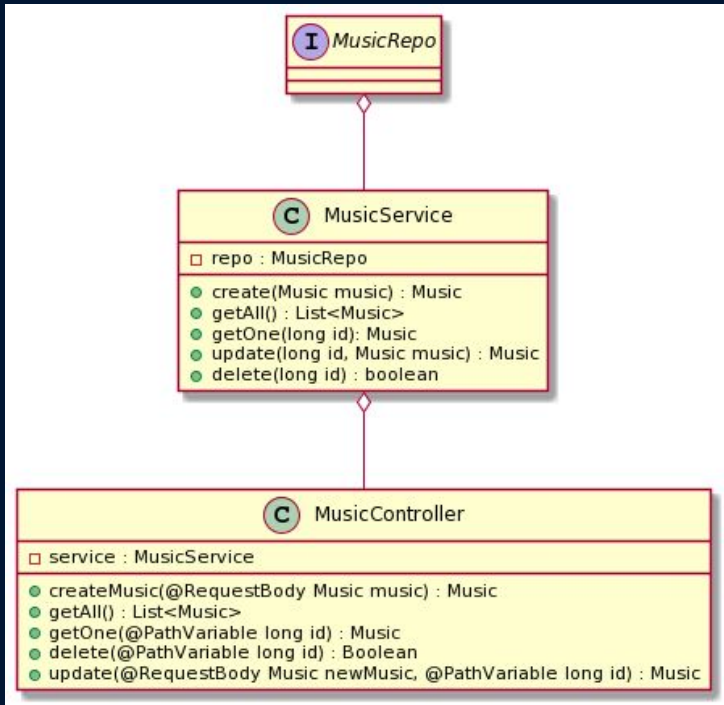
Approach

Design: ERD

Music		
PK	id	int
	type	varchar(80)
	name	varchar(255)
	artist	varchar(255)
	year	int

Approach

Design: UML



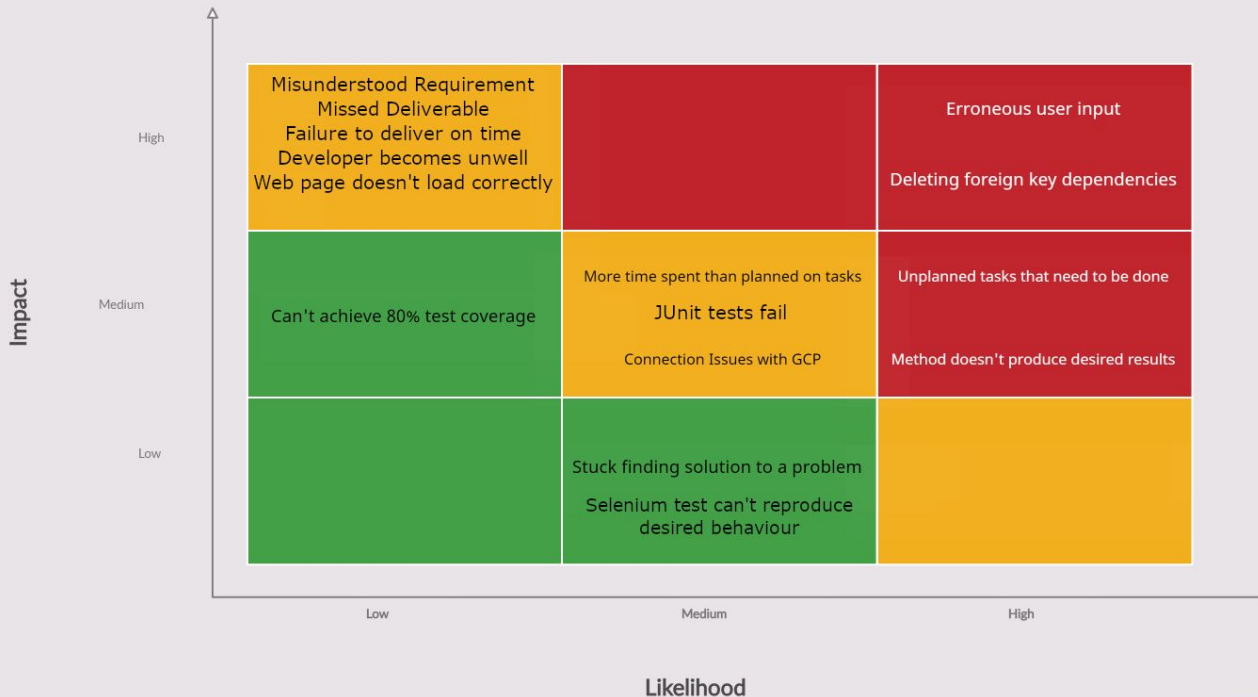
Approach

Risk Assessment Table

Description	Evaluation	Likelihood	Impact Level	Responsibility	Response	Control Measures
Method doesn't produce desired result	Back-end won't function correctly	High	Medium	Developer	Refactor method	Create and implement unit tests
JUnit tests fail	Software may not be functioning correctly	Medium	Medium	Developer	See if failure is due to test code or a fault in the program and correct accordingly.	Write test code correctly and test functionality of new features as they're implemented, to ensure issues are caught quickly.
Selenium test can't reproduce desired behaviour	Test won't be able to replicate end-user interaction	Medium	Low	Developer	Try to research a solution, otherwise perform the test manually.	
More time spent than planned on tasks	May need to use time allocated for other tasks	Medium	Medium	Developer	Less time spent on other tasks if appropriate	Ensure the project plan is as accurate as possible and manage time properly so that problems with one task don't affect others.
Connection issues with GCP	The program would fail to connect to the DB.	Medium	Medium	Developer	Add support for local MySQL instance	Add support for local MySQL instance
Stuck finding a solution to a problem	Time would be lost	Medium	Low	Developer	Seek help from trainers	Keep on top of course content, complete exercises and practise regularly. Read into anything else that may be useful in the project.
Misunderstood requirement	Refactor would be needed	Low	High	Developer	Refactor to correct any mistakes	Thouroughly read the spec and check frequently to stay on task.
Missed deliverable	Marks would be lost	Low	High	Developer	Attempt to hand in deliverable ASAP	Thouroughly read the spec and check frequently to stay on task.
Can't achieve 80% test coverage	Marks would be lost	Low	Medium	Developer	Seek help from trainers to improve tests	Research unit testing, junit and mockito.
Failure to deliver on time	Potentially fail the project	Low	High	Developer		Ensure the project plan is as accurate as possible and accounts for appropriate risks.
Developer becomes unwell	Project would be delayed	Low	High	N/A	Ask for an extension	
Web page doesn't load correctly	User won't be able to interact with back-end	Low	High	Developer	Investigate and refactor code	

Approach

Risk Assessment Matrix



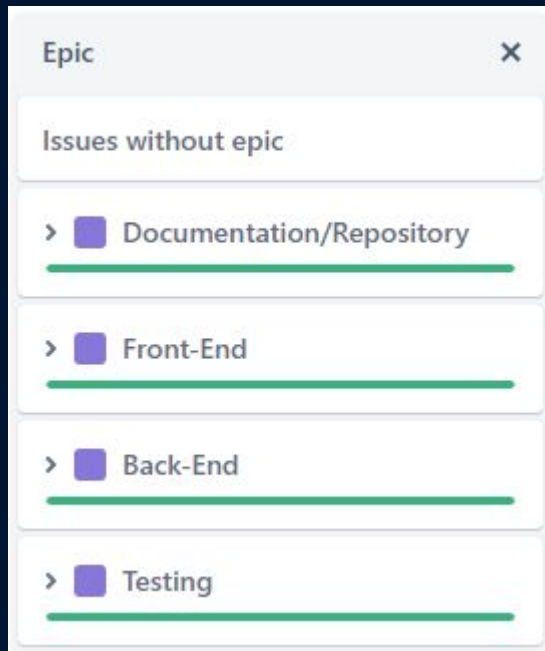
Sprint Plan

Goal: MVP and & all deliverables

01

Epics

Epics made for each section of the project.



Sprint Plan

Goal: MVP and & all deliverables

02

User Stories

Broad goals for each feature of the system.

Projects / ALowtonQA_HWA / Front-End / HWA-13

As a user, I want to be able to add music to the system from the front-end webpage, so that I don't have to interact with a CLI or database.

Attach Add a child issue Link issue

Description

Acceptance Criteria: When the user adds an entry using the form on the web page, the entry is added in the database and shown on the page.

Activity

Show: Comments History Newest first ↓

AL

Add a comment...

Pro tip: press M to comment

Done ▾

✓ Done

Assignee

Unassigned

Labels

None

Story point estimate

Priority

Highest

Sprint

None

Reporter

Anoush Lowton

Created May 2, 2021, 3:55 PM

Updated 5 hours ago

Resolved 6 days ago

Configure

Sprint Plan

Goal: MVP and & all deliverables

03

Tasks

Specific tasks to achieve the goals of the user stories

Projects / ALowtonQA_HWA / Front-End / HWA-40

Add POST request functionality using Axios & JS

Attach Add a child issue Link issue

Description

Acceptance Criteria: when the post request is made front the front-end, it is handled by the back-end and the correct response is received.

Activity

Show: **Comments** History Newest first ↓

Pro tip: press **M** to comment

Done ▾

✓ Done

Assignee

Unassigned

Labels

None

Story point estimate

Priority

Highest

Sprint

None

Development

1 commit 7 days ago

Reporter

Anoush Lowton

Created May 2, 2021, 6:37 PM

Updated 7 days ago

Resolved 7 days ago

Configure

Sprint Plan

Goal: MVP and & all deliverables

04

Acceptance Criteria

Condition that will need to be met in order for the issue to be completed.

05

Prioritisations

MoSCoW method used for determining priorities.

06

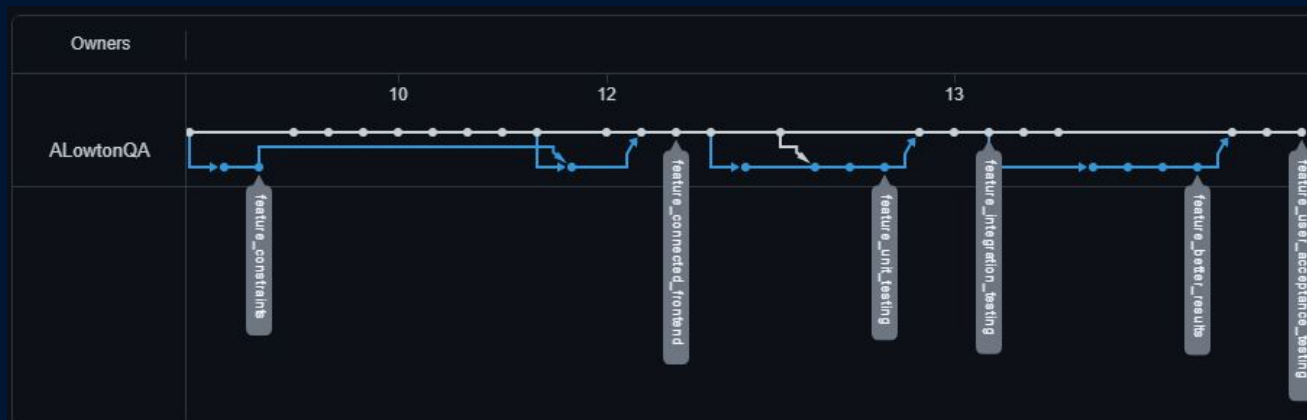
Estimations

Story points assigned to estimate time spent.



Version Control

Feature-Branch Model



Each feature has its own branch and is merged into dev periodically.

Integrating Jira with Git

The screenshot displays a Jira issue page for 'Front-End / HWA-15'. The issue title is 'the system from the front-end webpage, so that I don't have to interact with a CLI or database.' Below the title are buttons for 'Attach', 'Add a child issue', and 'Link issue'. The 'Description' section is empty. The 'Activity' section shows a comment by 'Anoush Lowton' 33 minutes ago: 'Modal form pre-filled'. Another comment by 'Anoush Lowton' 53 minutes ago states: 'Correct data retrieved on edit button press'. On the right, the 'Development' branch is highlighted with a red box, indicating '3 commits' and '1 minute ago'. The 'Reporter' is 'Anoush Lowton'. The page also shows metadata like 'Created May 2, 2021, 4:01 PM' and a 'Configure' button.

Front-End / HWA-15

the system from the front-end webpage, so that I don't have to interact with a CLI or database.

Attach Add a child issue Link issue

Description

Add a description...

Activity

Show: Comments History Newest first ↓

AL Add a comment...

Pro tip: press **M** to comment

AL Anoush Lowton 33 minutes ago

Modal form pre-filled

Edit · Delete · 🗨️

AL Anoush Lowton 53 minutes ago

Correct data retrieved on edit button press

Edit · Delete · 🗨️

Done ✓ Done

Assignee Unassigned

Labels None

Story point estimate 16

Priority ↑ Highest

Sprint HWA Sprint 1

Development 3 commits 1 minute ago

Reporter AL Anoush Lowton

Created May 2, 2021, 4:01 PM Updated 1 minute ago Resolved 1 minute ago

⚙️ Configure

Integrating Jira with Git




Development HWA-15

 Give feedback 

[Branches](#) [Commits](#) [Pull requests](#) [Builds](#) [Deployments](#) [Feature flags](#)

 **ALowtonQA_HWA** (GitHub)

[Show all files](#)

Author	Commit	Message	Date	Files
	8845fc	HWA-15 #done Update(put) functionality working	3 minutes ago	2 files
	79ecf5	HWA-15 #comment Modal form pre-filled	35 minutes ago	1 file
	5ca17d	HWA-15 #comment Correct data retrieved on edit button press	an hour ago	3 files

Utilising pull requests

Filters ▾

🔍 is:pr is:closed

🏷️ Labels 9

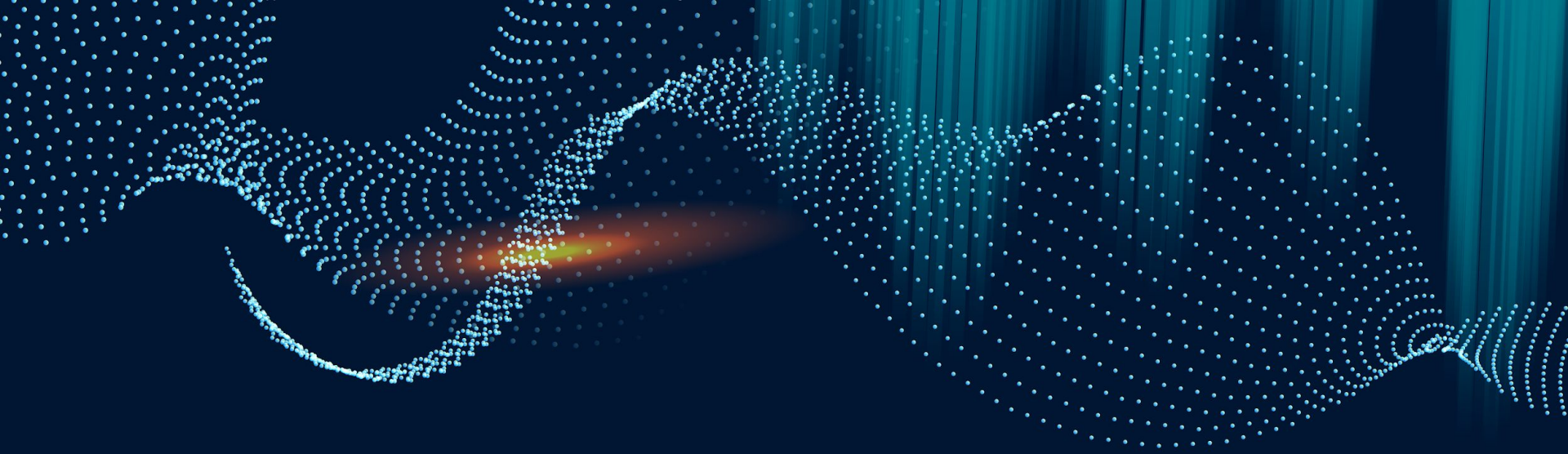
📅 Milestones 0

New pull request

✕ Clear current search query, filters, and sorts

<input type="checkbox"/> 🔄 0 Open	✓ 3 Closed	Author ▾	Label ▾	Projects ▾	Milestones ▾	Reviews ▾	Assignee ▾	Sort ▾
<input type="checkbox"/> 🔗	Feature unit testing	#3 by ALowtonQA was merged yesterday						
<input type="checkbox"/> 🔗	Feature constraints	#2 by ALowtonQA was merged 4 days ago						
<input type="checkbox"/> 🔗	Feature initial backend - merge to dev	#1 by ALowtonQA was merged 7 days ago						

💡 **ProTip!** Type **g** **p** on any issue or pull request to go back to the pull request listing page.













Testing

**Unit/Integration, User -Acceptance
& Static Analysis.**

Unit & Integration Testing

- Target Coverage of src/main/java: 80%
- Achieved: 92.4%

Element	Coverage	Covered Instructions	Missed Instructions	Total Instructions
▼ MusicHWA	 97.5 %	1,003	26	1,029
▼ src/main/java	 92.4 %	316	26	342
▼ com.qa.musichwa	 37.5 %	3	5	8
> MusicHwaApplication.java	 37.5 %	3	5	8
▼ com.qa.musichwa.domain	 89.8 %	185	21	206
> Music.java	 89.8 %	185	21	206
▼ com.qa.musichwa.rest	 100.0 %	57	0	57
> MusicController.java	 100.0 %	57	0	57
▼ com.qa.musichwa.service	 100.0 %	71	0	71
> MusicService.java	 100.0 %	71	0	71
> src/test/java	 100.0 %	687	0	687

Unit Testing

- Goal was to unit test each complex class in as isolated a manner as possible.
- Using @SpringBootTest for unit tests causes Spring Boot to set up a whole application context.
- This is slow, and causes unintended coverage.

MusicServiceUnitTest (12 May 2021 16:54:16)

Element	Coverage	Covered Instructions	Missed Instructions	Total Instructions
▼ MusicHWA	39.8 %	102	154	256
▼ src/main/java	27.5 %	57	150	207
▼ com.qa.musichwa	37.5 %	3	5	8
> MusicHwaApplication.java	37.5 %	3	5	8
▼ com.qa.musichwa.domain	50.7 %	36	35	71
> Music.java	50.7 %	36	35	71
▼ com.qa.musichwa.rest	10.5 %	6	51	57
> MusicController.java	10.5 %	6	51	57
▼ com.qa.musichwa.service	16.9 %	12	59	71
> MusicService.java	16.9 %	12	59	71
> src/test/java	91.8 %	45	4	49




Unit Testing

- By using mockito, I was able to unit test without loading the whole application, resulting in fast tests with no unintended coverage.

MusicServiceUnitTest (12 May 2021 17:15:00)				
Element	Coverage	Covered Instructions	Missed Instructions	Total Instructions
▼ MusicHWA	35.2 %	90	166	256
▼ src/main/java	21.7 %	45	162	207
▼ com.qa.musichwa	0.0 %	0	8	8
> MusicHwaApplication.java	0.0 %	0	8	8
▼ com.qa.musichwa.domain	46.5 %	33	38	71
> Music.java	46.5 %	33	38	71
▼ com.qa.musichwa.rest	0.0 %	0	57	57
> MusicController.java	0.0 %	0	57	57
▼ com.qa.musichwa.service	16.9 %	12	59	71
> MusicService.java	16.9 %	12	59	71
> src/test/java	91.8 %	45	4	49

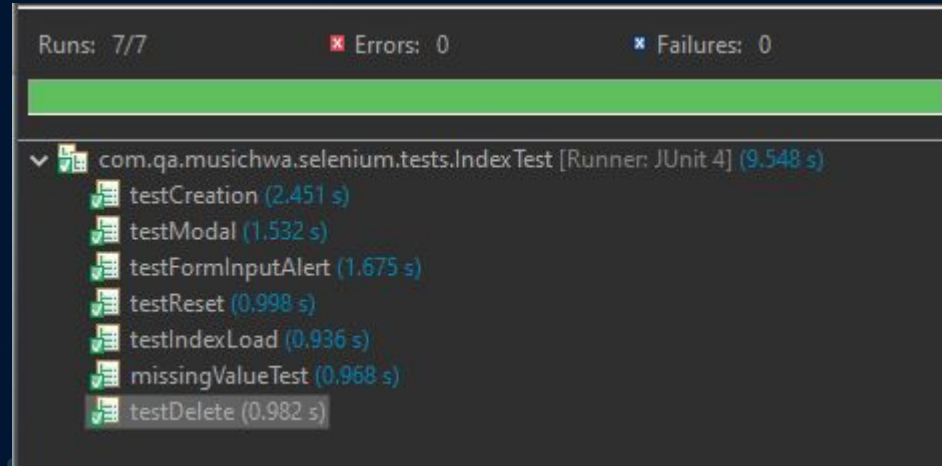
Integration Testing

- The goal of my integration tests was to test the layers of the back-end as one, to expose any faults between the components.

Element	Coverage	Covered Instructions	Missed Instructions	Total Instructions
▼ MusicHWA	 36.8 %	379	650	1,029
▼ src/main/java	 57.3 %	196	146	342
> com.qa.musichwa	37.5 %	3	5	8
> com.qa.musichwa.domain	 34.5 %	71	135	206
▼ com.qa.musichwa.rest	 93.0 %	53	4	57
> MusicController.java	 93.0 %	53	4	57
▼ com.qa.musichwa.service	 97.2 %	69	2	71
> MusicService.java	 97.2 %	69	2	71
> src/test/java	 26.6 %	183	504	687

User-Acceptance Testing

- The goal of my automated user-acceptance tests was to simulate end-user interaction with the front end, and ensure it functions as expected, including integration with the back-end.

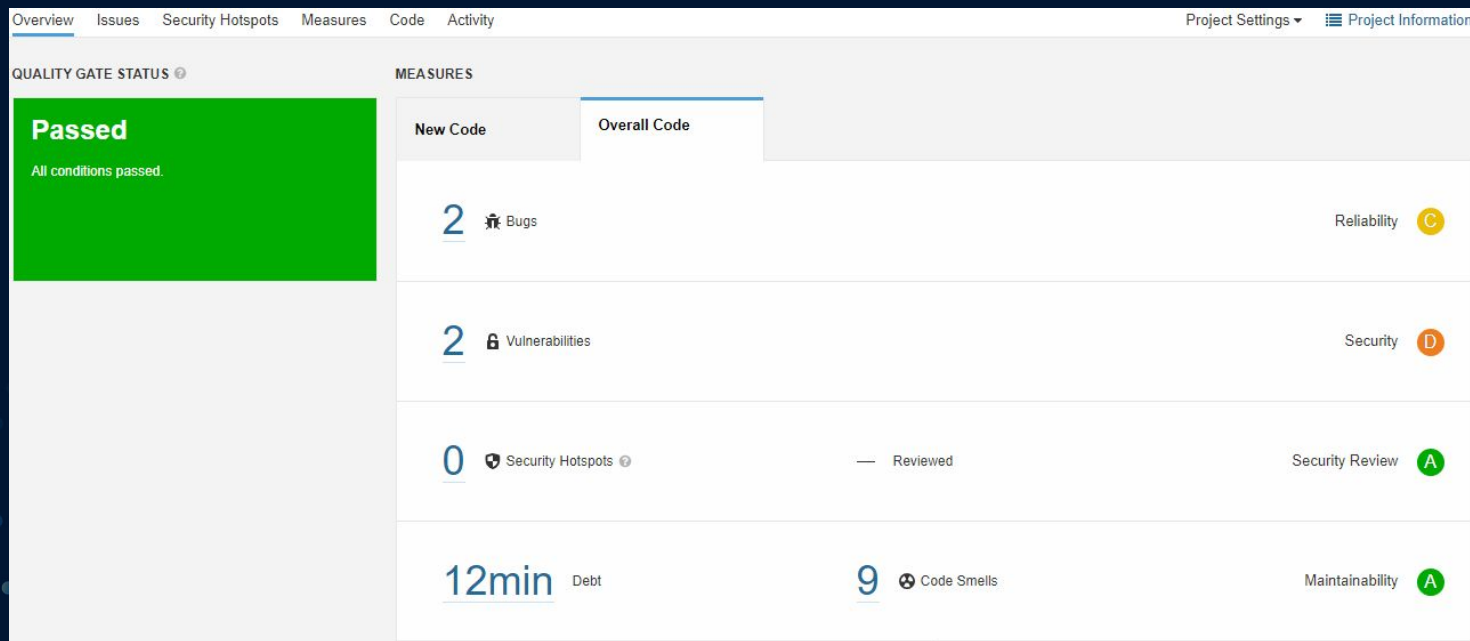


Static Analysis

- The goal of static analysis was to examine my code and its structure, to identify any potential issues, bugs, code smells and to ensure it adheres to standards and best practices.

Initial

Before
Refactoring

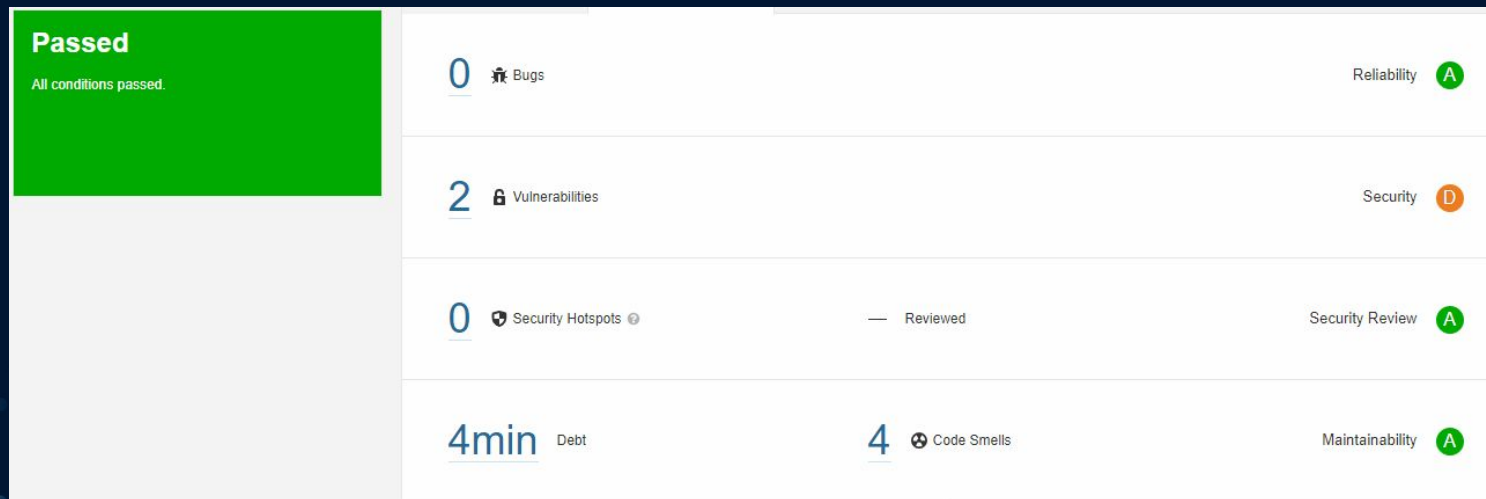


Static Analysis

- After identifying potential bugs and code smells, I reviewed the results from SonarQube and refactored where I felt it was necessary.

Final

After Refactoring



Demonstration

A few minutes to run
through some user stories.

Sprint Review

- 358/358 Story points completed in this 11 day sprint.

Date - 3 May 2021 - 14 May 2021

Sprint goal - HWA Project MVP, Documentation & Presentation



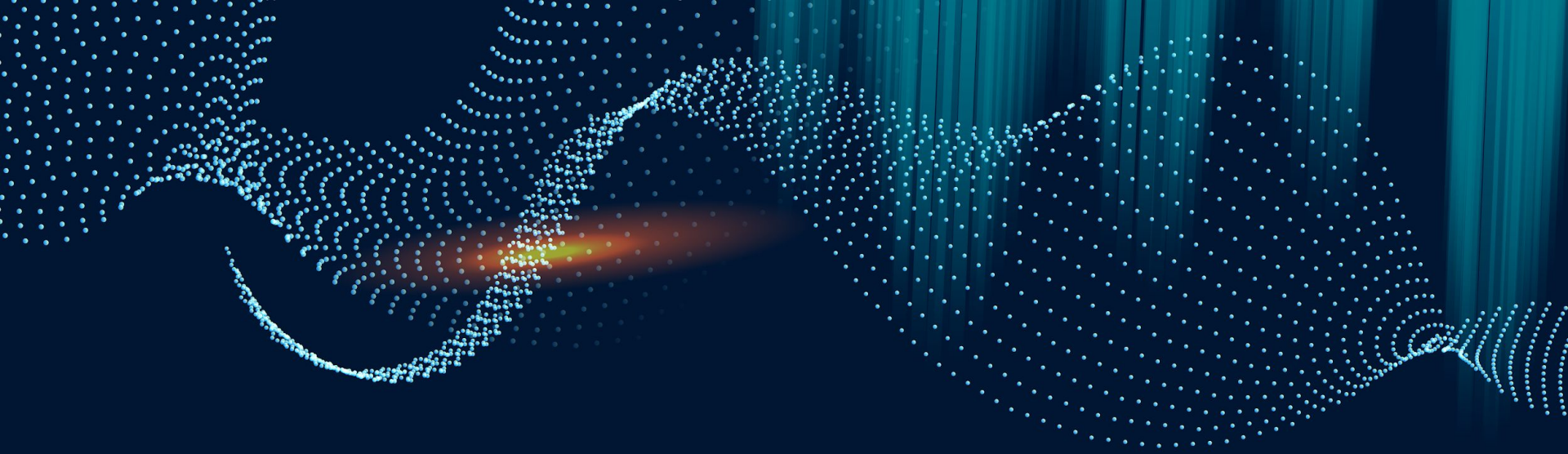
Sprint Retrospective

What went well?

- Everything was completed
- Estimations were mostly correct
- Prioritisations were accurate and helped me determine a good order.

What could be improved?

- Many issues were added during the course of the sprint.
- More accurate transitions between states.
- Utilise integration with git more.



Conclusion

THANKS!

CREDITS: This presentation template was created by Slidesgo, including icons by Flaticon, and infographics & images by Freepik.

