Project Postmortem and Week-by-Week Summary

Richard Casey S233122 – Professional Practice Module

Week-by-Week Summary

Week 1 Overview

Dates: April 17th, 2024 - April 23rd, 2024

Key Activities:

Outreach and Initial Contacts:

- Sent out emails to various industry professionals to seek mentorship and project briefs for the Professional Practice module. Contacts included:
  - Sean Jellesmark at Syngenta ([Email] (Week1/Communication Emails/Sean - Syngenta/1.pdf)).
  - Samantha Fry at Benolot ([Email] (Week1/Communication Emails/Samantha Fry - NA/1.pdf)).
  - Stuart Pentelow at d3t ltd ([Email] (Week1/Communication Emails/Stuart Pentelow – d3t ltd/1.pdf)).
  - Rob Adams at Ubisoft ([Emails] (Week1/Communication Emails/Rob Adams - Ubisoft/1.pdf)).
  - Jay Vickers at Staffordshire University ([Email] (Week1/Communication Emails/Jay Vickers – Staffordshire University/1.pdf)).
  - Joshua Pritchard at Bulkhead Interactive ([Email] (Week1/Communication Emails/Joshua - Bulkhead/1.pdf)).
  - Kristian Putman (Freelance) ([Email] (Week1/Communication Emails/Kristian Putman - Freelance/1.pdf)).

Responses and Scheduling:

April 17, 2024:

- Received a response from Sean Jellesmark expressing interest and suggesting a meeting ([Response] (Week1/Communication Emails/Sean - Syngenta/2.pdf)).

April 18, 2024:

- Sean Jellesmark confirmed availability for a meeting on April 23, 2024 ([Confirmation] (Week1/Communication Emails/Sean - Syngenta/3.pdf)).
- Jay Vickers responded, unable to commit to mentorship ([Response] (Week1/Communication Emails/ Jay Vickers – Staffordshire University/2.pdf)).
- Kristian Putman provided a detailed project brief focused on a puzzle/story game ([Project Brief] (Week1/Communication Emails/Kristian Putman - Freelance/3.pdf)).

April 23, 2024:

- Sent a thank you email to Sean Jellesmark following the initial meeting ([Thank You Email] (Week1/Communication Emails/Sean - Syngenta/5.pdf)).

Meeting with Syngenta (April 23, 2024):

- Met with Sean Jellesmark and Fabienne Ericher from Syngenta to discuss potential collaboration ([Meeting Notes] (Week1/Meetings/SyngentaMeeting.pdf)).

Email Communications:

- Several emails were exchanged throughout the week to set up meetings and discuss potential projects with various professionals ([Emails Folder] (Week1/Communication Emails)).

Week 1 Summary:

During Week 1, I made significant progress in reaching out to industry professionals and setting up initial meetings. My primary focus was on establishing contacts, discussing potential project briefs, and scheduling meetings. The process was nerve-wracking, similar to cold calling which I had previously done briefly and disliked. I expected little from the outreach, hoping at best for small project offers, which then made me worry about execution. The meeting with Syngenta was exciting due to their focus on data, but I was

proud of how I handled myself and firmly declined a project that wasn't a good fit. The responses I received initially offered projects that were too large, assuming I had ample time, which wasn't the case as a mature student with a job and young children. Kristian Putman's response, though initially a big project, was adjusted after explaining my situation. By the end of the week, I felt relieved to have secured a brief more quickly than expected.

Week 2 Overview

Dates: April 24th, 2024 - April 30th, 2024

Key Activities:

Continued Communication and Scheduling (April 24, 2024):

- Sent follow-up emails to various contacts to finalize project ideas and confirm schedules ([Emails Folder] (Week2/Communication Emails)).
- Replied to Fabienne Ericher at Syngenta to discuss potential collaboration on scientific game development projects ([Email] (Week2/Communication Emails/Fabianne – Syngenta/2.pdf)).
- Confirmed with Jay Vickers that mentorship wasn't feasible ([Email] (Week2/Communication Emails/Jay Vickers – Staffordshire University/1.pdf)).
- Coordinated with Kristian Putman to finalise project scope and details ([Email] (Week2/Communication Emails/Kristian Putman - Freelance/1.pdf)).

Email Communications:

- Several emails were exchanged to refine the project scope, finalise meeting schedules, and respond to feedback from various contacts ([Emails Folder] (Week2/Communication Emails)).
- Received an email from Kristian on April 28, 2024, confirming the revised project scope focusing on user authentication ([Email] (Week2/Communication Emails/Kristian Putman - Freelance/1.pdf)).

Meeting with Kristian Putman (April 29, 2024):

- Meeting held to discuss the rescoping of the project, deciding on the login page project due to its feasibility and relevance to future career opportunities ([Meeting Notes] (Week2/Meetings/Kris Meeting 1.pdf)).
- Key decisions made during the meeting:
  - Focus on implementing a secure user authentication system.
  - Use of JWT for session management.
  - Kristian provided further guidance on project steps and agreed to provide occasional feedback.

Week 2 Summary:

During Week 2, I focused on solidifying project details and ensuring all initial communications were followed up appropriately. I was confident that the information needed to complete the project was available; I just needed to find and implement it. However, I felt the project was actually more complex than it initially seemed, which was daunting. The revised project scope, focusing on user authentication, aligned better with my other commitments and interests. I was excited to delve into JWTs and salted hashes. The meeting with Kristian was pivotal in finalising a manageable project scope, setting the stage for focused development work. Email exchanges clarified roles, expectations, and project feasibility, ensuring alignment with both academic requirements and practical constraints.

Week 3 Overview

Dates: May 1st, 2024 - May 6th, 2024

Key Activities:

Research and Development (May 1, 2024):

- Spent significant time researching and working on secure storage for user credentials using salted hashes, as well as JWT (JSON Web Tokens) for session management.
- Total time spent on this day was approximately 7 hours, reflecting deep engagement with these technical concepts and the start of implementation.

First Scripts Development (May 2, 2024):

- Continued to work on the first scripts for the login page, ensuring proper implementation of salted hashes for password storage and JWT for authentication ([Initial Scripts] (Week3/Scripts)).
- Time spent on these tasks included detailed coding sessions and initial testing.

Meeting with Kristian Putman (May 2, 2024):

- Held a detailed meeting with Kristian to review progress and get feedback on the initial implementation of the login page ([Meeting Notes] (Week3/Meetings/Kris Meeting 2.pdf)).
- Discussed challenges faced during the implementation, such as secure storage for user credentials and JWT token management.
- Received valuable feedback and additional advice on best practices, such as using Bcrypt for password hashing and familiarising with OWASP (Open Worldwide Application Security Project) guidelines for web security.
- Kristian emphasized thorough testing, including unit and integration tests, and the necessity of secure token storage, advising on using HTTP-only cookies to mitigate XSS attacks.
- Confirmed that the current goal was to simulate the login and authentication process within Unity, rather than implementing it on a live database.

Further Development and Testing (May 6, 2024):

- Tested the simulated token and salted hash functionality within Unity.
- Focused on ensuring that the authentication processes worked as intended and identified any issues for further refinement.
- Spent approximately 2 hours on this day for testing and validating the functionality.

Week 3 Summary:

During Week 3, I made significant progress in research, development, and initial testing of the login page project. Researching secure storage for user credentials and managing sessions with JWT involved a lot of trial and error, especially since I need to read documentation repeatedly to get to grips with it. I managed my time effectively by working when the children were at school or in bed, avoiding work during weekends to prevent interruptions. The meeting with Kristian was positive, as he provided constructive feedback and highlighted considerations I hadn't thought of, reflecting his experience. Testing the initial scripts went smoothly without major issues, which I attribute to thorough research before implementation. The week ended with thorough testing of the simulated login and authentication processes within Unity, laying a strong foundation for the upcoming development phases.

Week 3 References:

Microsoft Docs. (n.d.). *How to: Hash Data with Salt*. Available at: https://docs.microsoft.com/en-us/dotnet/standard/security/cryptographic-services [Accessed 25 May 2024].

Auth0. (2020). *Introduction to JSON Web Tokens*. Available at: https://auth0.com/learn/json-web-tokens/ [Accessed 25 May 2024].

Week 4 Overview

Dates: May 8th, 2024 - May 14th, 2024

Key Activities:

Database Research and Preparation (May 8, 2024):

- Conducted extensive research on various databases for practical use, spending over 3 hours exploring options like MongoDB Atlas, Firebase, and Azure Cosmos DB.
- Evaluated the features, free tier offerings, and integration capabilities of these databases to decide on the most suitable one for the project.
- Time spent on this task included understanding the basics of database integration and secure database connections.

Meeting with Kristian Putman (May 8, 2024):

- Held a meeting with Kristian to review progress and discuss the next steps for integrating the project with a live database ([Meeting Notes] (Week4/Meetings/Kris Meeting 3.pdf)).
- Key points discussed:
  - Reviewed and received feedback on the LoginManager.cs and JwtTokenGenerator.cs scripts ([Scripts for Review] (Week4/Scripts)).
  - Kristian praised the code structure and suggested improvements such as generating unique salts for each user in the HashPassword method and securely storing the SecretKey.
  - Discussed transitioning from simulation to live database implementation, with Kristian recommending free databases like MongoDB Atlas, Firebase, or Azure Cosmos DB.
  - Emphasised the importance of secure database connections and handling sensitive data carefully.
  - Suggested exploring ORM (Object Relational Mapper) tools for simplifying database operations and improving code maintainability.
  - Confirmed the next meeting for May 15, 2024.

Script Work and Revisions (May 10, 2024):

- Focused on revising and improving scripts based on Kristian's feedback, including:
  - Implementing unique salt generation for each user in the HashPassword method.
  - Exploring methods for securely storing the SecretKey using environment variables or secure vaults.
- Spent considerable time refining and testing the scripts to ensure robust functionality and security.
- Installed necessary MongoDB DLLs to prepare for database integration.

Database Integration (May 14, 2024):

- Began the integration process with MongoDB, spending over 4 hours on setup and initial testing.
- Worked on connecting the project to MongoDB Atlas and ensuring that the database interactions were secure and efficient.

- The integration process involved significant time and effort, focusing on making sure that user data was stored securely and that the connection to the database was reliable.

Week 4 Summary:

Week 4 was crucial for transitioning the project from simulation to real-world application. The research on databases, particularly MongoDB, was more complex than anticipated, but I persevered with Kristian's guidance, who assured me it was one of the simpler options. The meeting with Kristian clarified that I was on the right track, delivering what he had in mind. Initially, I didn't think I could bring the project to a real-life implementation, expecting it to remain a simulation, but I surprised myself with the progress made. The week ended with substantial progress in integrating the project with a live database, setting the stage for further development and testing. Implementing the project into MongoDB was challenging but ultimately very rewarding, especially when I saw users appear in the MongoDB server correctly.

Week 4 References:

- MongoDB. (n.d.). Getting Started with MongoDB Atlas. Available at: MongoDB Atlas [Accessed 25 May 2024].
- Firebase. (n.d.). Firebase Realtime Database. Available at: Firebase [Accessed 25 May 2024].
- Microsoft Docs. (n.d.). Introduction to Azure Cosmos DB. Available at: Azure Cosmos DB [Accessed 25 May 2024].
- Microsoft Docs. (n.d.). Secure Database Connections in Azure. Available at: Database Security [Accessed 25 May 2024].

Week 5 Overview

Dates: May 15th, 2024 - May 21st, 2024

Key Activities:

Meeting with Kristian Putman (May 15, 2024):

- Held a detailed meeting with Kristian to review progress and receive feedback on the updated scripts ([Meeting Notes] (Week5/Meetings/Kris Meeting 4.pdf)).
- Key points discussed:
  - Reviewed the scripts: CredentialsManager.cs, JwtTokenGenerator.cs, JwtTokenValidator.cs, LoginManager.cs, MongoDBConfig.cs, MongoDBManager.cs, RefreshTokenManager.cs, and TabNavigation.cs ([Scripts for Review] (Week5/Scripts)).
  - Kristian praised the clear separation of concerns and the integration of MongoDB for storing user credentials.
  - Discussed the secure handling of JWTs and proper token validation in the JwtTokenGenerator.cs and JwtTokenValidator.cs scripts.
  - Highlighted the effective use of PBKDF2 for password hashing in CredentialsManager.cs and the robust error handling in MongoDBManager.cs.
  - Planned next steps for moving from simulation to implementation on a live database, focusing on secure integration with MongoDB Atlas.
  - Suggested creating a secure environment for development and testing using environment variables to store sensitive information.
  - Provided additional resources, including MongoDB documentation and tutorials, to aid in the database integration process.

UI and Cosmetic Improvements (May 16, 2024):

- Focused on making UI and cosmetic improvements to the project (UI Changes).
- Enhanced the overall look and feel of the application, making it more user-friendly and visually appealing.
- Spent approximately 2 hours on this task, ensuring that the UI was polished and professional.

Connection Failsafes Upgrades (May 20, 2024):

- Worked on upgrading connection failsafes to ensure the application could handle potential connectivity issues effectively.
- Implemented additional error handling and retry mechanisms to improve the reliability of the application when interacting with the database.
- Spent around 3 hours on enhancing these failsafes, focusing on making the application more robust.

Script Work and Testing:

- Continued refining and testing the scripts based on feedback from the meeting with Kristian.
- Implemented recommended changes, including securing connection strings and handling sensitive data appropriately.
- Ensured that the scripts were functioning correctly and securely, preparing for the transition to a live database.

Week 5 Summary:

Week 5 was dedicated to refining the project based on feedback from Kristian and preparing for live database integration. Kristian's feedback was, as always, constructive and encouraging, highlighting secure data handling and robust error handling. I didn't expect the project to progress past the simulation phase, but with Kristian's assurance, I moved forward. I enjoyed making UI improvements, as I consider myself a programmer with a designer's viewpoint, always considering design aspects in my code. Upgrading connection failsafes was straightforward, and I was satisfied with the professional look of the application. Significant progress was made in enhancing the UI, upgrading connection failsafes, and preparing the project for live database implementation. The week concluded with a strong foundation for the upcoming integration and further development phases.

Week 5 References:

Nielsen Norman Group. (2016). *10 Usability Heuristics for User Interface Design*. Available at: https://www.nngroup.com/articles/ten-usability-heuristics/ [Accessed 25 May 2024].

Unity. (n.d.). *Unity User Interface (UI) Tutorial*. Available at: https://learn.unity.com/tutorial/uielements-basics [Accessed 25 May 2024].

Microsoft Docs. (n.d.). *Exception Handling in C#*. Available at: https://docs.microsoft.com/en-us/dotnet/csharp/programming-guide/exceptions/ [Accessed 25 May 2024].

Microsoft Docs. (n.d.). *Retry Pattern in Azure Architecture Center*. Available at: https://docs.microsoft.com/en-us/azure/architecture/patterns/retry [Accessed 25 May 2024].

Week 6 Overview

Dates: May 21, 2024 - May 27, 2024

Key Activities:

Final Meeting with Kristian Putman (May 23, 2024):

- Held a final meeting with Kristian to review overall progress and discuss the completion of the project ([Meeting Notes] (Week6/Meetings/Kris Meeting 5.pdf)).
- Key points discussed:
  - Reviewed improvements made since the last meeting, including UI and cosmetic upgrades to enhance the application's professional look and feel.
  - Discussed contingency implementations based on Kristian's feedback, ensuring the application now checks for internet connectivity and user permissions before login attempts.
  - Conducted a comprehensive code review, emphasising the importance of thorough documentation and adding summaries (///<summary>) to methods for better team collaboration and compliance with standards.
  - Kristian praised the UI enhancements and the overall polished aesthetics of the application, highlighting the improved user experience.
  - Final feedback included professional goodbyes and mutual appreciation for the collaboration, with Kristian complimenting the quality of work, professionalism, and adaptability shown throughout the project.
  - Discussed the final steps for submitting the project and ensured all files and documentation were organised and ready for submission.

- Kristian offered to remain available for any last-minute questions or support as the project was finalized.

Portfolio Administration (May 22, 2024 and May 23, 2024):

- Focused on organizing and preparing the project files for final submission.
- Ensured that all documentation, code comments, and project reports were up-to-date and comprehensive.
- Spent significant time compiling the project into a portfolio format, ensuring that it met all academic and professional standards.

Final Adjustments and Testing (May 27, 2024):

- Made final adjustments to the project based on the feedback from the last meeting with Kristian.
- Conducted thorough testing to ensure that all features were functioning correctly and securely.
- Verified that the project was ready for submission, with all necessary failsafes and user feedback mechanisms in place.

Week 6 Summary:

Week 6 was primarily focused on finalising the project, incorporating feedback, and preparing for submission. The final meeting with Kristian was highly positive, with mutual appreciation for the collaboration and a focus on final improvements. I felt a bit sad that the project was ending, as it was a good experience, but also relieved to concentrate on my dissertation. Significant effort was dedicated to organizing the project portfolio, ensuring all documentation was comprehensive and up-to-date. Final adjustments and extensive testing were conducted to ensure the project met all requirements and was ready for submission. Implementing the project onto MongoDB was the most rewarding and challenging part, making the success even more satisfying.

Week 6 References:

- Microsoft Docs. (n.d.). Documenting your code in C#. Available at: Documenting Code [Accessed 25 May 2024].

Project Postmortem

Successes

- Successfully established and maintained professional relationships with industry contacts, providing valuable guidance and project insights.
- Developed and implemented a secure login system using best practices for password hashing and JWT for session management.
- Transitioned the project from simulation to real-world application, including secure database integration with MongoDB.
- Consistently received positive feedback and constructive criticism, leading to continuous improvements in the project.

Challenges

- Balancing academic workload with project demands and external commitments was a significant challenge.
- Implementing secure practices and ensuring robust error handling required extensive research and iterative testing.
- Managing time effectively to meet project milestones while maintaining high-quality work was demanding.

Lessons Learned

- The importance of maintaining clear and consistent communication with mentors and industry professionals.
- The value of incorporating best practices for security and documentation early in the project to ensure long-term maintainability and compliance with standards.

- The necessity of thorough testing and validation to identify and address potential issues before transitioning to live environments.

Recommendations for Future Projects

- Start with a clear project scope and timeline, allowing for flexibility to adapt to new challenges and feedback.
- Prioritise security and documentation from the beginning to avoid last-minute rushes and ensure high-quality deliverables.
- Maintain regular communication with mentors and industry contacts to leverage their expertise and receive ongoing support and feedback.

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- Microsoft Docs. (n.d.). Introduction to Azure Cosmos DB. Available at: https://docs.microsoft.com/en-us/azure/cosmos-db/introduction [Accessed 25 May 2024].
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- Nielsen Norman Group. (2016). 10 Usability Heuristics for User Interface Design. Available at: https://www.nngroup.com/articles/ten-usability-heuristics/ [Accessed 25 May 2024].
- Unity. (n.d.). Unity User Interface (UI) Tutorial. Available at: https://learn.unity.com/tutorial/uielements-basics [Accessed 25 May 2024].