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| PROGRAMMING 2B PART 1 | |
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| Programme Code: | BCAD2 |
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| Module Code: | PROG6212 |
| Date of Submission: | 15-09-2025 |

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| I hereby declare that I did not plagiarise the content of this assignment and that this is my own work.  Assignment submitted via Turnitin: (Tick the Box) |

1. The Documentation:

For the academics who serve as independent contractors (ICs), the Contract Monthly Claim System (CMCS) is an important tool for improving the difficult task of submitting and approving monthly claims (Microsoft, 2023). The CMCS provides you with hands-on training with C# programming and .NET GUI development which bases itself on real-world workplace incidents (Microsoft, 2023).

The explanation of design choices:

The User-Centric Design provides easy-to-use navigation and extra features for submitting claims and reviewing them (Emma, 2024) Thus, benefitting academic managers, program coordinators, IC professors and lastly users with disabilities (Emma, 2024).

* Security: the system will use encryption to protect sensitive information, especially personal information and finances (Frontegg, 2024). A Role-based access control as well as multi-factor authentication are going to be applied to simply protect user accounts and the claims will be reviewed by the lecturers, program coordinators and the academic management for safety reasons (Frontegg, 2024).
* Scalability and Maintainability: multiple databases that have front-end and back-end features are built into the CMCS system that ensure scalability and maintainability by carrying out easy upgrades and fast integration of new features (Ram, 2023).

The Database Structure:

The relational model that is used in the database supports SQL servers, and it’s supported in .NET systems (Microsoft learn, 2024). The structure includes many important tables:

* Users: this table uses the user’s username, password, user\_id and position (Manager, Coordinator or Lecturer) which is stored for system management needs (Microsoft learn, 2024).
* Lecturers: this table uses the lecturer’s ID, first name and surname, hourly rate and the link to the Users table via the user ID (Microsoft learn, 2024). Organized and easy to access lecturer-specific data (Microsoft learn, 2024).
* Claims: this table stores the lecturer claims by creating a connection with the Lecturers database via Claims\_id (Microsoft learn, 2024). Given that it has all the lecturer’s data like the month, year, hours worked as well as the status (Submitted, Reviewed, Approved and Rejected) (Microsoft learn, 2024).
* Supporting Documents: the documents correspond to the claim support and is tracked on this table (Microsoft learn, 2024). The foreign Key connects the document to the Claims table and each one is identified by the document\_id (Microsoft learn, 2024).
* Approval: this table contains the claim approval information with the approval\_id (Microsoft learn, 2024). It contains the approval date; approver comments and the foreign keys connected to the Claims and Users tables (Microsoft learn, 2024).

Assumptions:

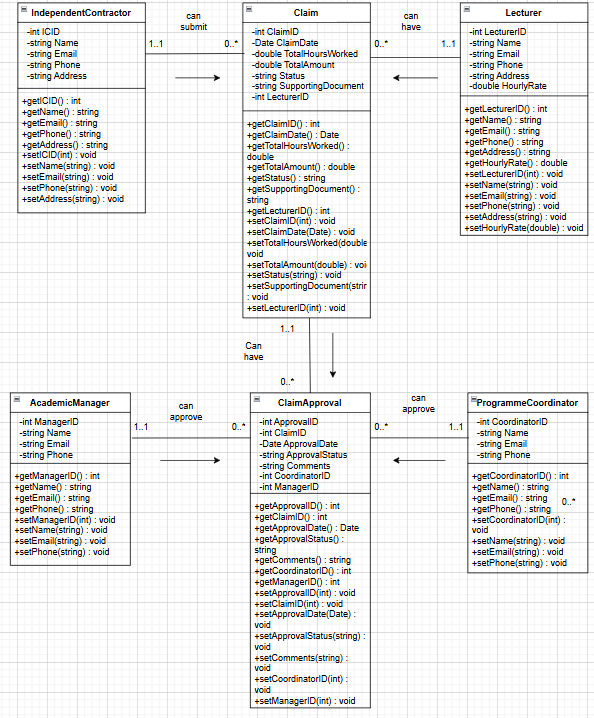
The CMCS system is designed for academic use, and it provides monthly claims and hourly charges (Indeed, 2025). Mainly require a user-friendly computer and have experience in web applications (Indeed, 2025).

Constraints:

The system must keep up with data protection regulations like GDPR to be able to protect user privacy and data security (Microsoft security, 2025). It must be capable of handling numerous claim submissions, especially towards the end of the month (Microsoft security, 2025).

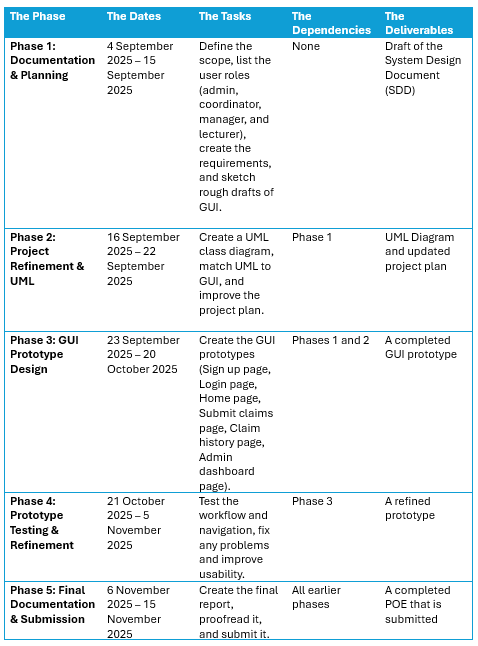
The Contract Monthly Claim System (CMCS) improves the administrative process by reducing the handling of claims thanks to it’s simple to use interface (Microsoft learn, 2015). It provides C# development training, improving the students’ skills and tackling real-word problems in the evolving software development sector (Microsoft learn, 2015).

1. The UML Diagram:



(Microsoft support, 2025)

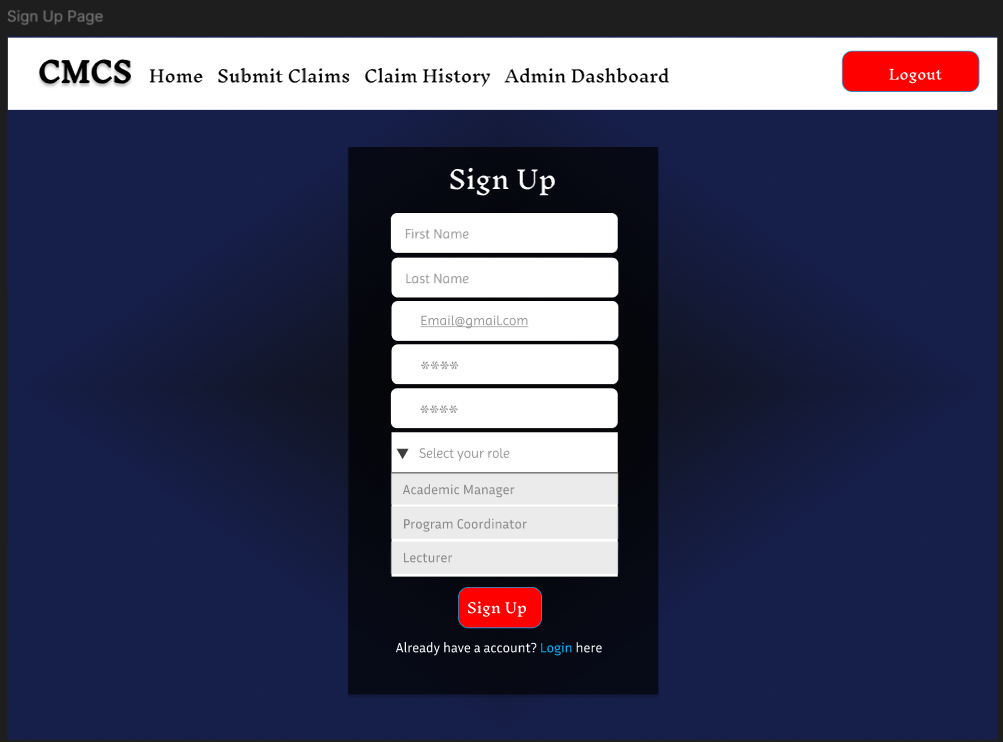
1. The Project Plan:



(Awati, 2024)

1. The GUI/UI:

Figure 1: Sign Up Page



(Figma, 2025)

Figure 2: Login Page

A screenshot of a computer

AI-generated content may be incorrect.

(Figma, 2025)

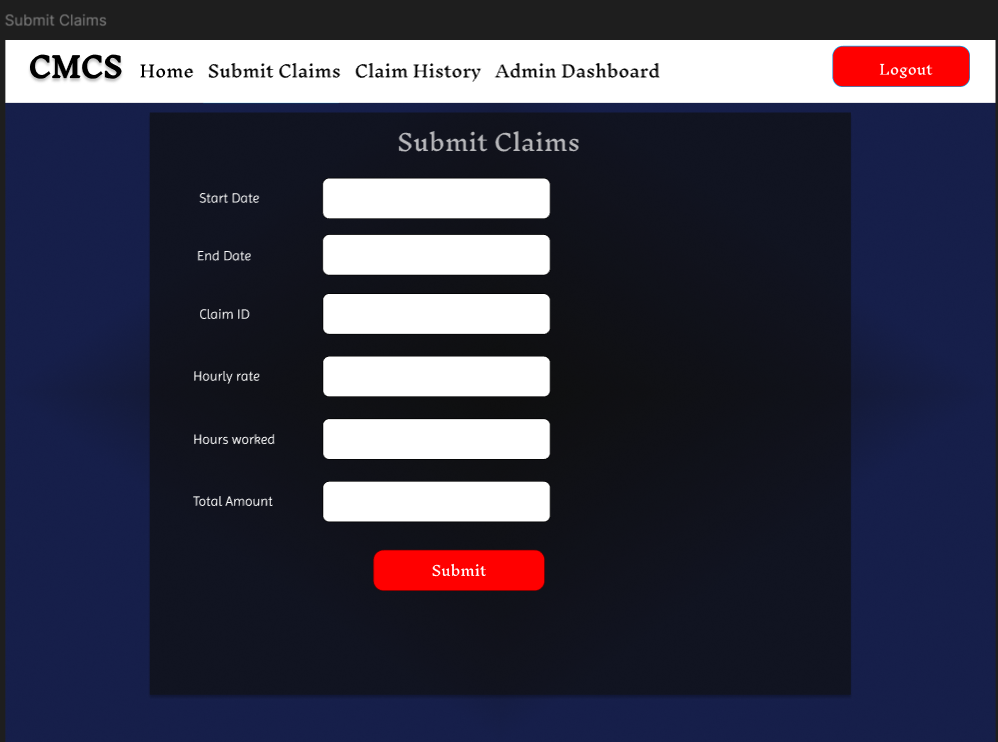
Figure 3: Home Page

A screenshot of a computer

AI-generated content may be incorrect.

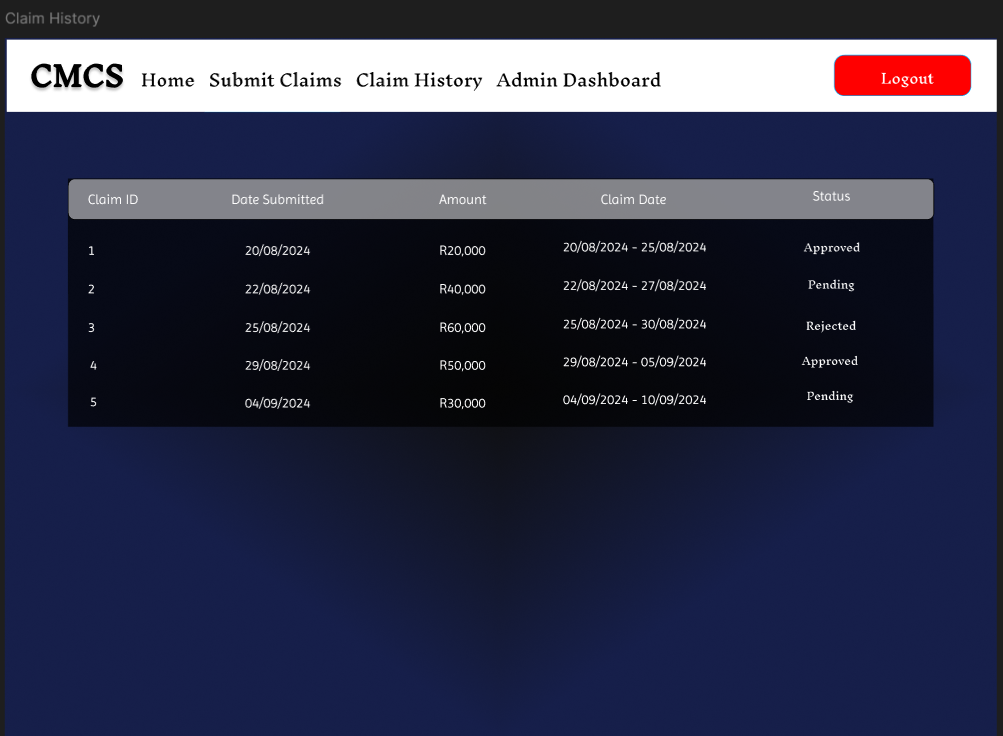
(Figma, 2025)

Figure 4: Submit Claims Page



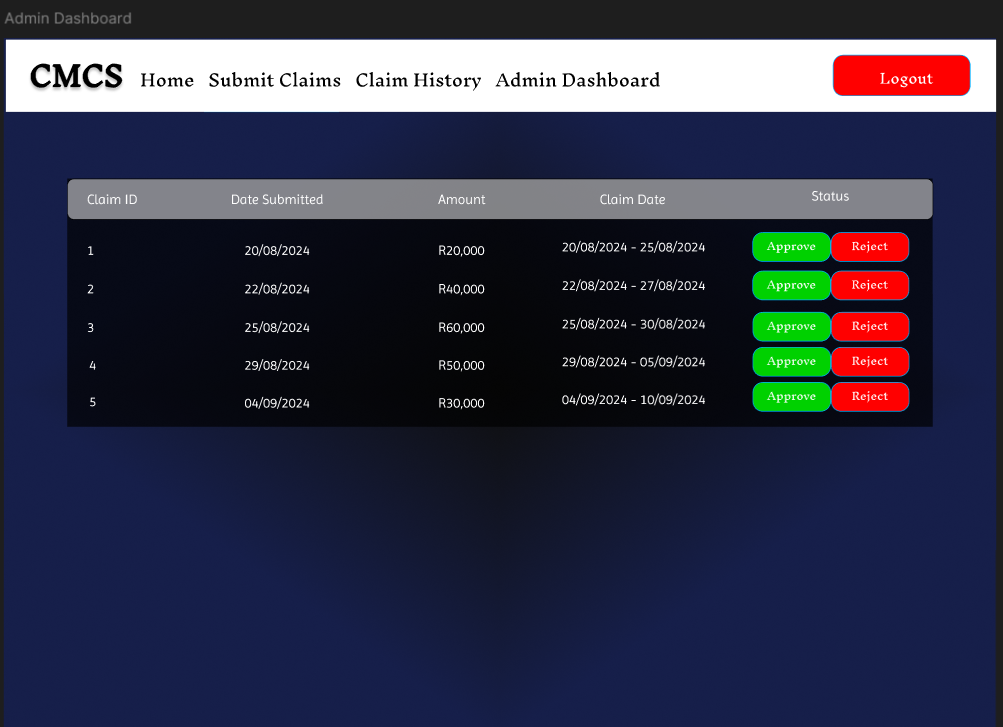
(Figma, 2025)

Figure 5: Claim History Page



(Figma, 2025)

Figure 6: Admin Dashboard Page



(Figma, 2025)

Reference list:

Awati, R. 2024. Project planning: What it is and 5 steps to create a plan, 23 August 2024. [Online], Available at:

<https://www.techtarget.com/searchcio/definition/project-planning>

[Accessed 4 September 2025].

Emma, L. 2024. User-centered design to enhance accessibility and usability

in digital systems, 2 December 2024.

[Online]. Available at:

<https://www.researchgate.net/publication/386339454_User-centered_design_to_enhance_accessibility_and_usability_in_digital_systems>

[Accessed 4 September 2025].

Figma. 2025. Figma, 4 September 2025. [Online]. Available at:

<https://www.figma.com/design/vUmzAj6queQJHisxrIMfvP/CMCS-Part-1?t=oGL0D8tsxlo675ZF-0>

[Accessed 4 September 2025].

Frontegg, 2024. Access Control in Security: Methods and Best Practices, 7 February 2024. [Online]. Available at:

<https://frontegg.com/guides/access-control-in-security>

[Accessed 4 September 2025].

Indeed. 2025. Everything You Need to Know About Majoring in Computer Science, 28 March 2025. [Online]. Available at:

<https://ca.indeed.com/career-advice/career-development/everything-you-need-to-know-about-majoring-in-computer-science>

[Accessed 4 September 2025].

Microsoft learn. 2015. C# Best Practices: Dangers of Violating SOLID Principles in C#, 7 January 2015. [Online]. Available at:

<https://learn.microsoft.com/en-us/archive/msdn-magazine/2014/may/csharp-best-practices-dangers-of-violating-solid-principles-in-csharp>

[Accessed 4 September 2025].

Microsoft. 2023. Claims-based authorization in ASP.NET Core, 11 October 2023.

[Online]. Available at:

<https://learn.microsoft.com/en-us/aspnet/core/security/authorization/claims?view=aspnetcore-9.0>

[Accessed 4 September 2025].

Microsoft learn. 2024. Databases, 22 November 2024. [Online]. Available at:

<https://learn.microsoft.com/en-us/sql/relational-databases/databases/databases?view=sql-server-ver17>

[Accessed 4 September 2025].

Microsoft security. 2025. What is GDPR compliance?, 2025. [Online]. Available at:

<https://www.microsoft.com/en-za/security/business/security-101/what-is-gdpr-compliance>

[Accessed 4 September 2025].

Microsoft support. 2025. Create a UML class diagram, 2025. [Online]. Available at:

<https://support.microsoft.com/en-us/office/create-a-uml-class-diagram-de6be927-8a7b-4a79-ae63-90da8f1a8a6b>

[Accessed 4 September 2025].

Ram, M. 2023. Frontend Development for Scalability: Building Robust and Maintainable Code, 11 July 2023. [Online]. Available at:

<https://medium.com/@mukesh.ram/frontend-development-for-scalability-building-robust-and-maintainable-code-f599425ced03>

[Accessed 4 September 2025].