

PROG6212 PART 1

Lecturer: Youn-Soo Kim

By: Kallan Jones ST10445389



Programming 2B
PROG6212 2025 FT
BCAD0701 VCWCCR
Term2 GR01

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Question 1

Database Design Reasoning

My CMCS (Contract Monthly Claim System) requires a very tough relational database structure that can handle the complex workflows of claim submissions, approvals, and document management. The design follows a normalized approach that ensures data integrity and minimizes data redundancy (Claude.ai, 2025).

Core Entity Design:

- **User Management:** This is a role-based system that supports three very distinct user types (Lecturers, Programme Coordinators (Coordinators), and Academic Managers (Managers)), that have the appropriate permissions and access controls.
- **Claim Processing:** This is a central claim entity that contains calculation fields (hours worked, hourly rate, total amount) that has automated capabilities.
- **Document Management:** This is a secure file storage system that is linked to claims via metadata tracking specifically for audit tracking purposes.
- **Workflow Tracking:** This is a status management system that enables transparent claim progression from submission to final approval. (Claude.ai, 2025)

GUI and User Experience

The user interface design that I have followed prioritizes role-specific functionality while it maintains consistent navigation patterns that is the same across all user types. Each role receives a tailored dashboard that presents the relevant information and actions.

Design Philosophy:

- **Intuitive Navigation:** It has a clear menu structure that has role-appropriate options that are clearly displayed
- **Responsive Layout:** It is a web-based interface that is optimized for both desktop and phone usage.
- **Visual Feedback:** It has real-time status indicators and has progress tracking that enhances the user engagement.
- **Accessibility:** It complies with the web accessibility standards and ensures that it is usable for all users. (Claude.ai, 2025)

Technology Stack Selection

The system that I have utilized ASP.NET Core MVC framework as per the guidelines for its robust security features, scalability, and maintainability. The entity framework provides a

seamless database integration, while the Bootstrap makes sure that it has responsive design consistency (Claude.ai, 2025).

Security and Data Integrity Considerations

There are authentication and authorization mechanisms to ensure that the users can only access appropriate functions which is based on their assigned roles. There are file upload restrictions and validation to prevent security vulnerabilities while maintaining system performance (Claude.ai, 2025).

Assumptions

1. **User Authentication:** The system assumes that there is integration with existing institutional authentication systems or that there is implementation of secure local authentication.
2. **File Storage:** Document uploads will always be stored locally on the server with enough storage capacity allocated.
3. **Network Infrastructure:** Reliable internet connection is available for every user that accesses the web-based platform.
4. **User Training:** Basic computer knowledge is assumed for every system user with very minimal extra training required.
5. **Data Backup:** Regular backups will be implemented by the institution that is hosting
6. **Browser Compatibility:** Users that access the system will access it using modern browsers that is supported by the current web standards. (Claude.ai, 2025)

Constraints

1. **Tech Limitations:** Development is restricted to the ASP.NET core framework and SQL server database technology.
2. **File Size Restrictions:** Document uploads will be limited to 10MB per file so that the server storage and performance is managed.
3. **File Type Restrictions:** Only PDF, Word, and Excel documents will be accepted to make sure that the data is secured and that for compatibility issues.
4. **Concurrent User Limits:** System designed to support a maximum of 100 concurrent users.
5. **Development Timeline:** Prototype development has to be completed within the specified POE timeframe.
6. **Budget Constraints:** Open-source and free development tools will be used to minimize the budget needed to create the platform.

7. **Hosting Environment:** Application must be deployable on standard windows server hosting infrastructure.
8. **Compliance Requirements:** The System must conform to the institutional data protection and privacy requirements. (Claude.ai, 2025)

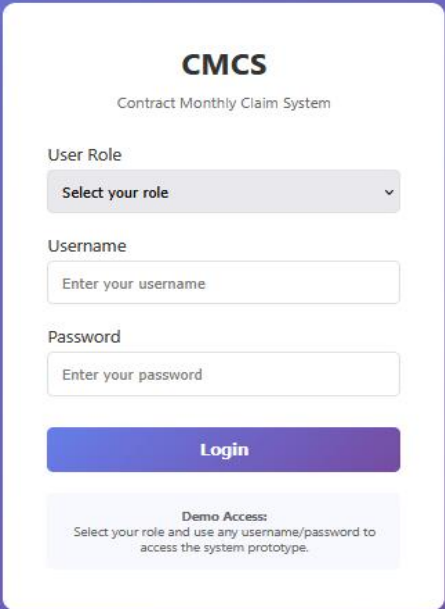
```
classDiagram
    class ClaimStatusHistory {
        +StatusID INT PK
        +ClaimID INT FK
        +changedBy INT
        +newStatus ClaimStatus
        +changeDate DATETIME
    }
    class Claim {
        +ClaimID INT PK
        +UserID INT FK
        +ModuleID INT FK
        +HoursWorked FLOAT
        +HourlyRate FLOAT
        +TotalAmount FLOAT
        +SubmissionDate DATE
        +Status ClaimStatus
    }
    class SupportingDocument {
        +DocumentID INT PK
        +ClaimID INT FK
        +FileName STRING
        +FileType STRING
        +UploadDate DATETIME
    }
    class User {
        +UserID INT PK
        +firstName STRING
        +lastName STRING
        +email STRING
        +userRole UserRole
        +isActive BOOLEAN
    }
    class Module {
        +ModuleID INT PK
        +moduleCode STRING
        +moduleName STRING
        +standardHourlyRate FLOAT
    }

    ClaimStatusHistory "1" -- "*" Claim : History of
    Claim "1" -- "*" ClaimStatusHistory : Tracks
    Claim "1..*" -- "1" SupportingDocument : Has
    SupportingDocument "1..*" -- "1" Claim : Belongs to
    User "1..*" -- "1" Claim : Submitted by
    Claim "1..*" -- "1" User : Submits
    Claim "1..1" -- "1..*" Module : For
    Module "1..*" -- "1" Claim : Has claims
    User "1..*" -- "1" Module : Teaches
    Module "1..*" -- "1" User : Taught by
```

[illegible]

Question 4

Login Page: The Login page has a clean and centered design that has a role selection dropdown. The strengths of this layout is that it has logical field progression, eg. From Role to Username to Password.



CMCS
Contract Monthly Claim System

User Role
Select your role ▼

Username
Enter your username

Password
Enter your password

Login

Demo Access:
Select your role and use any username/password to access the system prototype.

Lecturer Dashboard: The lecturer portal has metrics such as pending claims, approved claims, and the total earned. It also has hyperlinks to other pages such as the Submit a new claim page, claim status and claim history.

CMCS - Lecturer Portal

Welcome, Lecturer [Logout](#)

Dashboard

Manage your monthly claims efficiently and track their status in real-time.

3


Pending Claims

12

Approved Claims


R24,500

Total Earned

**Submit New Claim**


Submit your monthly claim with hours worked and hourly rate. Upload supporting documents.

[Submit Claim](#)

**Claim Status**

Check the current status of your submitted claims and approval progress.

[View Status](#)

**Claim History**

View all your previous claims, payments, and detailed transaction history.

[View History](#)

Submit Claim Page: The submit claim page allows the user to select which month the claim is from the module and then the hours worked, it automatically calculates the total earned. You can add any supporting notes or documents before you submit the claim.

CMCS - Submit Claim

DashboardStatusHistoryLogout

Submit Monthly Claim

Fill in your claim details, upload supporting documents, and submit for approval.

Claim Month

Select month

Module/Course

Select module

Hours Worked

Enter hours worked

Hourly Rate (R)

Enter hourly rate

Claim Calculation

Hours Worked:0

Hourly Rate:R0.00

Total Amount:R0.00

Additional Notes

Any additional information or notes about this claim...

Supporting Documents

Click to upload supporting documents

PDF, Word, Excel files accepted (Max 5MB each)

Cancel

Submit Claim

Claim Status Page: The claim status page shows any/all claims that you have made and their status, eg. Pending, under review, or accepted/rejected.

CMCS - Claim Status

DashboardSubmitHistoryLogout

Claim Status

Track the progress of your submitted claims through the approval process.

PROG6212 - March 2025

Submitted on March 15, 2025

HOURS WORKED

45.5

HOURLY RATE

R350

TOTAL AMOUNT

R15,925

STATUS

UNDER REVIEW

1

Submitted

2

Coordinator Review

3

Manager Approval

4

Payment

View Details

DATA6222 - March 2025

Submitted on March 10, 2025

HOURS WORKED

32.0

HOURLY RATE

R300

TOTAL AMOUNT

R9,600

STATUS

PENDING

1

Submitted

2

Coordinator Review

3

Manager Approval

4

Payment

View Details

WEB6312 - February 2025

Submitted on February 28, 2025

HOURS WORKED

40.0

HOURLY RATE

R325

TOTAL AMOUNT

R13,000

STATUS

APPROVED

1

Submitted

2

Coordinator Review

3

Manager Approval

4

Payment

View Details

Claim history page: The claim history page shows all the claims that you have submitted and their status, it also shows starts like approved claims and rejected claims to name a few.

CMCS - Claim History

Dashboard

Submit

Status

Logout

Claim History

View all your submitted claims, payments, and transaction history.

15

Approved Claims

2

Rejected Claims

3

Pending Claims

R67,850

Total Earned

Status

Module

From Date

To Date

All Status

All Modules

mm / dd / yyyy

mm / dd / yyyy

Claim ID	Module	Period	Hours	Rate	Amount	Status	Submitted	Actions
#CM2025-001	PROG6212	March 2025	45.5	R350	R15,925	PENDING	Mar 15, 2025	View
#CM2025-002	WEB6312	February 2025	40.0	R325	R13,000	APPROVED	Feb 28, 2025	View PDF
#CM2025-003	DATA6222	February 2025	38.0	R300	R11,400	APPROVED	Feb 25, 2025	View PDF
#CM2025-004	PROG6212	January 2025	42.0	R325	R13,650	APPROVED	Jan 30, 2025	View PDF
#CM2024-012	WEB6312	December 2024	35.0	R300	R10,500	REJECTED	Dec 28, 2024	View
#CM2024-011	DATA6222	November 2024	40.0	R275	R11,000	APPROVED	Nov 30, 2024	View PDF

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Programme Coordinator Dashboard: this dashboard shows the coordinators view of the web-platform. They can either approve or reject a claim made by a lecturer. They can also review these claims. If the coordinator approves a claim it gets sent to the managers dashboard.

CMCS - Programme Coordinator

Pending ReviewReviewed ClaimsLogout

Programme Coordinator Dashboard

Review and approve monthly claims submitted by lecturers.

8
Pending Review

24
Reviewed This Month

3
Rejected Claims

35
Total Claims

Claims Pending Review

All ModulesAll Lecturers

PROG6212 - March 2025
Lecturer: Dr. John Smith

PENDING REVIEW

HOURS WORKED	HOURLY RATE	TOTAL AMOUNT	SUBMITTED
45.5	R350	R15,925	Mar 15, 2025

View DetailsApproveReject

DATA6222 - March 2025
Lecturer: Prof. Sarah Johnson

PENDING REVIEW

HOURS WORKED	HOURLY RATE	TOTAL AMOUNT	SUBMITTED
32.0	R300	R9,600	Mar 10, 2025

View DetailsApproveReject

WEB6312 - February 2025
Lecturer: Ms. Emily Davis

PENDING REVIEW

HOURS WORKED	HOURLY RATE	TOTAL AMOUNT	SUBMITTED
40.0	R325	R13,000	Feb 28, 2025

View DetailsApproveReject

Academic Managers Dashboard: this dashboard is of the managers view, they have to review the coordinators approved/ rejected claims, they have to do the final approve/reject of the claim so that it can be fully processed.

CMCS - Academic Manager

Awaiting Approval

Processed Claims

Logout

Academic Manager Dashboard

Review coordinator decisions and provide final approval for monthly claims.

6

Awaiting Final Approval

18

Finally Approved

2

Finally Rejected

26

Total Processed

Claims Awaiting Final Approval

All CoordinatorsAll Modules

PROG6212 - March 2025

Lecturer: Dr. John Smith

COORDINATOR APPROVED

Approval Workflow

Lecturer Submitted → Coordinator Approved → Manager Review

HOURS WORKED	HOURLY RATE	TOTAL AMOUNT	SUBMITTED
45.5	R350	R15,925	Mar 15, 2025

Programme Coordinator Review

Reviewed: Mar 16, 2025

Approved by: Coord. Sarah Thompson

Notes: Hours and documentation verified. All supporting documents are complete and accurate. Lecturer has maintained excellent attendance records. Recommend approval.

View Full Claim

Final Approve

Final Reject

DATA6222 - March 2025

Lecturer: Prof. Sarah Johnson

COORDINATOR APPROVED

Approval Workflow

Lecturer Submitted → Coordinator Approved → Manager Review

HOURS WORKED	HOURLY RATE	TOTAL AMOUNT	SUBMITTED
32.0	R300	R9,600	Mar 10, 2025

Programme Coordinator Review

Reviewed: Mar 12, 2025

Approved by: Coord. Michael Brown

Notes: Standard monthly claim. Hours are within acceptable range and all required documentation provided. Teaching evaluations are positive. Approved for manager review.

View Full Claim

Final Approve

Final Reject

References

Claude.ai, 2025. *Claude*. [Online]
Available at: claude.ai
[Accessed 17 09 2025].

Disclosure Of AI Use

Part 1, the documentation.

Purpose of use: It was to help me understand how to answer the question by giving me context of what I have to answer.

The tool that I used was claude.ai and I accessed it on the 17th of September, 2025. I needed help with brainstorming and understanding what I needed to include in the whole of the documentation part of the project along with the assumptions and constraints.

Link: <https://claude.ai/chat/21f06611-86d1-4cb2-9622-c6e21b080be8>



could you help me do question 1 of part 1 please, its out of 20 marks with 15 being a explanation and then 5 being the assumptions or constraints i considired