Faculty of Engineering & Information Technology

32998 .Net Application Development – Spring 2025

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Assignment 2

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17 Oct 2025

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1. Project Idea

We suggest creating a cross-platform desktop program called Family & Household Financial Tracker as part of this project. To ensure a cutting-edge, responsive user experience and smooth cross-platform integration, the application will be developed with React for the frontend and Blazor Hybrid with.NET 8 for the backend. This hybrid approach combines the performance and stability of native desktop applications with the adaptability and interactivity of web technologies.

This application's main goal is to assist families in effectively, cooperatively, and transparently managing their finances. Household financial management is often fragmented, with decisions made secretly or handled solely by one person. By offering a common platform where parents, partners, and kids can all take part in financial planning, budgeting, and expense tracking, our app aims to address these problems.

Our solution prioritizes financial education, shared responsibility, and interpersonal communication over traditional banking or budgeting apps, which typically concentrate on individual accounts, institutional integrations, or sophisticated financial tools. Users of all ages and technical skill levels can interact with their household finances in a meaningful way thanks to its user-friendly and accessible design.

The Family & Household Financial Tracker is a communication tool that promotes cooperation, clarity, and trust in addition to being a tool for budgeting and transaction recording. Through the application, families can view and manage their financial data together, preventing financial stress, fostering healthy financial habits, and reducing misunderstandings. For younger users, it also acts as an educational tool, teaching them the fundamentals of responsible spending and budgeting in a secure setting.

In the end, we want to develop a solution that tackles actual social issues and fits in with the course's technical goals. Our goal is to provide a technically sound and socially significant application through careful design and strong implementation.

2. Motivation

Managing money is a vital part of family life, but it often leads to stress, confusion, and unfairness. Based on our own experiences and observations, we identified several recurring challenges:

- Partners disagreeing about spending habits Arguments often arise over who spent what, when, and why—especially when expenses are untracked or poorly communicated.

- Parents struggling to teach budgeting to children financial literacy is rarely taught effectively at home, leaving kids unprepared for real-world money management.
- One person bearing the entire financial burden When one family member handles all finances, others may feel excluded, mistrustful, or unaware of the household's financial health.
- Lack of awareness until problems arise Families often don't realize they're over budget or facing financial hardship until bills pile up or spending becomes unsustainable.
- Existing tools are bank-centric and overly complex Most financial apps focus on linking bank accounts or tracking individual spending. They lack features that support shared responsibility, communication, and education within families.

We believe that a well-designed, intuitive application can transform household money management from a source of conflict into a platform for cooperation. Our goal is to create a tool that fosters transparency, shared responsibility, and financial confidence for every member of the family.

3. Vision

Managing household finances should be a collaborative effort, not a source of conflict. Our vision is:

"To change the handling of household finances from a point of contention to a forum for cooperation."

Based on this vision, our application is designed to help families achieve the following goals:

- Distribute the duties of financial planning Every family member can participate in budgeting, tracking, and planning according to their role.
- Have frank discussions about money without passing judgement The platform encourages open, honest conversations about spending, saving, and financial priorities.
- Instruct kids and teens in wise financial practices Children and adolescents can learn budgeting and responsibility through simplified interfaces tailored to their needs.
- Make assured, well-informed financial decisions together Families can view real-time data, track progress, and make decisions with clarity and confidence.

This application is more than a budgeting tool—it is a communication platform that transforms financial data into mutual understanding and shared responsibility.

4. Real-World Challenges and Solutions

Challenge	Solution
Untracked spending causes arguments between couples.	Shared expense views for user-specific profiles.
All money is handled by one person, which breeds distrust.	Role-based access for kids, partners, and parents.
Budgeting is difficult for parents to teach.	Kid-friendly interfaces for tracking pocket money.
Monthly budgets are not adhered to by families.	Centralised planner with indicators of actual vs live progress.
Stress related to money is not recognised until it is too late.	Dashboards with alerts for overbudget categories.
Multiple payment methods obscure the complete financial picture.	Unified local tracking for all payment methods.
International family members contribute but lack visibility.	Transparency through shared views and exportable reports.

These solutions are designed to address not only technical gaps but also the social and emotional dynamics that affect financial harmony within families.

5. Key Features

Technical Implementation

Feature	Implementation
GUI Framework	Blazor Hybrid (.NET 8) with MudBlazor (Material Design UI)
.NET Platform	C# (.NET 8) with Visual Studio 2022
Data Storage	SQLite with Entity Framework (local-first)
LINQ & Lambda	Filtering, summaries, and queries
Delegates	Callback functions for sorting and calculations

Generics/Collections	List<T> for managing budgets and expenses
Interfaces/Polymorphism	Role-based logic and report generation
Unit Testing	NUnit for validating budget limits and logic

The application will be compiled and demonstrated using Visual Studio 2022 with .NET 8, ensuring compatibility with course requirements.

6. GUI Design and Interfaces

The frontend will be built using React, which guarantees responsiveness and adherence to contemporary UI/UX standards. Blazor Hybrid seamlessly integrates.NET backend logic with desktop and web environments.

Key GUI features include:

- Dashboard visual summaries: Immediate view of financial metrics and trends.
- Budget planner with categorized expenses: Clear tracking and planning.
- Expense tracker with user attribution: Each transaction linked to a user profile.
- Easy authentication and user management: Simplified login and role management.
- Saving goal and transaction features: Efficient financial goal tracking.

Blazor components and React state management ensure smooth data flow, unified user experience, and effective engagement across roles.

7. Data Management and Security

SQLite will be used to store all application data locally, preserving user privacy and enabling offline access. Database interactions will be managed by Entity Framework, allowing for dependable and effective CRUD operations.

Security features include:

- User-friendly security management: Simple but strong security measures.
- Local encryption: Protects sensitive data.

Users maintain complete control and data sovereignty by staying away from cloud services and third-party servers.

8. Entities and Services Overview

Domain	Entities	Services / Features
User Management	User, Profile	Easy authentication, User management, Role assignment
Finance	Transaction, SavingGoal, Budget	Transaction recording, Categorization, Saving goal tracking, Budget planning
Security	UserCredentials, EncryptedData	Local encryption, Secure login, Simple strong security measures
GUI / Interface	Dashboard, Planner, Tracker	Visual summaries, Expense tracker, Budget planner, Responsive UI
Data Management	SQLite Database, EF Models	CRUD operations, Data persistence, Offline access

Brief Explanation:

- User Management: Simplifies role assignment, profile management, and login.
- Finance: Maintains saving objectives, keeps track of and classifies transactions, and aids in budgetary planning.
- Security: Preserves simplicity and privacy by locally protecting sensitive data.
- GUI / Interface: Across devices, dashboards, planners, and trackers offer clarity and usability.
- Data Management: EF and local storage guarantee dependable, offline data operations.

9. Testing and Validation

To ensure reliability and correctness, unit tests will be implemented using NUnit, focusing on the core functionalities of the application.

Key test cases include:

- Saving goal service tests: Verify the correct creation, update, and tracking of saving goals.
- Transaction service tests: Ensure that transactions are accurately recorded, categorized, and attributed to the correct user.

Early in the development cycle, testing will be incorporated to quickly identify problems and guarantee reliable application behaviour.

10. Team Contribution

Member	Responsibility
Chi Yui Steve Chak	Designing React user interfaces, creating forms, and visualising charts
Jang Jungho	Implementing backend logic using Blazor, managing file I/O operations, and conducting unit testing

Together, both team members will collaborate on final presentation, debugging, and system integration. The division of labour ensures that each member makes a meaningful contribution while developing complementary technical skills throughout the project.

11. Conclusion

Beyond software requirements, the Family & Household Financial Tracker tackles practical issues that families encounter when working together to manage their finances. In addition to making precise budgeting and transaction tracking easier, the tool promotes open communication, accountability, and shared decision-making among all members of the household. It promotes financial literacy, establishes trust, and guarantees transparency in household money management by fusing cutting-edge technology with well-considered design.

This project goes beyond standard financial apps by offering a platform that is accessible to users of all ages and technical skill levels, allowing kids and teenagers to learn about financial responsibility in a fun and safe setting. Clear visual representations of spending, savings objectives, and budget progress help parents and partners avoid financial stress and misunderstandings.

Technically speaking, the application exhibits expertise in secure data management, responsive interface design, GUI development, and thorough testing. Performance and usability are guaranteed in desktop and web environments using React, Blazor Hybrid, and local-first database architecture.

In the end, the final product is prepared to satisfy academic requirements and provide a noticeable, beneficial influence on regular family life. It serves as an example of how thoughtfully designed software can improve financial literacy, foster family cooperation, and promote social well-being in significant ways.