Evergreen Budgeting: A Personal Budgeting Application

Honours Individual Project Presentation

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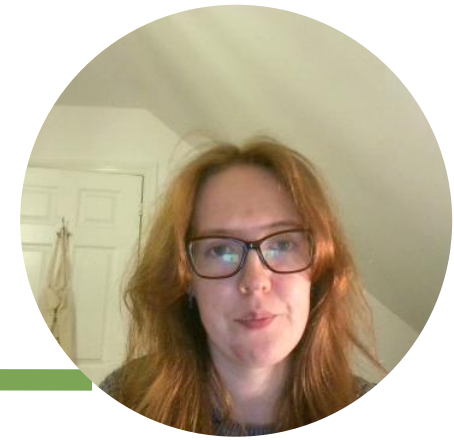
March 2025

Motivation & Goals of the Project

Motivation

- Budgeting is a fundamental practice that allows personal goals to be met

- Helps maintain financial stability, reduce stress and improves financial literacy

- Financial literacy often overlooked in education

- Technology can help provide intuitive tools

- Current solutions are either overwhelming or too rigid

Goals

- Develop a mobile-friendly personal budgeting app

- Allow users to:
  - Track, log, edit and delete their spending, income and savings
  - Set and monitor a category-based monthly budget
  - Define savings goals
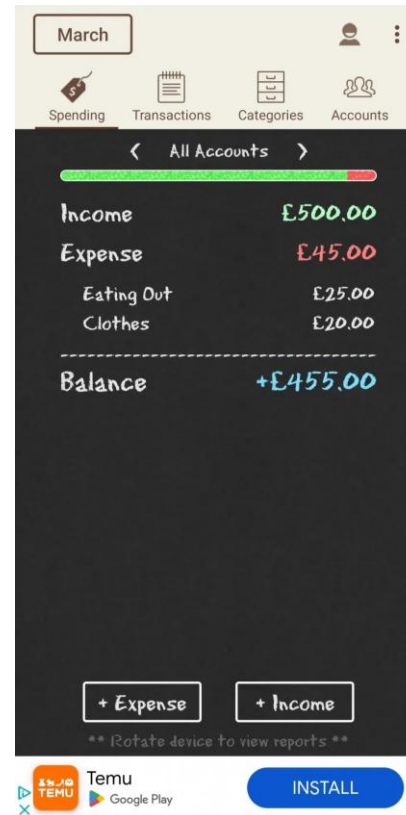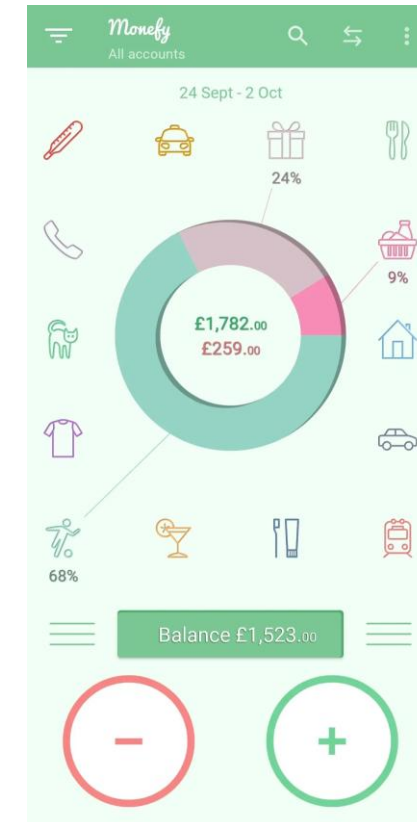 - Generate reports on their financial activity

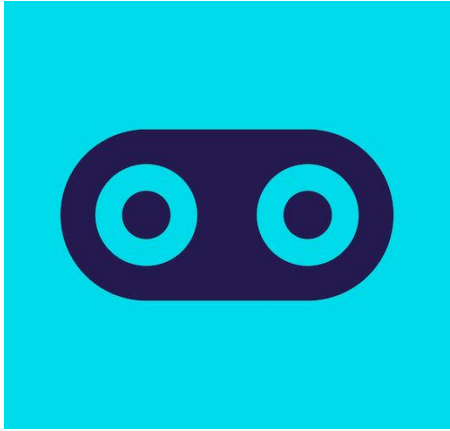# Existing App Comparison

GoodBudget

Spending Tracker

Monefy

Existing App Comparison

Snoop

PocketGuard

YNAB

Rocket Money

Existing App Comparison

Key Insights

- Manual-entry are simpler but lack insights

- Bank-integrated have more complex features but are often unreliable

- Bank-integrated apps often try and sell their own products

- Customisation and flexibility are favoured but often lacking

- Ease of use more important that number of features

Gaps Identified

- Paywalls

- Lacking reporting and visualisation tools

- Limited savings goal tools

- Syncing and backup features often unavailable

- Limited reporting periods (e.g. weekly, monthly, etc)

User Survey

- Aimed to:
    - Gather data on how people budget and the tools they use to do so
    - Validate issues/wants found in the app comparison
    - Gain understanding of budgeting habits and features user like/want

- Gathered feedback from people who do and don't budget
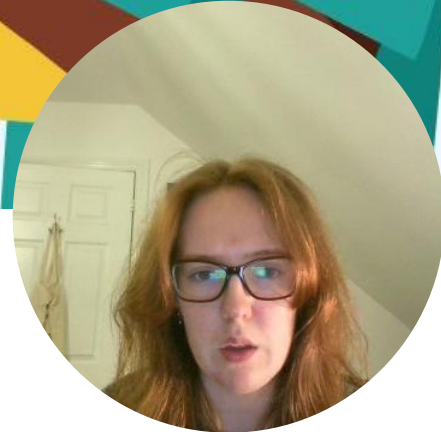
Results Relevant to App Design

- Received 51 responses

- App should be mobile friendly as 63% use their phone to mange their finances

- Weekly and monthly were the most popular budgeting periods

- Most common tool with spreadsheets, with only 11% currently using a budgeting app
  - 92% said they'd be willing to use one

- Most requested features were:
  - Spending/income tracking
  - Categorisation of expenses
  - Charts & reports
  - Savings goal tracking

- App should be simplistic, flexible and easy to use

What Devices Participants Use to Manage Their Finances
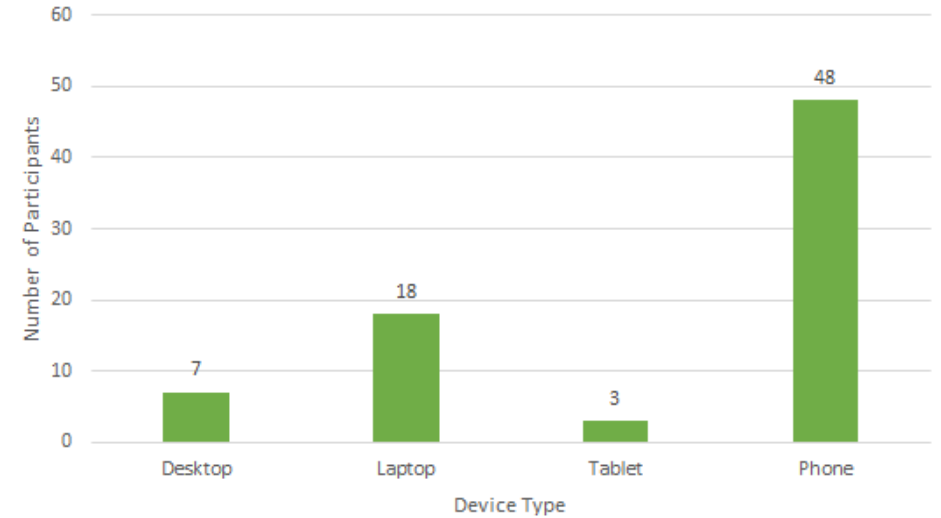
What methods do you currently use to manage your budget?

Pen and Paper
Spreadsheet
Budgeting App
Banking App
Other
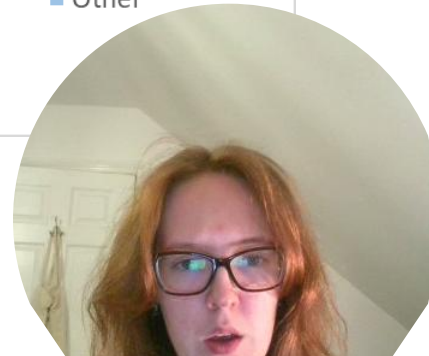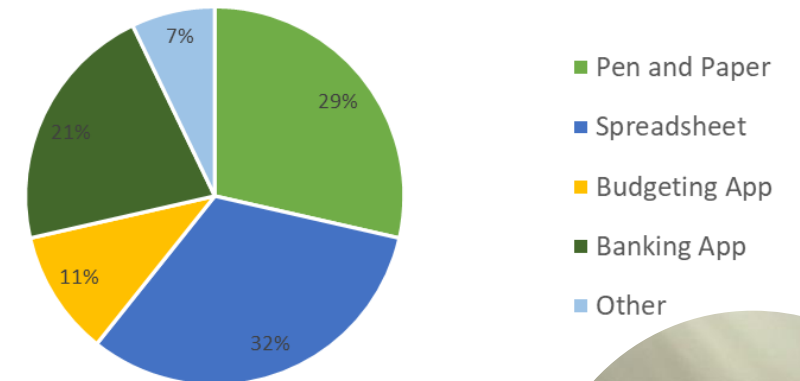
MoSCoW Prioritisation

Must Have

1. Secure login
2. Set a default currency
3. Log spending & income
4. Vie reports on financial activity
5. Set and track a budget based on spending categories
6. Clearly view when overspending has occurred
7. Mobile friendly with PWA capabilities

Should Have

1. Assign currency to each transaction
2. Create custom categories
3. Create & track multiple bank accounts
4. Charts on spending by shop, payment method, etc
5. Reports on specific bank accounts
6. Additional savings goals formats

Could Have

1. Automatic conversion between currency types
2. Variable payment amounts for repeated transactions
3. Additional reporting periods for charts
4. Export data in PDF or Excel
5. Tailored suggestions on where to reduce spending
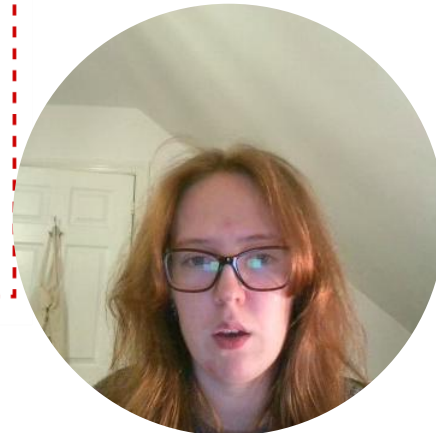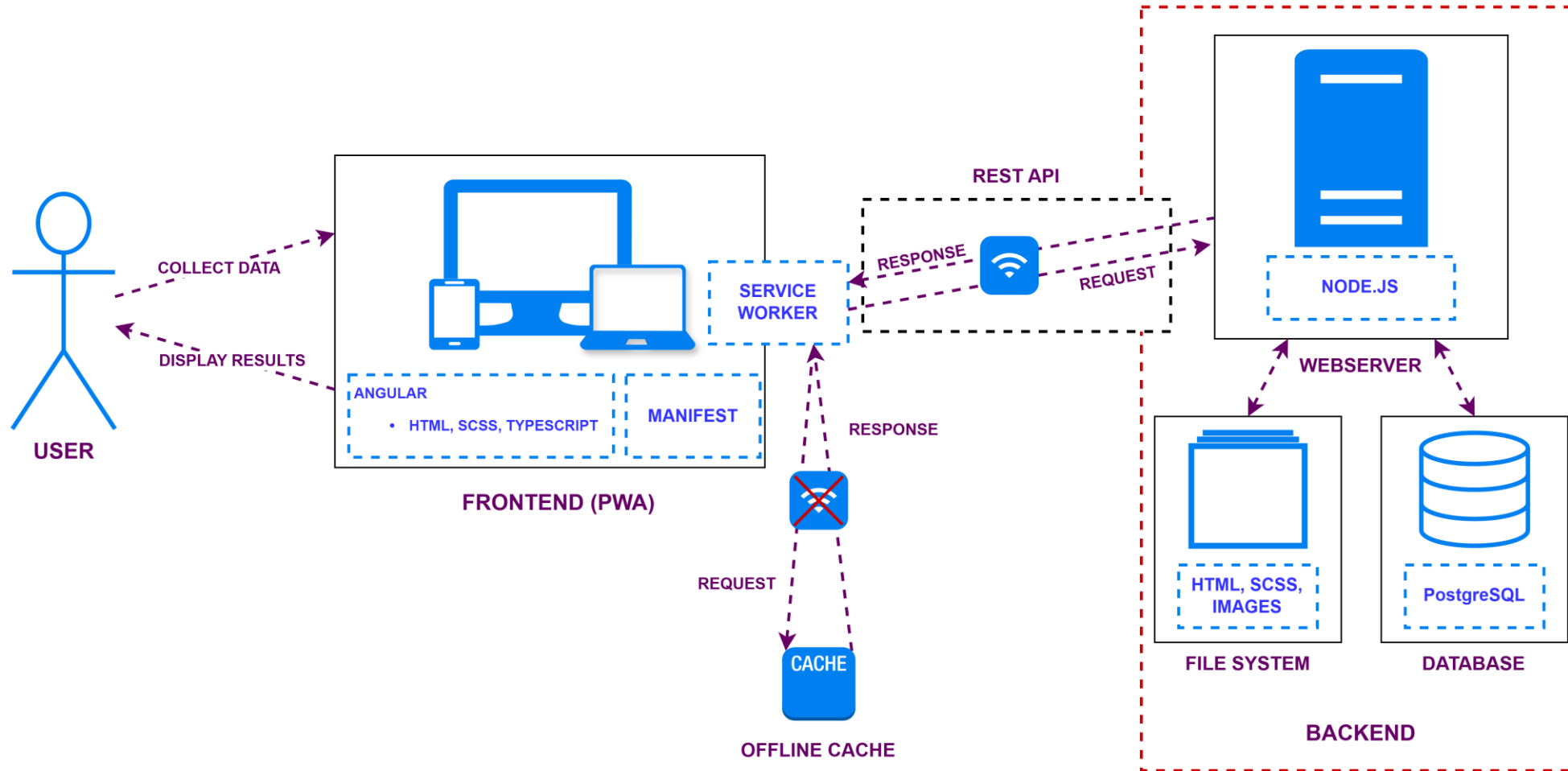6. Automatically calculate interest gained on bank accounts

Won't Have

1. Automatic categorisation of transactions
2. Bank account integration

Architecture Design

MVP ER Diagram

USER

PK	user_id
	username
	email
	password
	default_currency
	starting_balance

CATEGORY

PK	category_id
	name
	category_type

SAVINGS_GOAL

PK	goal_id
FK1	user_id
	goal_amount
	goal_due_date
	starting_savings

TRANSACTION

PK	transaction_id
FK1	user_id
FK2	category_id
	type
	name
	transaction_date
	amount
	shop
	payment_method
	repeat
	repeat_schedule
	end_date

BUDGET

PK	budget_id
FK1	user_id
FK2	category_id
	limit

AIMS FOR

MAKES

SETS

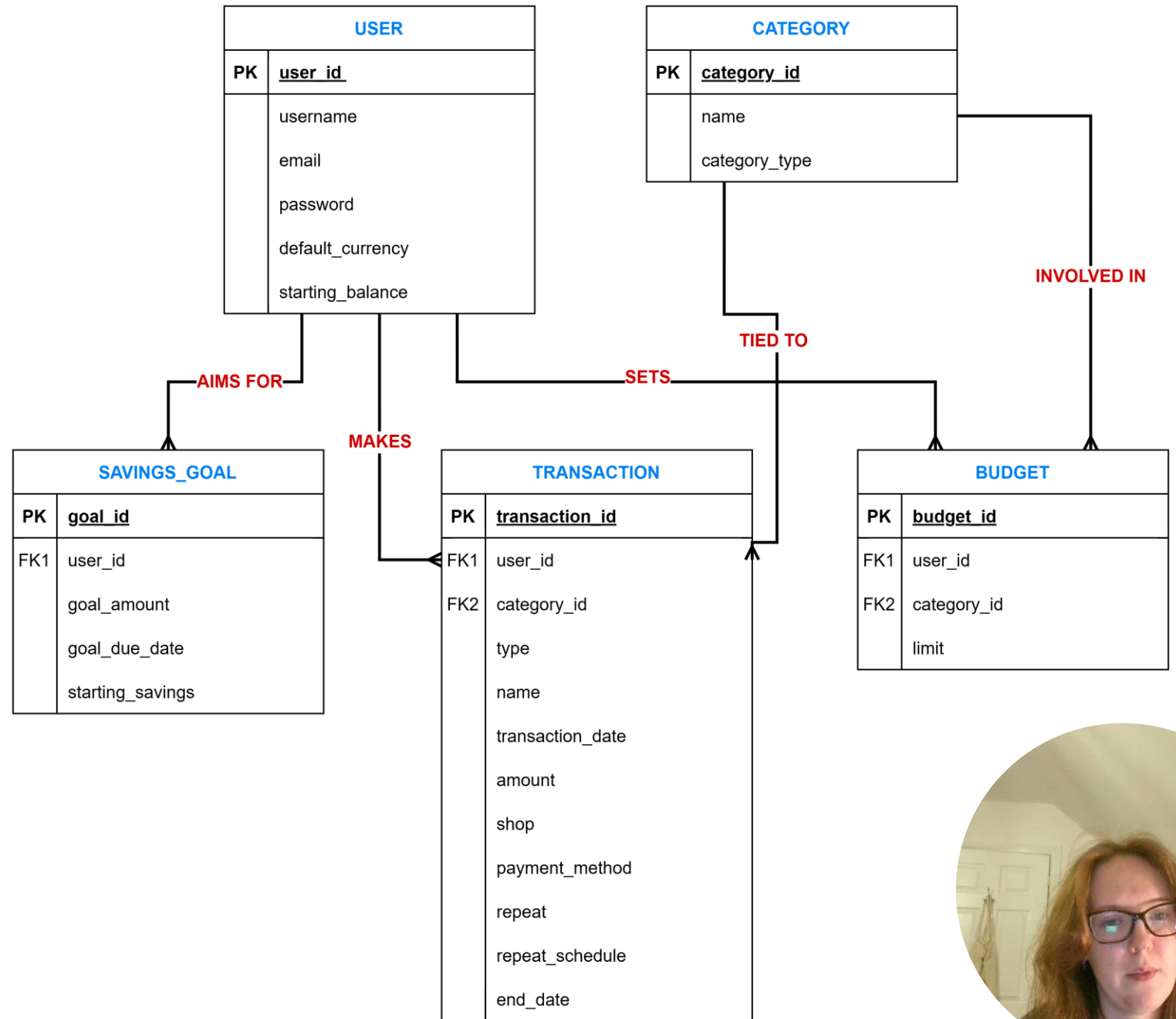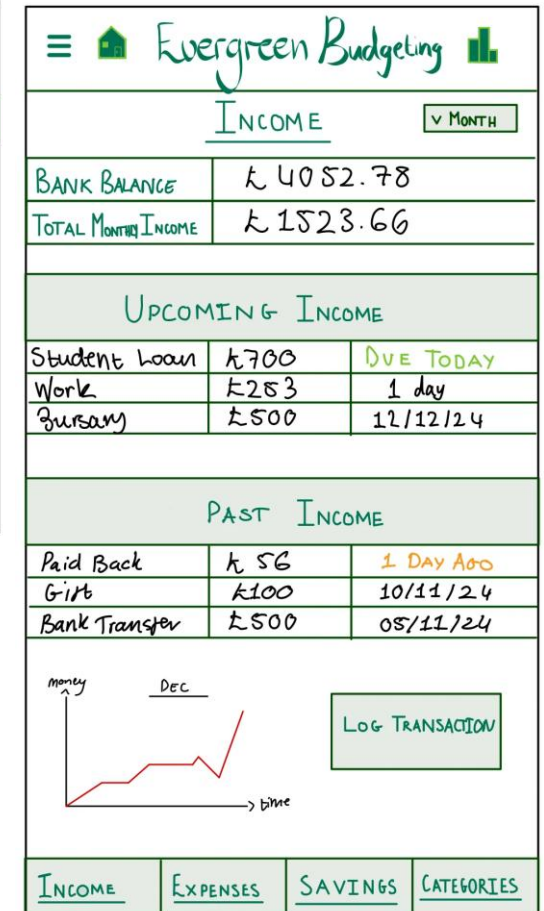TIED TO

INVOLVED IN
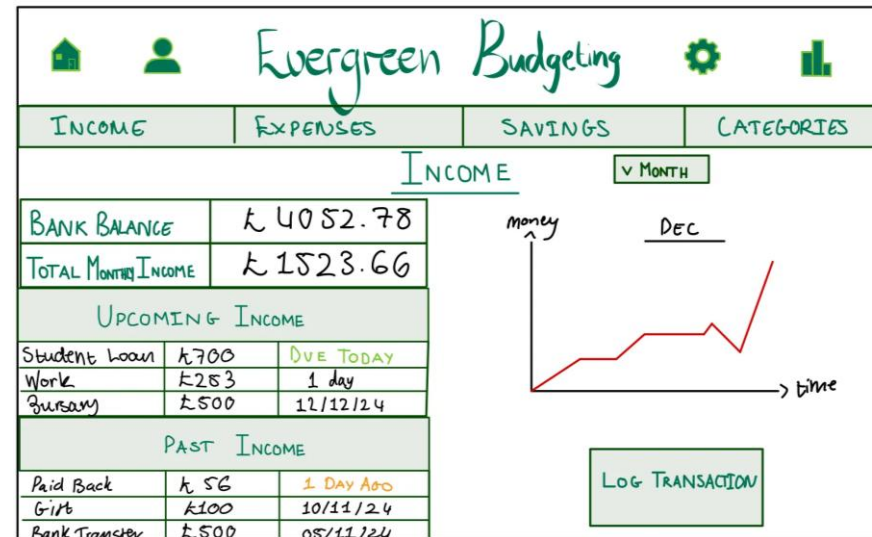
Wireframes

- Drawn for each main page

- Both a phone and desktop view

- Name was decided on as:
    - Ties into the "Money Tree" idea
    - Evergreen has connotations of longevity
    - Green commonly associated with money

- Nature palette and design for a calming feel

- Logo also designed

Wireframes

Home Page

Budget Page

Reports Page

Software Engineering Practices

Version Control

- Git and GitHub

- Feature Branching

- Small and regular commits

- Each commit tied to a relevant issue

Issue Management

- Milestones used for major features

- Kanban board: backlog, to do, in progress, done

- Time estimates: t-shirt sizes

- Priority labels: low, medium, high

- Closed either with a commit or a closing comment

Continuous Deployment

- Master branch treated like production

- Pushes to master automatically deployed to the hosted application

- Frontend hosted using Firebase

- Server hosted using Vercel

- Database hosted using Supabase

EVERGREEN
– BUDGETING –
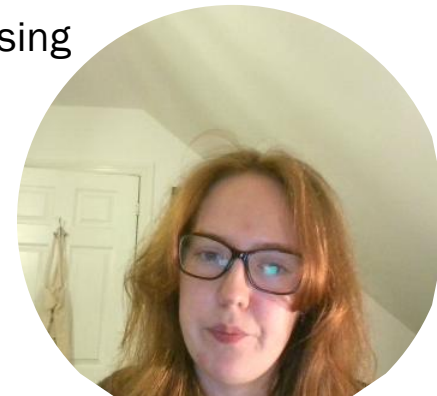
Home   Transactions   Budget   Reports   → Log In

Sign In

Username/Email:*

Password:*

Sign In

New to Evergreen? Register Here!

Security

SQL Injection

- An attack that imbeds malicious SQL queries through form inputs or URL parameters

- Parameterised queries used throughout to sanitise inputs

Authentication

- JSON Web Tokens (JWTs) are used to restrict access to the app

- Created at login and expire after an hour

- Can't access the server or database without a valid JWT

- Will be immediately logged out if a valid JWT isn't found

Passwords

- Passwords are hashed with a salt

- Plaintext passwords are never stored

- Password comparison on login is done in the database

CORS

- Cross-Origin Resource Sharing (CORS)

- Determines what domains can access the server

- Only allows access to the hosted frontend when in production

- Localhost is only allowed when in development or test mode

- All traffic is served over HTTPS

Testing

- Unit tests done for the frontend and server
  - Both exceed the industry standard of 80% coverage
  - Each Angular component and service is covered by tests
  - Each file in the server is covered
- User testing was conducted using the evaluation participants to perform tasks and ensure all outputs and interactions behaved as expected
- Storage capabilities of the database tested
- Manual system testing was also conducted using generated mock data

16

All files

96.17% Statements 628/653   87.03% Branches 94/108   98.91% Functions 91/92   96.1% Lines 617/642

Press *n* or *j* to go to the next uncovered block, *b*, *p* or *k* for the previous block.

Filter:

File ▲		Statements		Branches		Functions		Lines	
api		99.13%	342/345	82.14%	23/28	97.77%	44/45	99.11%	337/340
api/database-queries		92.85%	286/308	88.75%	71/80	100%	47/47	92.71%	280/302

All files

92.98% Statements 967/1040   85.83% Branches 200/233   91.24% Functions 417/457   93.18% Lines 916/983

Press *n* or *j* to go to the next uncovered block, *b*, *p* or *k* for the previous block.

Filter:

File ▲		Statements		Branches		Functions		Lines	
app		100%	3/3	100%	0/0	100%	1/1	100%	2/2
app/bank-balance		100%	56/56	100%	8/8	100%	24/24	100%	54/54
app/bar-chart		100%	44/44	100%	12/12	100%	21/21	100%	43/43
app/budget-page		100%	26/26	100%	2/2	100%	13/13	100%	24/24
app/budget-table		92.45%	49/53	92.85%	13/14	89.28%	25/28	98%	49/50
app/data-structures		100%	3/3	100%	0/0	100%	1/1	100%	2/2
app/display-savings-goals		90.62%	58/64	90%	9/10	88.88%	24/27	89.83%	53/59
app/home-page		100%	8/8	100%	0/0	100%	3/3	100%	7/7
app/line-graph		100%	43/43	100%	12/12	100%	21/21	100%	42/42
app/log-transaction-page		80.76%	84/104	62.96%	17/27	79.31%	23/29	80%	80/100
app/login-page		100%	15/15	100%	4/4	100%	7/7	100%	13/13
app/nav-bar		100%	12/12	100%	1/1	100%	5/5	100%	11/11
app/net-income-table		100%	24/24	100%	0/0	100%	15/15	100%	24/24
app/pie-chart		97.67%	42/43	100%	6/6	95.23%	20/21	97.67%	42/43
app/register-page		100%	43/43	100%	16/16	100%	21/21	100%	41/41
app/reports-page		100%	10/10	100%	0/0	100%	4/4	100%	10/10
app/savings-area		100%	24/24	100%	2/2	100%	12/12	100%	22/22
app/services		88.07%	96/109	100%	3/3	83.54%	66/79	87.73%	93/106
app/set-budget-page		92.02%	127/138	74.07%	40/54	89.65%	52/58	92.18%	118/128
app/set-savings-goal-page		97.61%	41/42	88.88%	8/9	100%	17/17	97.36%	37/38
app/table-action		70.96%	22/31	50%	3/6	55.55%	5/9	67.85%	19/28
app/transaction-display-page		91.3%	21/23	75%	3/4	85.71%	6/7	90.47%	19/21
app/transaction-table		93.81%	91/97	94.11%	32/34	89.28%	25/28	95.55%	86/90
app/watering-can		100%	24/24	100%	9/9	100%	6/6	100%	24/24
environments		100%	1/1	100%	0/0	100%	0/0	100%	1/1

Evaluation

Aims

- Assess whether the application meets the MVP requirements

- Determine whether the application is:
    - Easy to use
    - Mobile-friendly
    - Intuitive

- Identify areas for improvement

- Test the system through a number of structured tasks to observe if the system responds as expected

Methodology

- Task-based evaluation

- Monitored and un-monitored participants

- Asked questions on:
    - Demographic information
    - If they managed to successfully complete the tasks
    - Satisfaction with the features
    - What they would change

- Post-task questions focused on usability, pain points and overall experience

Main Results

- 20 participants, 11 supervised and 9 unsupervised

- All tasks were successfully completed, with only 2 bugs being identified, which were fixed promptly

- The app was reported to be:
  - Intuitive and user-friendly
  - Clean design and strong visualisation

- 55% of participants stated they would switch to using the app over their current method, with multiple inquiring when they could start using it

- Issues identified:
  - Savings being under Transactions
  - Flag icon for adding a savings goal
  - Tying transactions to goals
  - Date filtering
  - Mobile-usability issues around table displays and touch-screen features

Would this app replace your current budgeting method?

- Yes
- No
- Maybe

55% Yes, 30% No, 15% Maybe
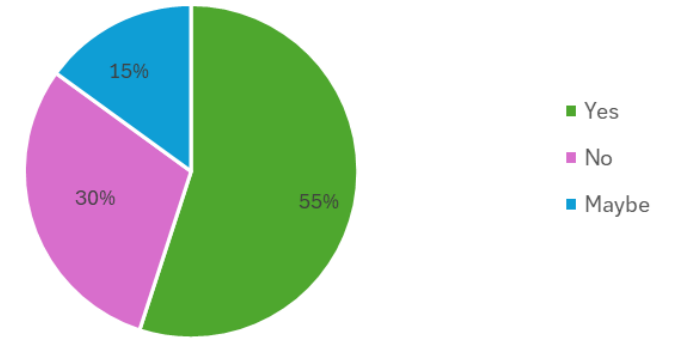
What version of the app was preferred
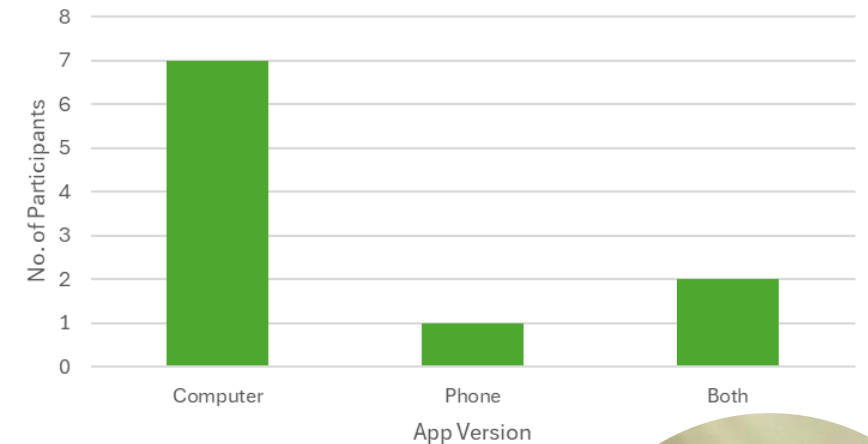
MVP Requirements Evaluation

Requirement	Met?
Secure Login	✔
Default Currency	✔
Log spending & Income	✔
View Reports on Financial Activity	✔
Set & Track Budget	✔
Clear Overspending Indication	✘
Mobile Friendly with PWA Capabilities	✘
Easy to Use	✔
Intuitive	✔
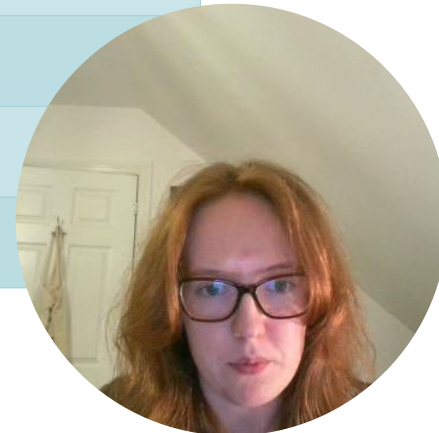
Future Work

Mobile Usability

- Change table displays on mobile to contain less info

- Have rows expand when clicked

Reporting & Customisation

- Allow historical reports to be viewed

- Additional reports such as breakdowns per shop, etc

Custom Categories & Multiple Bank Accounts

- Allow users to create their own categories

- Allow multiple bank accounts to be created and tracked

Linking Savings to Goals

- Allow individual savings transactions to be tied to specific goals

- Allow percentage of bank accounts to be tied to goals

Bank Integration

- Integrate optional bank links so the app will work with or without this functionality

Thank You for Listening

If you have any questions, I can be reached at 2635375B@student.gla.ac.uk.

The hosted application can be found at https://evergreen-budgeting-app.web.app

The repository for the project can be found at https://github.com/kirstyb2003/evergreen-budgeting-app