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CS251: Intro to Software Engineering

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Pre-Project Activities.

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Pre-Project Activities

Market and Gap Analysis:

Global Practices:

1. Mint:

a. Overview:

- I. Mint.com was originally created by Aaron Patzer
- II. Mint.com, was a personal financial management website and mobile app for the US and Canada.

b. Features:

- I. Budgeting: It makes a budget for each category, It automates budget expense categories to transactions as they come in.
- II. Investment tracking: It allows the users to track where to invest their money. It helps the user to monitor the market and the real estate investments
- III. Security features: It includes multi-factor authentication for accessing your account, it also requires a 4-digit code to view your account or Touch ID.
- IV. Bill reminders: it will give you alerts to remind you to pay the upcoming bills and not to miss payment again.
- V. Savings goal: This feature is used for setting up short-term or long-term savings goals such as buying an apartment, or a car
- VI. Data visualizing: Graphs transform raw financial data into visually stunning representations

c. User Experience:

- I. You have to recategorize many of your transactions. Really frustrating.
- II. Need a more formal income and expense report.
- III. You can't change the date that our month starts on.
- IV. The desktop version is much more useful.

V. Easy to use, fully automated, free to use.

VI. Ads for premium services.

Egypt's Market:

1. MoneyFellows:

a. Overview:

I. The first and biggest Money Circles app in Egypt

II. Money Circles with a legal contract supervised by the Central Bank Of Egypt Regulatory Sandbox with their banking partner Banque Misr monitoring all their banking transactions and users' payouts.

b. Features:

I. Unlimited Payouts: Payouts up to 1,200,000 EGP and you can join as many circles as you want

II. Cashback on your Payout: Save up to 1,000,000 EGP in installments with up to 20% cashback on your payout

III. Easy Payments: Money Fellows Card, Credit/ Debit Cards, Pre-paid Cards, Bank Transfers, Fawry, E-wallets.

IV. Flexible Durations: Flexible circle durations over 6, 10 or 12 months

c. User Experience:

I. Their call center requests you to make an edit if you have made a mistake

II. After the new update there were too ununderstandable fees .

III. Some users can't understand some feature

Gap Analysis:

1. Lack of communication: Many users find it difficult to communicate with the call center or customer support in existing budgeting apps, Long wait times, Lack of 24/7 availability.

2. Limited Reporting: Most apps in Egypt provides only basic reports and lack of visualizations, predictive insights.

3. Lack of AI Integration: Most Arab budgeting apps do not integrate AI into their platforms, there is no AI driven financial planning that suggests optimal budgets based on income and expenses, no Personalized recommendations to save money or reduce overspending, no forecasting future spending based on past behavior.

4. Lack of Financial Education: Most Egyptian apps do not provide financial education or resources to help users improve their financial literacy, users may not know how to use these features or how to set realistic goals.

5. Limited Multi-Currency Support: In the Egyptian market they only support Egyptian pounds and do not offer multi-currency support so the users can not easily track their finances if they have multiple currencies that they get from their income.

Market segmentation and targeted audience:

If we decided to study the market segmentation for an software like the budgeting app and its importance nowadays and many categories in the societies will use it in different ways , different requirements and the degree of importance for them

1. Age

● From(18-24)

- .In this age this tends to use mobile and technology more
- 2.May need help with student debt, part-time income, or early career budgeting.
Or for paying their university expenditures

● Millennials (25–40):

- Focused on financial goals like saving for homes, paying off loans, or starting families.
- Interested in automated savings, investment tracking, and debt management.
- May prefer apps that integrate with other tools (e.g., banking, credit cards).

● From(47-51)

- Here they less familiar with technology and intend to use old way
Like writing their pays and manage in a notebook
- Consider more on saving money for retirement

2. Income level

- **Low income:**

More need it to manage their expenses and prevent any lack in money as it may cause them a big problem as they will have many responsibilities related to taxes

- ***Middle and high income***

The most of them is having many responsibilities related to as home taxes of car taxes and many other payments that they may not have time to manage it so such a software will help them a lot

- ***Freelancers/Gig Workers:***

Require tools for irregular income, tax withholdings, and expense tracking. And management as their income is not constant every month and may gain money or not so they need well management

- ***High-Net-Worth Individuals:***

- Focused on wealth management, multi-account aggregation, and tax optimization. They are the least who may need such a software as most of them have lawyers and assistants that manage their money

Income stability for country

- ***Stable Economies*** (e.g., U.S., Germany):

- Users focus on long-term goals (retirement, investments, vacations). As they become more careful while dealing with money so a software like that will gather a lot of users in these countries
- This may spend money on things more than essential than the normal person needs so they will need a system to manage all things
- The engineers may have a challenge that these countries are evolved in technologies and the software should have innovative features to gather users to use it and to compete with other softwares and applications

- ***Unstable Economies :***

- Users prioritize day-to-day survival budgeting. So they may not need to track their payment as they spend it on essential things like medicine, food and education only

- o Key features:
 - Basic expense tracking with minimal data usage.
 - Offline functionality (poor internet access in some regions). Which is not important as the software with online features
 - SMS-based alerts for low-tech users
- o Monetization challenges: Users may resist paid subscriptions but engage with ads or microtransactions.

3. Regions with High Inflation or Economic Instability (, Turkey)

These regions are prime targets for budgeting apps because users face unique financial pressures:

- **Hyperlocal Needs:**
 - o **Rapid price changes:** Users need real-time expense tracking and alerts for rising costs (e.g., groceries, utilities).
 - o **Currency devaluation:** Multi-currency support or tools to hedge against inflation (e.g., converting savings to stable currencies like USD).
 - o **Irregular income:** Gig workers or those with unstable jobs need flexible budgeting for unpredictable cash flow so the software will not be able to deal with the user's budgeting and payments, and also many of them work with part-time jobs beside their stable jobs so calculating their budgeting and organizing it for long-term is impossible
- **Behavioral Shifts:**
 - o People in high-inflation economies are **more cost-conscious** and likely to adopt tools to stretch their budgets.
 - o Most of them doesn't have bank accounts so such software may not help low-income people in their budget organizing

4. Psychographic Segmentation

- **Financially Disciplined Users:**
 - o Want detailed analytics, customizable categories, and exportable reports. Warning messages if there is over paying
- **Financially Struggling Users:**

- o Need alerts for overspending, bill reminders, and debt payoff strategies.
- **Privacy-Conscious Users:**
 - o Prefer offline-first apps or end-to-end encryption (e.g., local data storage).
- **Gamification Seekers:**
 - o Motivated by progress bars, badges, or rewards for hitting savings goals.

3. Behavioral Segmentation

- **Frequency of Budgeting:**
 - o Daily trackers vs. monthly planners.
- **Tech Savviness:**
 - o Power users (spreadsheet enthusiasts) vs. novices (need guided tutorials).
- **Willingness to Pay:**
 - o Free users (ad-supported) vs. premium subscribers (ad-free + advanced tools).

Domain Analysis

1. Introduction

This document explores the science of budgeting, money tracking, and saving. Its purpose is to guide the development of software that helps individuals manage their money flow efficiently. By analyzing income, expenses, and savings, users can gain insight into spending habits, identify even the most insignificant expense categories, and ultimately optimize their financial well-being.

2. Glossary

Key terms simplified for software development clarity:

a. Gross Income

Definition: The total income earned by an individual before any deductions.

Sub-glossary: Income Sources Examples

- i. **Salary:** Regular earnings from employment.
- ii. **Bonuses:** Additional earnings awarded periodically.
- iii. **Freelance or Contract Work:** Income from self-employed activities.
- iv. **Investments:** Earnings from dividends or interest.

b. Deductions

Definition: Amounts subtracted from gross income, including taxes, insurance premiums, retirement contributions, and other mandatory expenses.

Purpose: To determine the actual take-home pay available for budgeting.

c. Net income

Definition: The income remaining after all deductions have been subtracted from the gross income, also called “Take-home pay”.

Usage: This is the actual amount available for covering expenses and saving.

d. Categories of expenses

Definition: Various classifications of expenditures that help users understand where their money is going.

Examples of Basic Expense Categories:

Life Expenses: Includes rent, utilities, groceries, and essential daily needs.

Housing-Related Expenses: Mortgage or rent payments, property taxes, and maintenance.

Loan Payments: Car loans, student loans, and mortgage loans.

Transportation: Expenses for fuel, public transit, or vehicle maintenance.

Entertainment and Dining: Costs associated with leisure, dining out, and recreational activities.

e. Variable expenses

Definition: Costs that fluctuate from month to month, such as dining out, entertainment, or utility bills during seasonal changes.

Importance: Monitoring these can help identify spending patterns and opportunities for adjustment.

f. Fixed expenses

Definition: Regular, recurring costs that remain relatively constant each month, such as rent or subscription services.

Impact: These form the baseline of the budget and are essential for planning long-term financial commitments.

g. Emergency Fund

Definition: A reserve of money set aside to cover unexpected expenses or financial emergencies.

Significance: Establishing and maintaining an emergency fund is crucial for financial stability and reducing reliance on credit in times of crisis.

h. Saved Money

Definition: Portion of income intentionally set aside for future use, goals, or emergencies.

Subcategories:

Emergency Fund (see dedicated glossary entry).

Retirement Savings: Long-term savings.

Short-Term Savings: Funds for upcoming goals (e.g., vacation).

3. General knowledge about the domain

Monthly Financial Cycle

- Begins when salary/net income is deposited.
- Fixed expenses (rent, loans) are prioritized.
- Variable/discretionary expenses are tracked throughout the month.
- When adding a payment, the user selects a category and enters the amount.
- Remaining funds are allocated to savings, debt repayment, or investments.

Tracking Transactions

- Each expense is logged under a category (e.g., "Groceries," "Entertainment").
- The user can track total spending per category or for the entire month.

4. Customers and users

The primary users of this software include:

- **Individuals and Families:** Seeking a better understanding of their personal cash flow to make informed spending and saving decisions.
- **Young Professionals and Students:** Who are new to budgeting and need a simple yet effective tool to manage limited resources.
- **Self-Employed or Freelance Workers:** Who require tailored budgeting features that accommodate variable income streams.

5. The environment

The software is designed to operate in a digital, connected environment that may include:
Mobile and Desktop Platforms: Enabling users to access their budgeting information on the go or at home.

Integration with Financial Institutions: Allowing secure import of bank transactions and real-time updates.

Cloud-Based Data Storage: Ensuring that users' data is safely stored, backed up, and accessible from multiple devices.

User Interface Considerations: A focus on simplicity and clarity to assist users in quickly understanding and managing their financial data.

6. Tasks and procedures currently performed

income Tracking:

- Automatically aggregate income details from various sources (e.g., salary, bonuses, freelance earnings).

Expense Tracking:

- Record every expense and categorize it by type (e.g., housing, transportation, daily needs).
- Consolidate expense data from receipts, bank transactions, and manual entries into a unified system.
- Ensure that all expense entries are consistent and easy to review.

Budget Review and Analysis:

- Generate monthly summaries that compare actual spending against pre-planned budgets.
- Provide visual reports and insights into spending patterns for better decision-making.
- Offer automated calculations to simplify budget review processes.

The Proposed Solution

Purpose and Goals:

The proposed Personal Budgeting Software aims to help users manage their personal finances effectively by providing tools for income and expense tracking, automated budgeting, financial goal setting, and AI-driven insights. The high-level objectives are:

- Simplify personal finance management for users in the Arab region.
- Offer localized features (e.g., Arabic language,).
- Provide advanced reporting and predictive insights to help users make smarter financial decisions.
- Address gaps in existing apps (e.g., lack of AI, poor communication, limited multi-currency support).

Key Features and Functionality:

1. Automated Budgeting:
 - Automatically categorize transactions using AI.
 - Set spending limits and track progress in real-time.
2. Income and Expense Tracking:
 - Sync with local banks and e-wallets for real-time transaction tracking.
 - Support multi-currency for users with international income or expenses.
3. Financial Goal Setting:
 - Set and track short-term and long-term goals (e.g., saving for a car, Umrah, or retirement).
 - Provide AI-driven recommendations to achieve goals faster.
4. Advanced Reporting and Insights:
 - Generate visual reports (e.g., charts, graphs) to show spending trends.
 - Offer predictive insights (e.g., forecast future spending based on past behavior).
5. 24/7 Customer Support:
 - Offer live chat, email support, and AI chatbots for instant help.
 - Ensure Arabic-language support for all communication channels.
6. Offline Functionality:
 - Allow users to track expenses and budgets offline.
 - Sync data automatically when the app reconnects to the internet.

Technologies:

1. Third-Party Integrations:
 - Banking APIs: Integrate with local banks (e.g., CIB, Banque Misr) and e-wallets (e.g., Vodafone Cash, Fawry).
 - Payment Gateways: Support local payment methods (e.g., Meeza, PayPal).
 - Cloud Services: AWS or Google Cloud for data storage and scalability.
2. Technical Decisions:
 - Platform: Mobile-first (iOS and Android) with a responsive web version.
 - Deployment: Cloud-based platform for real-time updates and scalability.
 - Security: End-to-end encryption and multi-factor authentication for user data protection.

How It Solves Gaps:

1. Lack of AI Integration:
 - Uses AI for automated transaction categorization, predictive insights, and personalized recommendations.
2. Limited Reporting:
 - Provides advanced reporting with visualizations and trend analysis.
3. Poor Communication:
 - Offers 24/7 customer support with live chat, email, and AI chatbots in
4. Limited Multi-Currency Support:
 - Supports multi-currency tracking and real-time conversion.
5. No Offline Functionality:
 - Allows users to track expenses and budgets offline.