**Problem Definition & Design Thinking**

**Title: COST ESTIMATION AND BUDGET ANALYSIS**

**Problem Statement:**

In today's competitive environment, mid-sized retail companies are increasingly investing in custom software solutions to streamline their operations and reduce overhead. However, many of these companies face challenges in accurately estimating project costs and maintaining financial control throughout the software development lifecycle. The absence of a systematic approach to cost estimation often results in budget overruns, inefficient allocation of resources, and delayed delivery timelines.

Many mid-sized firms struggle with project cost overruns due to vague estimations and poor budget tracking. This project focuses on building a reliable cost estimation and budget analysis model for a custom Inventory Management System to prevent financial mismanagement.

**Target Audience:**

* For managers aiming to avoid budget surprises in tech projects.
* For analysts who track project spending with precision.
* For students learning real-world cost control strategies.
* For startups needing smarter budgeting in development.
* For finance teams seeking project-based cost insights.

**Objectives:**

* To understand the concepts and methods of cost estimation.
* To explore techniques for effective budget analysis.
* To apply these concepts to a hypothetical project.
* To evaluate cost performance using analytical tools.

**Design Thinking Approach:**

**Empathize:**

Many project teams dive into development with only rough cost guesses, leading to stress, budget overruns, and tough last-minute decisions. By understanding their challenges—unclear estimates, shifting requirements, and limited financial foresight—we can create a smarter, more human-centered approach to budget planning.

**Key User Concers:**

* + - * Unclear cost breakdowns causing confusion during budget approvals.
      * Unexpected expenses derailing the project timeline.
      * Difficulty tracking real-time spending against planned estimates.
      * Lack of transparency between technical and finance teams.
      * Inaccurate forecasting leading to resource shortages or excess.

**Define:**

Cost estimation and budget analysis involve forecasting the total financial resources required for a project and continuously evaluating how actual spending aligns with those forecasts. It’s a strategic process that blends planning, prediction, and performance review to ensure a project stays financially viable from start to finish.

**Key Features Required:**

* Smart adjustment of costs as project changes occur.
* Live budget vs. actual spend tracking.
* Clear separation of all cost categories.
* Use of past data to improve future predictions.

**Ideate:**

Some pontential ideas for this solution include:

* Create modular templates for flexible cost estimation.
* Design real-time dashboards for expense tracking.
* Integrate historical data to refine future estimates.
* Build alert systems for overspending detection.

**Brainstroming Result:**

* Pinpointed gaps in cost prediction.
* Explored real-time budget tracking ideas.
* Suggested visual cost dashboards.
* Proposed auto-alerts for budget breaches.

**Prototype:**

Developing a basic chatbot where user can input their symptoms, and the chatbot provides:

* Designed a clean web interface for user-friendly navigation.
* Built a cost input panel with auto-calculation logic.
* Integrated a live dashboard to compare estimated vs. actual costs.

**Key Components Of Prototype:**

* **Cost Estimator –** Auto-calculates project costs based on inputs.
* **Budget Dashboard –** Real-time budget tracking and status.
* **Report Generator –** Exports data to PDF/Excel.
* **Forecast Tool –** Predicts future costs from past data.

**Test:**

The prototype was tested using sample project data to simulate real-world budgeting scenarios. Each module—cost estimation, tracking, and alerts—was evaluated for accuracy, responsiveness, and usability. Results showed reliable calculations, timely alerts for overspending, and smooth user interaction across all components.

**Test Goals:**

* Verify accuracy of automated cost calculations.
* Ensure real-time updates reflect actual spending changes.
* Test alert functionality for over-budget scenarios.
* Validate data export in PDF/Excel formats.