



Low Level Design Document

This Low Level Design (LLD) document outlines the implementation details for **TaskFlow - To-Do List Manager**, a React/TypeScript-based application for managing to-do tasks with creation, editing, completion, and filtering features.

1. System Components

Component	Description	Key Responsibilities
App	Root component	Routing, global state management
TaskList	Displays list of tasks	Render, filter, update task list
TaskItem	Represents a single task	Display, edit, complete, delete
TaskForm	Form for creating/editing tasks	Input validation, submit handling
FilterBar	UI for filtering tasks	Set filter state, trigger re-render
State Management	React Context/Reducer or useState	Store and update tasks/filter state

2. Class/Interface Overview

Name	Type	Description	Key Methods/Props
Task	Interface	Task data model	id, title, completed
TaskContext	Context	Global state for tasks/filter	tasks, addTask, editTask, toggleTask, deleteTask, filter
TaskList	Component	Renders filtered tasks	tasks, onEdit, onToggle
TaskForm	Component	Handles task creation/editing	onSubmit, initialData
FilterBar	Component	Sets current filter	filter, setFilter

Key Interface Example:

```
interface Task {
  id: string;
  title: string;
  completed: boolean;
}
```

3. Data Structure Overview



Field	Type	Description
id	string	Unique task identifier
title	string	Task description
completed	boolean	Completion status

State Example:

```
type TaskState = {
  tasks: Task[];
  filter: 'all' | 'active' | 'completed';
}
```

4. Algorithms / Logic

Task Filtering Logic:

```
function getFilteredTasks(tasks, filter) {
  if (filter === 'active') return tasks.filter(t => !t.completed);
  if (filter === 'completed') return tasks.filter(t => t.completed);
  return tasks;
}
```

Task Creation/Editing Flow:

1. User submits TaskForm.
2. Validate input (non-empty title).
3. If editing, update task in state; else, add new task with unique id.

Task Completion Toggle:

- On checkbox click, invert `completed` status for the task.

5. Error Handling

Scenario	Handling Approach
Empty task title	Show validation error in TaskForm
Duplicate task id	Use UUIDs to ensure uniqueness
Invalid filter value	Default to 'all' filter
State update failure	Show error message, retain previous state

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