

# Smart Habit Tracker CLI Project (TypeScript)

## Step 1 – Project Setup

Initialize a new Node project, install TypeScript, and configure tsconfig.json. Enable strict mode, noImplicitAny, and strictNullChecks. Ensure your project compiles cleanly before continuing.

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## Step 2 – Design Your Domain Types

Create an enum for habit status, an interface for Habit, and type aliases where appropriate. Include readonly fields, optional properties, and proper Date typing.

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## Step 3 – Build the HabitManager Class

Create a class responsible for managing habits. Implement methods for adding habits, completing habits, retrieving habits, and generating statistics. Use proper return types and strict null handling.

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## Step 4 – Create Advanced Types

Define a HabitStats type. Improve it using utility types like Record, Pick, and Omit. Create a 'habit preview' type that excludes certain properties.

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## Step 5 – Add File Persistence

Use Node's fs module to save and load habits from a JSON file. Handle Date serialization/deserialization properly and implement a type guard for safe parsing.

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## **Step 6 – Build the CLI Layer**

Use a CLI library like commander or yargs. Define command types explicitly. Avoid using 'any'. Ensure commands are strongly typed.

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## **Step 7 – Implement a Generic Repository**

Create a reusable generic Repository class with constrained types. Refactor HabitManager to use this repository.

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## **Step 8 – Add Streak Calculation**

Implement a function that calculates streaks based on completion dates. Handle edge cases and ensure the function is fully typed.

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## **Step 9 – Add Custom Error Handling**

Create custom error classes such as HabitNotFoundError. Implement discriminated union result types for safer error handling.

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