# NovaSync

## A lightweight splitter for groups, prizes & club funds
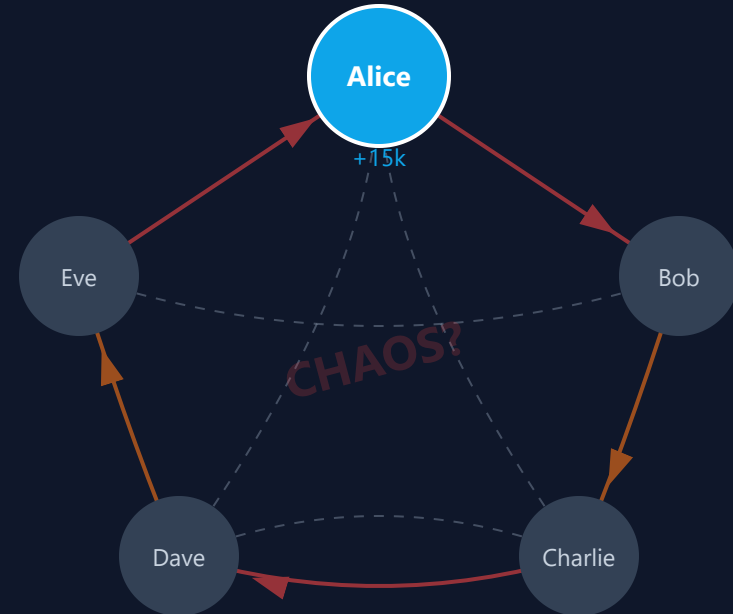
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# The Problem: "The Chaos of Group Trips"

## Imagine a Trip to Goa with 5 Friends...

### The "Before" State

- Alice paid ₹15k
- Bob paid ₹3k
- Charlie paid ₹500

**Result:** A tangled mess of "Who owes whom?"

Alice
+15k

Eve

Bob

CHAOS?

Dave

Charlie

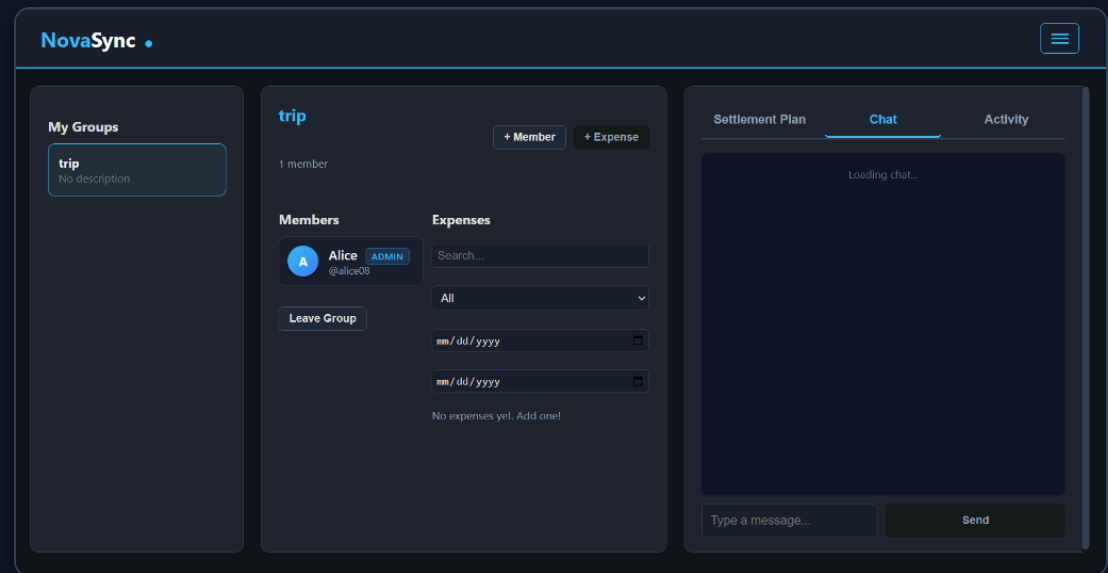Complexity: **O(N²)** (Everyone pays everyone)

# The Solution - NovaSync

## Unified Group Expense Manager

NovaSync replaces the chaos with a single, intelligent "Settlement Plan".

- **Log It**: Enter expenses as they happen.
- **Split It**: Handles Equal, Exact, or Percentage.
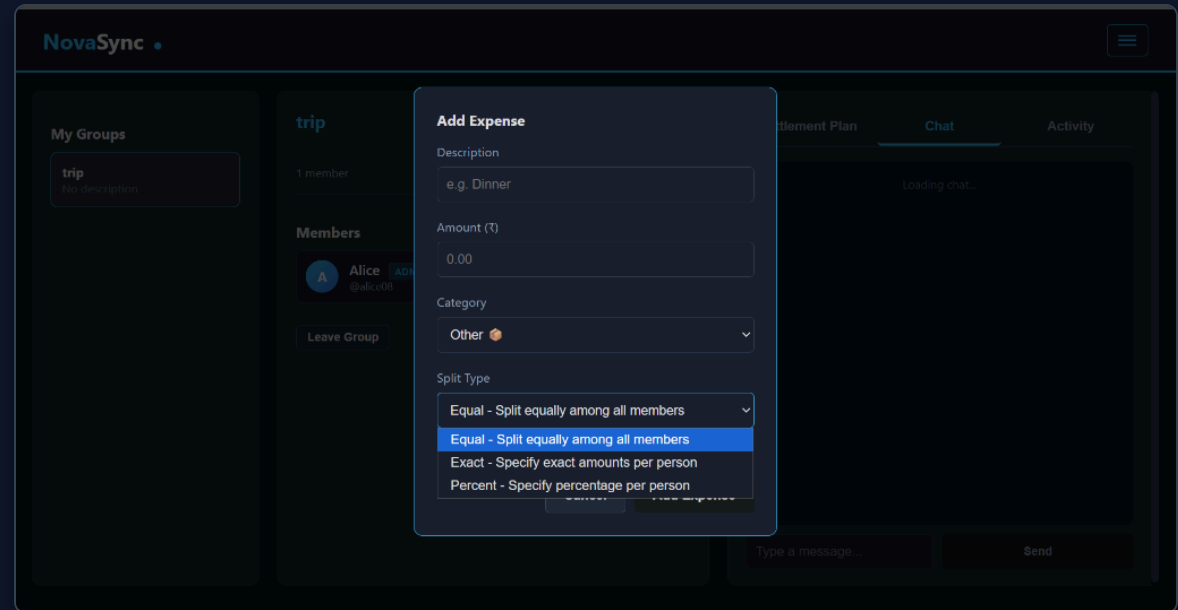- **Forget It**: We track net balances.

> *"Enter the cost, and we figure out the rest."*

# Key Features

## 1. Advanced Splitting Options



- **Equal**: Good for meals.
- **Percentage**: Good for shared utilities.
- **Exact**: Good for individualized orders.

## 2. Auto-Recurring Expenses

- Set it and forget it. Rent and bills regenerate automatically.

## 3. Smart Settlement Engine

- The heart of the app. Visualizes debts as a simple "To Pay" list.

# Technical Stack (MERN Architecture)

- **Frontend: Vanilla JavaScript**

  Lightweight, fast, and demonstrates core DOM manipulation skills.

- **Backend: Node.js & Express**

  Non-blocking I/O handles multiple concurrent requests efficiently.

- **Database: MongoDB (with Mongoose)**

  Flexible schema allows complex relationship mapping.

- **Security: JWT + Bcrypt**

  Stateless Auth & Password Hashing.

# The "Secret Sauce" - Algorithm

## The Greedy Strategy

**Objective:** Minimize the total number of transactions.

1. **Calculate Net Flow**: Determine Creditors (+) and Debtors (-).
2. **Sort & Match**: Match the biggest Debtor with the biggest Creditor.
3. **Settle**: Transfer the smaller of the two amounts.
4. **Repeat**: Iterate until all balances are zero.

**Result:** Reduces $O(N^2)$ (Chaos) to $O(N)$ (Order).

"Fewer bank transfers = happier friends."

# Future Scalability

## Roadmap

- **OCR Receipt Integration**: Using Google Vision API to scan bills and auto-fill forms.
- **Payment Gateway**: Clicking "Settle" triggers a UPI intent (GPay/PhonePe).
- **Machine Learning**: Analyzing spending patterns to suggest budget optimizations.

# Conclusion

## Why NovaSync?

✅ **Accurate**: Deterministic math.

✅ **Efficient**: Minimizes transactions.

✅ **User-Friendly**: Dark Mode UI.

**GitHub Repo:** https://github.com/Nandansai08/NovaSync.git

# Thank You!