Requirements:

1. **Pseudo-code**
   - Provide a high-level overview (language-agnostic) describing the data structures you plan to use and the key steps to manage budgets, turn campaigns on/off, handle dayparting, and reset budgets daily/monthly.

Pseudo-code

I will keep it really simple to only meet requirements, without a lot of assumptions

Data Structures

Brand:

   - id

   - name

   - monthly_budget

   - daily_budget

Campaign:

   - id

   - name

   - brand_id

   - is_active

   - start_hour

   - end_hour

Spend:

  - id

  - campaign_id

  - brand_id

  - amount

  - date

CORE FUNCTIONS

CheckCampaignStatus():

   FOR each campaign in Campaigns

      IF current_time outside campaign.dayparting_hours

         DeactivateCampaign()

      IF brand.daily_budget_exceeded OR brand.monthly_budget_exceeded

         DeactivateCampaign()

      ELSE

         ActivateCampaign()

RecordSpend(campaign_id, amount):

   create new Spend record

   update brand's daily and monthly totals

   IF budget exceeded

      DeactivateCampaign()

ResetDailyBudgets():

  FOR each brand in Brands

    IF NOT monthly_budget_exceeded

      reset daily_spend

      reactivate campaigns

ResetMonthlyBudgets():

  FOR each brand in Brands

    reset monthly_spend

    reactivate campaigns

SCHEDULED TASKS

- Run CheckCampaignStatus every hour

- Run ResetDailyBudgets at midnight

- Run ResetMonthlyBudgets on first day of month

BUDGET CALCULATIONS

DailyBudgetCheck:

  sum(today's spends) <= daily_budget

MonthlyBudgetCheck:

  sum(this month's spends) <= monthly_budget

DAYPARTING LOGIC

IsWithinOperatingHours:

   IF campaign has dayparting

     return current_hour >= start_hour AND current_hour < end_hour

   ELSE

     return true

ACTIVATION RULES

ShouldCampaignBeActive:

   return IsWithinOperatingHours AND

      NOT DailyBudgetExceeded AND

      NOT MonthlyBudgetExceeded