**Planning and Implementing**

* **Working sequence for the Railway logic-based system**
  + **Check for Trains**
    - Continuously monitor if any train is detected within 500m of the crossing.
  + **If No Train Detected (500m range):**
    - Verify if no train has been at 200m for at least 10 seconds
    - If true: Open the crossing gates
    - If false: Keep checking (loop back to Step 1)
  + **If Train Detected (500m range):**
    - Determine the train's current distance (500m/200m/50m)
    - **At 500m:**
      * Check if any vehicle is stuck on the tracks
      * If yes: Turn signal red to warn approaching train
      * If no: Keep signal green
    - **At 200m:**
      * Check for vehicles on tracks again
      * If yes: Freeze gate operation (keep open)
      * If no: Close crossing gates automatically
    - **At 50m:**
      * Perform final safety check for vehicles
      * If yes: Trigger emergency train brake
      * If no: Maintain clear green signal
  + **Continuous Loop**
    - After every action, the system automatically returns to:
    - Train detection (Step 1) if gates are open
    - Distance monitoring (Step 3) if train is approaching
  + **Gate Reopening Rule**
    - Gates only reopen when:
    - No train is detected within 200m
    - This condition lasts 10+ seconds

┌───────────────────────────────────────────────────────┐

FLOW CHART

└───────────────────────────────────────────────────────┘

START

│

▼

[TRAIN IN 500m?] ◀──────────────────────────────┐

│ │

├─NO─→ [NO TRAIN AT 200m FOR 10s?] │

│ │ │

│ ├─YES─→ OPEN GATES ───────────────────┘

│ │

│ └─NO───┐

│ │

▼ │

[DISTANCE?] ◀─────────────────────────────────┐

│ │

├─500m─→ [VEHICLE ON TRACK?] │

│ │ │

│ ├─YES─→ RED LIGHT (SLOW) ───────┘

│ │

│ └─NO─→ GREEN LIGHT ─────────────┐

│ │

├─200m─→ [VEHICLE ON TRACK?] │

│ │ │

│ ├─YES─→ KEEP GATES OPEN ───────┘

│ │

│ └─NO─→ CLOSE GATES ───────────┐

│ │

└─50m─→ [VEHICLE ON TRACK?] │

│ │

├─YES─→ EMERGENCY BRAKE ─────┘

│

└─NO─→ MAINTAIN GREEN ──────┐

│

▼

(REPEAT)