**🛠️ Phase 1: Card Detection Prototype**

**Objective**: Detect and identify individual cards on the table.

**Steps**:

1. **Collect Card Images**
   * Capture high-quality images of each Baloot card from various angles and lighting conditions.
   * Label them using a tool like [LabelImg](https://github.com/tzutalin/labelImg).
2. **Train a Card Detection Model**
   * Use YOLOv8 (recommended for speed and accuracy).
   * Classify cards by **rank and suit**.
   * Test on sample images to verify correct detection.
3. **Build a Basic Interface**
   * Use OpenCV to read from a webcam.
   * Show bounding boxes and detected card labels in real time.

**🧑‍🤝‍🧑 Phase 2: Player Association**

**Objective**: Determine which player played which card.

**Steps**:

1. **Define Player Zones**
   * Use a top-down or angled camera view.
   * Divide the screen into 4 areas (one per player).
   * When a card is detected in a zone, assign it to that player.
2. **Track Card Plays**
   * Log the sequence of plays and card positions.
   * Label which card belongs to which player in each round.

**🧠 Phase 3: Game Logic Implementation (Baloot Rules)**

**Objective**: Apply صن and حكم rules to determine trick winners and assign points.

**Steps**:

1. **Build a Game Engine**
   * Write Python functions to determine:
     + Trump suit
     + Trick winner
     + Team ownership of each card
     + Bonus rules (Baloot, Ashkal, etc.)
2. **Integrate With Detected Data**
   * Pass detected card and player info to the game engine.
   * Update team scores after each trick.

**📊 Phase 4: Score Tracking and UI**

**Objective**: Display team scores and game progress in real time.

**Steps**:

1. **Develop a Dashboard**
   * Use **Tkinter**, **Streamlit**, or a simple HTML page.
   * Show:
     + Current scores
     + Round winner
     + Cards played
2. **Enable Game History**
   * Log all rounds in a CSV or database.
   * Optionally provide replay/export options.

**🎁 Bonus Phase: Advanced Features**

**Optional Enhancements**:

* Voice or text announcements of trick winners.
* Detect bidding phase automatically (صن vs حكم).
* Add hand/gesture tracking (e.g., to trigger card detection).
* Train the model to detect overlapping or rotated cards.

**✅ Roadmap**

* **Card detection with YOLOv8**
* Player card zone mapping
* صن/حكم game engine
* Real-time scoreboard UI
* Game history and export