Frontend Functionalities (Android App)

1. User Registration & Authentication

- **Mobile OTP Verification**:
  - Integration with SMS gateway (e.g., MSG91/Twilio).
  - OTP input screen with auto-read and resend options.
- **Email Verification**:
  - Link sent to the user's email to activate the account.
  - Error handling for invalid/expired links.
- **Password Security**:
  - Strength meter for password creation.
  - AES-256 encryption for stored credentials.

2. KYC Integration

- **Document Upload**:
  - PAN card, Aadhaar, and bank statement upload with file size/format validation.
  - Real-time preview of uploaded documents.
- **Third-Party KYC Verification**:
  - Integration with Digio/Signzy APIs for automated validation.
  - Status tracking (Pending/Approved/Rejected) with reason for rejection.

3. Trading Interface

- **Live Rate Display**:
  - Real-time USDT/INR rates via WebSocket (updated every 5 seconds).
  - Historical rate charts (1h/24h/7d) using TradingView or Chart.js.
- **Buy/Sell Orders**:
  - Order confirmation popup with fees and final amount.
  - Order history with filters (completed/pending/failed).
- **Wallet Balance**:
  - Display USDT and INR balances.
  - Quick action buttons for deposit/withdrawal.

4. Profile Management

- **Bank Account Linking**:
  - IFSC code validation via Razorpay/UPI APIs.
  - Account number masking (e.g., XXXX-XXXX-1234).
- **USDT Wallet Management**:

- o Add/delete USDT addresses (ERC-20/TRC-20).
- o QR code scanner for wallet addresses.
- **Referral System**:
  - o Unique referral code generation (e.g., REF-ABC123).
  - o Dashboard showing referral earnings, downline users (Level 1-3), and bonus history.

5. Notifications

- **In-App Alerts**:
  - o Push notifications for deposit/withdrawal confirmations.
  - o Login alerts for unrecognized devices/IPs.
- **Email Notifications**:
  - o Customizable templates for transactional emails (e.g., withdrawal success).
  - o Toggle settings to enable/disable email/SMS alerts.

6. Security Features

- **Session Management**:
  - o Automatic logout after 15 minutes of inactivity.
  - o JWT token-based authentication.
- **2FA (Optional)**:
  - o Google Authenticator integration for added security.

Backend Functionalities

1. User Management

- **Admin Dashboard**:
  - o View/block users, reset passwords, and track login history.
  - o Export user data to CSV/Excel.
- **KYC Approval Workflow**:
  - o Automated checks (e.g., PAN-Aadhaar linking via NSDL API).
  - o Manual override for admin/sub-admin approvals.

2. USDT/INR Rate Management

- **Rate Configuration**:
  - o Admin-controlled rate markup/spread settings.

- o API integration with crypto exchanges (e.g., Binance/WazirX) for real-time rates.
- **Audit Logs**:
  - o Track rate changes (timestamp, admin ID, old/new values).

3. Deposit/Withdrawal Management

- **USDT Deposits**:
  - o Blockchain listener to track transactions to user wallets.
  - o Confirmations after 3 network blocks.
- **INR Withdrawals**:
  - o Payout integration with Razorpay/UPI/Paytm.
  - o Escrow system to hold funds until withdrawal is approved.

4. Referral System Backend

- **Multi-Level Tracking**:
  - o Hierarchical storage of referral relationships (user → Level 1 → Level 2 → Level 3).
  - o Commission calculation (e.g., Level 1: 10%, Level 2: 5%, Level 3: 2%).
- **Bonus Disbursement**:
  - o Automated credit to user wallets on successful referrals.
  - o Threshold for withdrawal (e.g., minimum ₹100 earned).

5. Email & Notification Services

- **Transactional Emails**:
  - o Triggers for deposits, withdrawals, KYC status, and referral bonuses.
  - o Integration with SendGrid/Mailgun for delivery tracking.
- **SMS Alerts**:
  - o Twilio/MSG91 API for critical actions (e.g., withdrawal requests).

6. Sub-Admin Roles

- **Role-Based Access Control (RBAC)**:
  - o Define roles (e.g., Support Agent, KYC Moderator, Transaction Approver).
  - o Granular permissions (e.g., "View Users" but not "Delete Users").
- **Activity Logs**:
  - o Track sub-admin actions (e.g., "User XYZ blocked by Sub-Admin ABC").

7. Security & Compliance

- **Data Encryption**:
  - AES-256 for sensitive data (bank details, KYC docs).
  - SSL/TLS for API communication.
- **Anti-Fraud Measures**:
  - IP whitelisting for admin panel.
  - Rate limiting for login attempts.

8. Logging & Analytics

- **Audit Trails**:
  - Log all financial transactions, rate changes, and admin actions.
- **Revenue Reports**:
  - Daily/weekly/monthly trading volume and commission earnings.

Technical Stack

- **Frontend**: Android (Kotlin), Jetpack Compose, Retrofit, WebSocket.
- **Backend**: Node.js (Express.js)/Python (Django), PostgreSQL.
- **APIs**:
  - Twilio (SMS), SendGrid (Email), Razorpay (Payments), Etherscan (USDT tracking).
- **Security**: JWT, OAuth2, Cloudflare WAF.