**1. Summary of Data Collection Methods and Results**

**Data Collection Techniques**

The following methods were employed to gather requirements for the Mobile-Based Attendance Management System:

1. **Surveys**:

- **Purpose**: Collect standardized feedback from a large audience (students, lecturers).

- **Implementation**:

- **Tools**: Google Forms with closed-ended (e.g., multiple-choice) and open-ended questions.

- Example Questions:

- "How satisfied are you with the current attendance system?"

- "Which authentication method do you prefer (GPS, QR code, facial recognition)?"

- **Results**:

- Quantitative: More than 65% of students reported technical issues with existing systems.

- Qualitative: Requests for offline functionality and simplified UI.

2. **Interviews**:

- **Purpose**: Gain in-depth insights from key stakeholders (Lecturers and Administrators).

- **Implementation**:

- Conducted one-on-one sessions with open-ended questions.

- Example Topics:

- Administrative needs like real-time attendance dashboards

- Security concerns like data encryption requirements

- **Results**:

- Lecturers emphasized the need for automated report generation.

3. **Brainstorming Sessions**:

- **Purpose**: Generate technical solutions and prioritize features.

- **Implementation**: Collaborative discussions with the development team.

- **Results**:

- Feature prioritization (e.g., GPS check-in and facial recognition as a must-have).

- Identified technical challenges (e.g., ensuring GPS accuracy in indoor environments).

4. **Reverse Engineering**:

- **Purpose**: Analyze competitors’ apps to identify gaps.

- **Implementation**: Reviewed app store reviews and competitor features.

- **Results**:

- Common user complaints: Poor offline support and slow loading times.

- Adopted best practices in case of low accuracy with GPS

**2. Cleaning and Categorization of Survey and Interview Data**

**Data Cleaning Process**

- **Steps Taken**:

1. **Removal of Noise**:

- Deleted 15% of survey responses due to incompleteness or duplication.

2. **Standardization**:

- Converted inconsistent formats (e.g., "Y/N" → "Yes/No").

3. **Outlier Filtering**:

- Excluded irrelevant responses (e.g., jokes, unrelated feedback).

4. **Qualitative Coding**:

- Tagged open-ended responses into themes (e.g., "Privacy Concerns," "Feature Requests").

**Categorization**

- **Functional Needs**:

- **Check-in Methods**: GPS, facial recognition.

- **Reporting**: Customizable attendance reports for lecturers.

- **Non-Functional Needs**:

- **Performance**: It's important to ensure a reasonable response time

- **Accessibility**: Offline mode for areas with poor connectivity.

- **User Behavior Insights**:

- 80% of students use smartphones daily, but 70% face data limitations.

**Conclusion**

The data collection methods provided a robust mix of quantitative and qualitative insights, ensuring alignment with stakeholder needs. Cleaning and categorization transformed raw data into actionable requirements, directly informing the system’s design. This structured approach ensures the project is both user-centric and technically viable.