

Centennial College

25M - Software Requirements Engng (Sec.004) - Group 5

Team Project - Part A

TapAndGo

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Introduction:

Purpose:

This software requirement specification (SRS) outlines the addition of a new feature to the current banking mobile applications. This feature will allow users to reserve a cash pickup from a nearby ATM using their mobile device, eliminating the need to wait in long queues.

This feature will be merged into the current banking systems and is intended to enhance customer experience by enabling faster and more convenient cash withdrawals. Users can select an ATM through the mobile app, reserve a cash amount, and authenticate on arrival using NFC, tap card or QR code.

This document covers version 1.0.0 of the feature and focuses only on the functionality related to reservation, authentication, and integration with existing ATM infrastructure.

Document Conventions:

| Acronyms | Description |
|-----------------|--------------------------|
| QR | Quick Response |
| ATM | Automated Teller Machine |
| DB | Data Base |
| NFC | Near Field Communication |

Intended Audience and Reading Suggestions:

- Developers: who will develop the software
- Project Managers: who will oversee the development of the software
- Stakeholders: who will fund the project
- Banking Companies: the companies who will take it
- End Users: the customers who will use the feature
- Testers: The tester are

Project Scope:

Withdrawing money from an ATM can often be frustrating. Long queues, limited cash availability, and the risk of a card getting stuck are common issues that waste time and inconvenience users. Therefore, to address these issues, we created a software called TapAndGo, which will enable the user to access the ATM service quickly and conveniently. Moreover, we added secured contactless tap technology. Which will be simply tapping to start, users will experience faster transactions, reduce waiting for a long time, and a safer card free interface. Therefore, we created TapAndGo for making banking more efficient and user-friendly.

References:

<https://wise.com/us/blog/cardless-atm>

Overall description:

2.1 Product Perspective:

This is a new software functionality that can be embedded into mobile banking apps.

2.2 Product Features (Functions):

1. *Connect to Wi-Fi or use mobile data*
2. *Connect to Google Maps*
3. *Generate QR codes*
4. Face ID
5. Connect with nearby available ATM

2.3 User Classes and Characteristics:

1. Everyday Banking Customer: Will withdraw regularly from the ATM.
2. Bank Staff or System Maintainers: Will keep the software functioning for the users if any issues have been discovered.

2.4 Operating Environment:

- The software will be generated using Java and C#
- The software will be using SQL (Structured Query language) developer tool
- The program will run on all mobile banking apps and webapps
- Compatible with all smart phones (IOS, Android OS), PCs and Mac

2.5 Assumptions and Dependencies:

- There will be QR code scanner and Face-ID at the ATM.
- There will be password/biometrics/face id verification if the software is not in use for specific amount of time.

- The device is connected to internet
- The bank database will be used for withdrawal history, account balance and device NFC info.
- The ATM has an NFC adaptably
- The software will work based on the local time
- The software will have Card taping in the scenario if the user was unable to tap by phone.

External Interface Requirements:

3.1 User Interfaces:

TapAndGo will be implemented in mobile banking apps as a service provided by the bank. This allows the users to access the feature through the bank apps instead of installing a whole new application.

1. Mobile Interface:

As the service implemented in the bank's mobile app, it is required that the user has the bank's mobile app to use TapAndGo service. In addition, the mobile device can be used to complete the withdrawal process.

Supported Platforms:

- Android (version 8.0 and above)
- IOS (version 13 and above)

Features:

- Locate and reserve ATM withdrawal
- Scan QR code for session linking
- Authenticate with biometrics or PIN
- Complete the withdrawal via NFC or QR at the ATM

The interface will follow the existing app's design language to ensure consistency and usability.

2. Web Interface:

TapAndGo will be accessible through a web browser, as the user is able to make the request, choose the ATM location and set the amount.

Supported browsers:

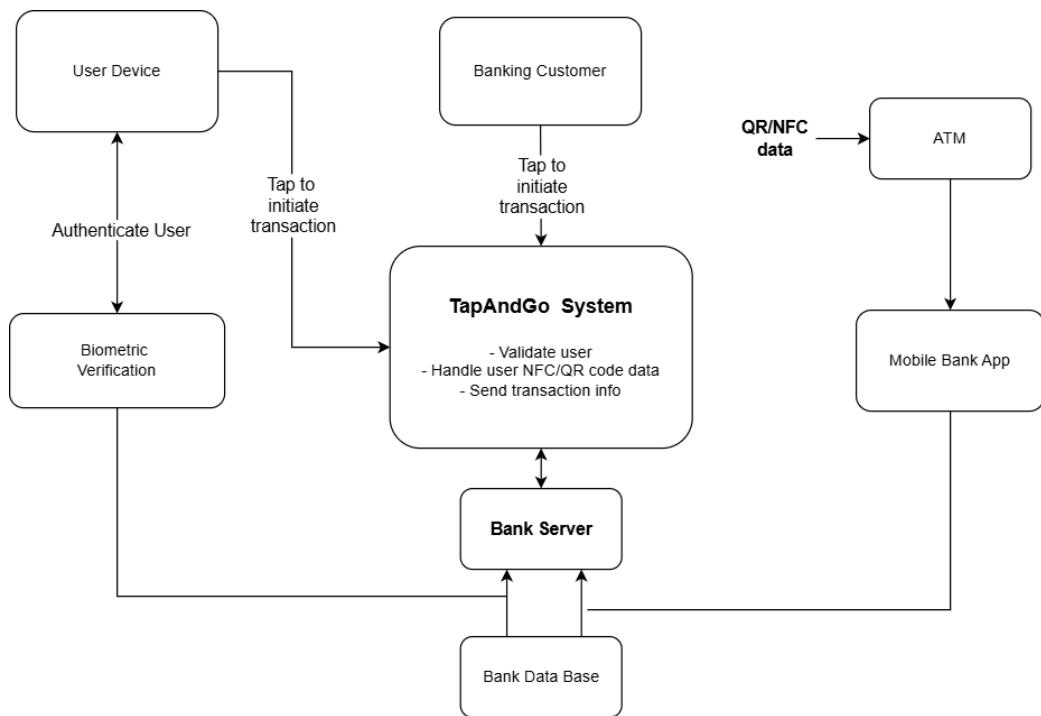
Chrome, Firefox, Safari, Microsoft Edge (latest versions).

Features:

- Select ATM location and withdrawal amount
- Generate a QR code containing a secure session ID

To complete the transaction, users are required to log in on their mobile device upon reaching the ATM, and then tap their phone or scan a QR code to authorize the transaction.

Diagram:



System architecture of the TapAndGo feature, illustrating the interaction between the banking customer, mobile banking app, ATM, biometric verification, and backend components such as the TapAndGo system, bank server, and database.

3.2 Hardware Interfaces:

- ATM Machine
- Mobile with NFC Reader
- QR Code Scanner
- Camera for Face ID
- Fingerprint Scanner on phone
- Mobile sensor to find nearby bank ATMs.

3.3 Software Interfaces:

- Scanner Application API to scan QR codes and perform facial recognition at the ATM.

Link: [SpeedFace-V5L\[QR\]](#)

- The mobile banking Application “ TapAndGo” will be built inside existing banking apps (like CIBC)

Link: [CIBC Mobile Banking](#)

- Timer and Calendar API used to track pickup times, deadlines, or user reminders

Link: [Mango](#)

- Geo-location Services helps users locate and navigate to the nearest available NFC-enabled ATM

Link: [About - Google Maps](#)

Stakeholder Register:

| Stakeholder Name | Stakeholder Position | External/Internal | Stakeholders contact details | Operational/Executive | Interest (high, medium, low) |
|------------------|---------------------------|-------------------|------------------------------|-----------------------|--|
| John Wilson | Banking Customer | External | John.Wilson@g mail.com | Operational | Main user of the feature, needs fast and secure ATM access |
| Li Thomson | Product Manager | Internal | Li.Thomson@g mail.com | Executive | Makes key decisions about product features and priorities |
| Sara David | Software Developer | Internal | Sara.David@g mail.com | Operational | Builds and maintains the TapAndGo functionality |
| Kamdem Ndogmo | ATM Network Administrator | Internal | Kamdem@gma il.com | Operational | Ensures ATMs are working with NFC/QR features |
| Mohammed Yousef | IT Security Analyst | Internal | Mohammed.Yo usef@gmail.co m | Executive | Makes sure the feature is secure and protects user data |
| Ibrahim Lewis | Investor/Stake holder | External | Ibrahim.Lewis @gmail.com | Executive | Provides funding and expects a return on investment |

Interview Questions:

| Question | Stakeholder Position | Answer |
|--|----------------------|---|
| Round 1 | | |
| 1) When do you usually withdraw money from ATMs? | Banking Customer | Mostly in the morning before work and sometimes on weekends. |
| 2) What issues do you usually face while using ATMs? | Banking Customer | Long lines, sometimes the machine is out of service, and I'm worried about card skimming. |
| 3) Would you be comfortable using QR codes or tapping your phone to withdraw cash? | Banking Customer | Yes, that would be easier and feel more secure than using a card. |
| 4) Would you use a feature that lets you reserve your cash ahead of time? | Banking Customer | Definitely! That would save me time and help avoid wasted trips. |
| 5) How important is security to you when using ATMs? | Banking Customer | Very important. I only use ATMs I trust, and I prefer contactless options. |
| Round 2 | | |
| 1) What is the main goal of adding this TapAndGo feature? | Product Manager | To improve customer experience and reduce ATM congestion. |
| 2) What platforms must this feature support? | Product Manager | Android, iOS, and our web banking portal. |
| 3) Are there any time constraints for the release of this feature? | Product Manager | Yes, we want a working prototype within three months |
| 4) What metrics will define success for this feature? | Product Manager | User adoption rate, reduced ATM wait time, and transaction speed. |

| | | |
|---|-----------------|--|
| 5) Will this feature be optional or required for users? | Product Manager | It will be optional at first, then marketed as a preferred method. |
|---|-----------------|--|

Round 3

| | | |
|---|--------------------|--|
| 1) What technologies do you plan to use for this feature? | Software Developer | Java for backend, C# for desktop integration, and SQL for the database. |
| 2) What security measures will you add? | Software Developer | Data encryption, Face ID/Fingerprint login, and session timeout |
| 3) How will the app interact with the ATM network? | Software Developer | Through an API provided by the bank's ATM software vendor. |
| 4) Do you expect any compatibility issues? | Software Developer | Possibly with older ATM models that don't support NFC or QR scanning. |
| 5) How will you test the feature before launch? | Software Developer | Using test environments, virtual ATMs, and feedback from internal users. |

Round 4

| | | |
|---|---------------------------|---|
| 1) Are all our ATMs currently equipped with NFC readers? | ATM Network Administrator | No, about 70% have NFC, and we plan to upgrade the rest. |
| 2) Can ATMs currently support QR code scanning? | ATM Network Administrator | Only newer models, but we can install external QR scanners. |
| 3) Will TapAndGo affect ATM performance or speed? | ATM Network Administrator | It may improve it since the process will be quicker. |
| 4) What's needed to upgrade all ATMs for TapAndGo? | ATM Network Administrator | Firmware updates and possibly adding new hardware modules. |
| 5) What is the most common issue faced with ATM hardware? | ATM Network Administrator | Card jams and touchscreen calibration issues. |

Fucntional Requirements:

| Requirement ID | Requirement Title | Description | Priority | Requester |
|----------------|------------------------|---|----------|----------------------------|
| FR01 | ATM Cash Reservation | The system shall allow users to reserve a cash amount and select an ATM location in advance via the bank's mobile or web platform. | High | John Wilson (Customer) |
| FR02 | QR Code Generation | Upon successful reservation, the system shall generate a unique QR code to be scanned at the ATM for transaction authorization. | High | John Wilson (Customer) |
| FR03 | NFC Tap Authentication | The system shall enable users to complete transactions by tapping their NFC-enabled phone on the ATM, replacing traditional card insertion. | High | John Wilson (Customer) |
| FR04 | Biometric Login | Users shall be able to access the app using biometric methods (e.g., Face ID, fingerprint) for added security and convenience. | High | Mohammed Yousef (Security) |
| FR05 | Transaction History | The system shall store and display previous TapAndGo ATM withdrawals for user reference and financial tracking. | Medium | John Wilson (Customer) |
| FR06 | ATM Availability Info | The app shall display real-time ATM availability, including status (online/offline), queue status, and cash availability. | Medium | Kamdem Ndogmo (Admin) |

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| FR07 | Reservation Expiry Timer | Reservations shall automatically expire after a set time (e.g., 15 minutes), requiring the user to reinitiate the process if not completed. | High | Li Thomson (Manager) |
| FR08 | In-App Notifications | Users shall receive notifications for reservation status, expiry warnings, and successful withdrawal alerts. | Medium | Li Thomson (Manager) |
| FR09 | Cancel Reservation Option | The app shall allow users to cancel a pending reservation before it is used at the ATM. | High | John Wilson (Customer) |
| FR10 | Admin Monitoring Dashboard | Internal staff shall access a monitoring dashboard to view system usage, errors, and ATM compatibility issues. | Medium | Kamdem Ndogmo (Admin) |

Non-Functional Requirements:

| Requirement ID | Requirement Title | Description | Priority | Requester |
|----------------|------------------------|--|----------|----------------------------|
| NFR01 | Platform Compatibility | The system must be compatible with Android (v8+) and iOS (v13+), and support Chrome, Firefox, Safari, and Edge browsers. | High | Li Thomson (Manager) |
| NFR02 | Security Compliance | The system shall enforce end-to-end encryption, session timeout, and authentication protocols, and pass | High | Mohammed Yousef (Security) |

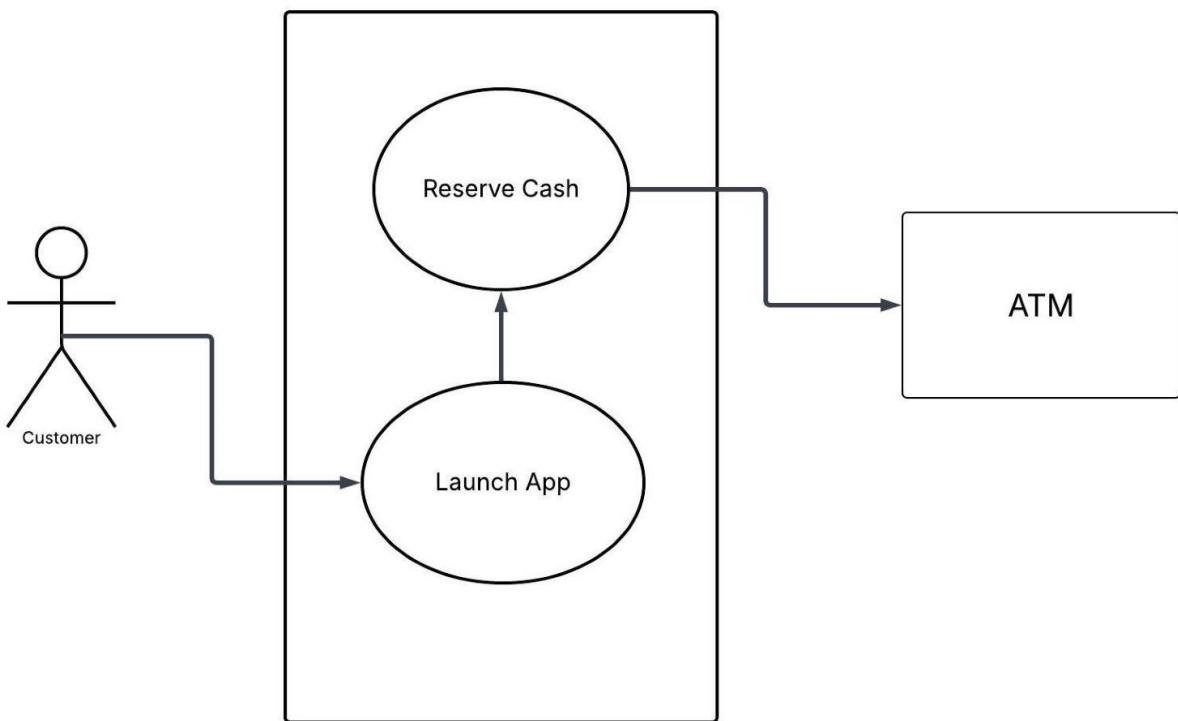
| | | | | |
|-------|----------------------------|---|--------|----------------------------|
| | | penetration and malware tests. | | |
| NFR03 | Performance Response Time | System actions such as QR generation and ATM lookup must respond within 2 seconds under normal load conditions. | Medium | Sara David (Developer) |
| NFR04 | System Uptime | The service must maintain 99.9% uptime with redundancy systems in place to prevent user disruption. | High | Kamdem Ndogmo (Admin) |
| NFR05 | Data Privacy Compliance | The app shall comply with data privacy laws (e.g., GDPR) to ensure personal user data is not misused or stored longer than necessary. | High | Mohammed Yousef (Security) |
| NFR06 | ATM Hardware Compatibility | The system must support ATMs with QR code readers and NFC modules; backward compatibility plans for older models must be in place. | Medium | Kamdem Ndogmo (Admin) |

Section #8:

| Use case name | List of related Requirements ID | Actor (s) | Brief Description |
|---------------------------|---------------------------------|------------------|---|
| Reserve-Cash | FR01 | Banking Customer | The actor selects a nearby ATM and reserves a cash amount in advance using the mobile or web app. The system locks the amount for a short period. |
| Generate QR Code | FR02 | Banking Customer | After a reservation is made, the app generates a unique QR code to be scanned at the ATM for session validation. |
| Authenticate with NFC | FR03 | Banking Customer | The actor taps their NFC-enabled phone at the ATM to authenticate and complete the withdrawal securely. |
| Biometric Login | FR04 | Banking Customer | The actor logs into the app using Face ID or fingerprint to verify identity before initiating any action. |
| Cancel Reservation | FR09 | Banking Customer | Allows the user to cancel a reservation before it expires or is used. |
| View Transaction History | FR05 | Banking Customer | Displays a list of completed TapAndGo withdrawals for tracking and reference. |
| Check ATM Availability | FR06 | Banking Customer | Actor can view real-time ATM status (online/offline), cash level, and estimated queue time before reserving. |
| Send In-App Notifications | FR08 | Banking Customer | Notifies the user about reservation confirmation, expiration warnings, |

| | | | |
|--------------------------|------|---------------------------|---|
| | | | and successful transactions. |
| Monitor System Dashboard | FR10 | ATM Network Administrator | Allows admin to view system usage stats, feature health, and ATM compatibility reports through a dedicated dashboard. |

Section #9:



Use case name: Reserve Cash

Primary Actor: Banking Customer

Goal in Context: This is a demonstration for FR01 allowing users to reserve a cash withdrawal at a nearby ATM of the customer's choice through the mobile or web app.

Preconditions:

- User is authenticated via biometrics or credentials.
- ATM availability and cash levels are synced and up to date.
- A confirmation is sent to the user with a unique reservation ID or QR code.

Scenario details:

1. Customer logs into the bank app.
2. Customer selects the TapAndGo feature.
3. Customer views nearby ATM locations with availability.
4. Customer selects ATM and desired withdrawal amount.
5. System verifies ATM availability and cash status.

6. System reserves the amount and creates a reservation record.
7. System sends confirmation (QR code or session ID) and displays a success message.

Exception:

1. *No ATMs available*: Show message "No nearby ATMs available".
2. *ATM does not support feature*: Display alternative ATM options.
3. *Insufficient funds*: Display error and cancel process.
4. *Server error*: Show system error message; advise user to try again.

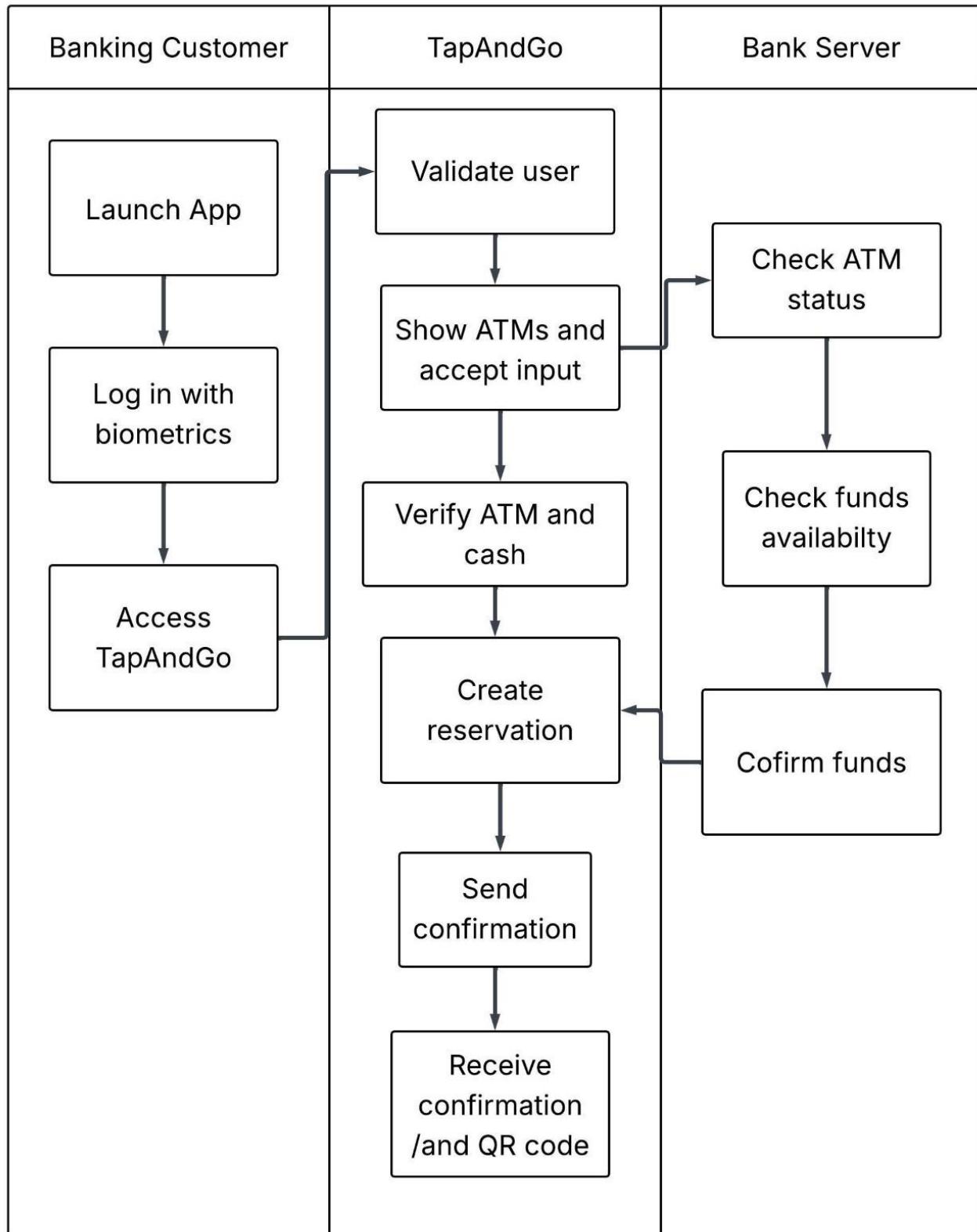
Priority: High

When Available: 24/7, depending on the availability of ATMs

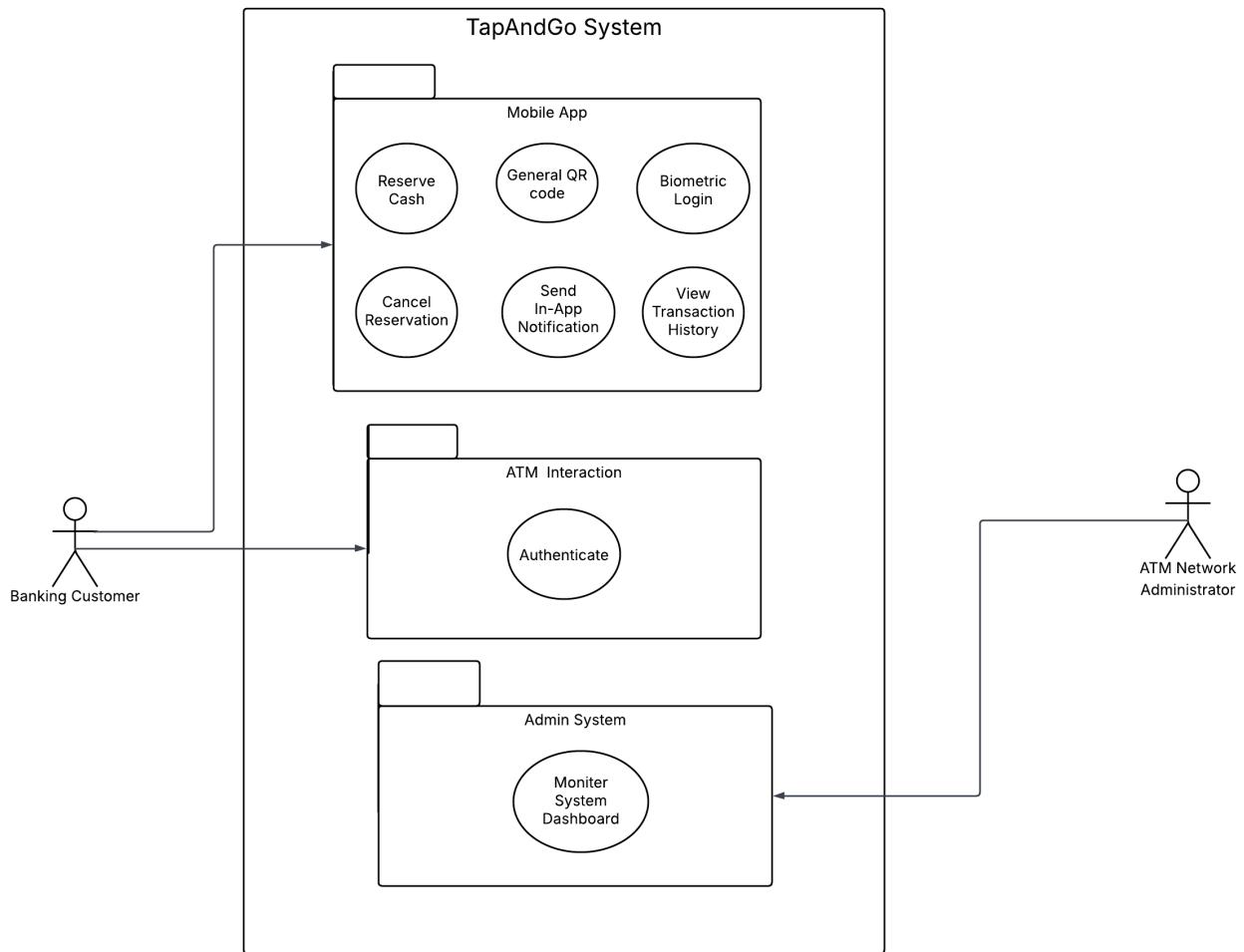
Frequency of use: Expected multiple time per week

Channel to Actor: Mobile App (Android/iOS) or web browser

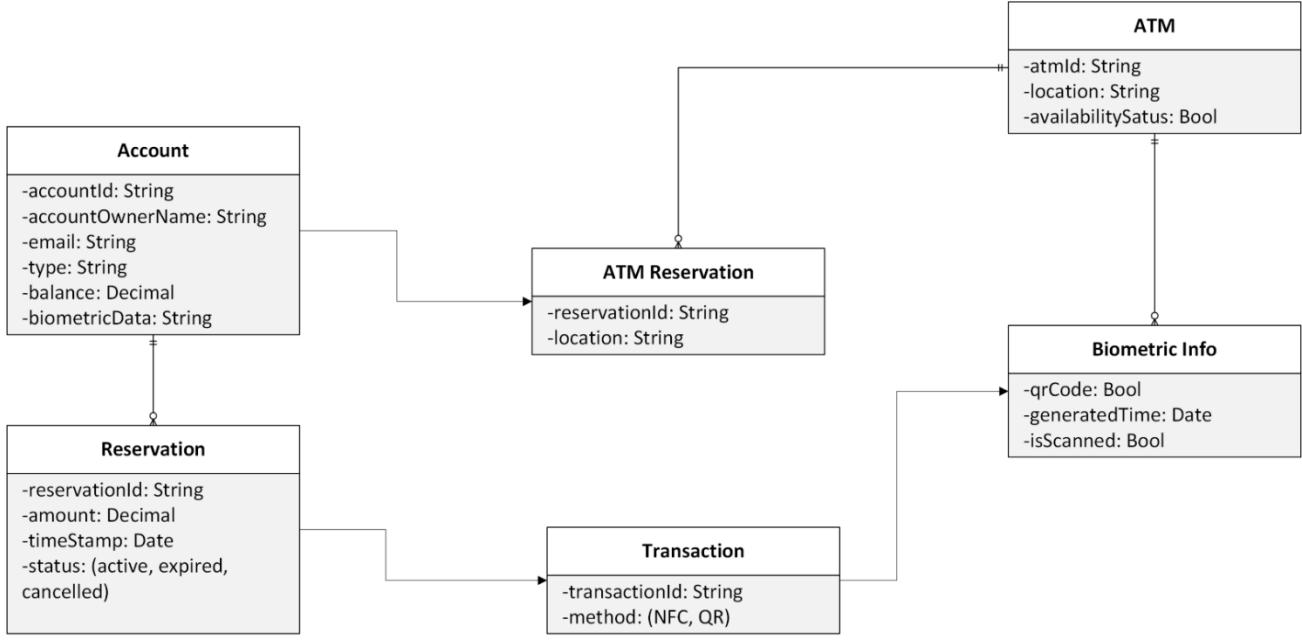
Section #10:



Section #11:



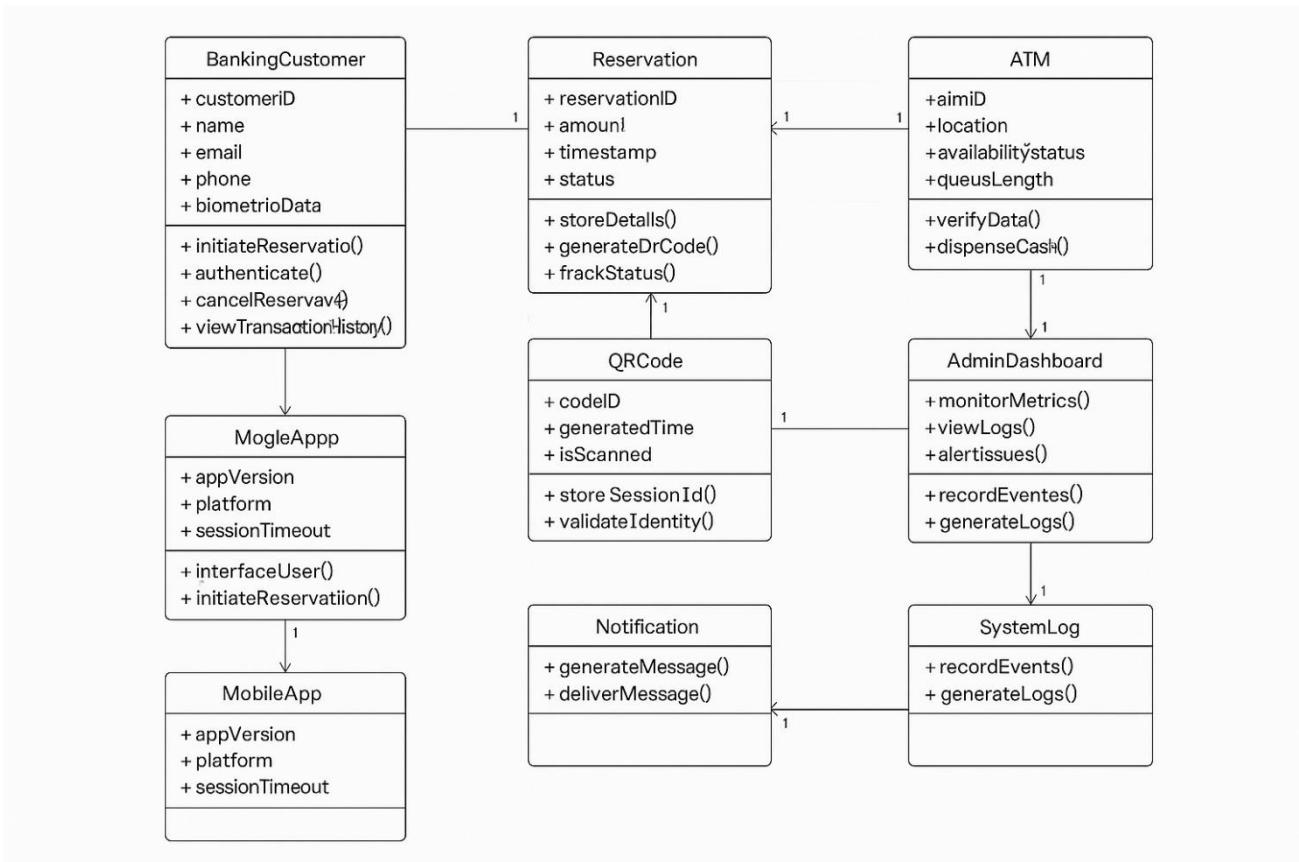
Section#12:



Section #13:

| Class | Responsibilities | Collaborators |
|----------------|---|--|
| Account | <ul style="list-style-type: none"> 1. Store user information (ID, name, contact) 2. Store biometric data 3. Maintain account balance | <ul style="list-style-type: none"> 2. BiometricInfo 3. Reservation |
| Reservation | <ul style="list-style-type: none"> 1. Record reservation details (amount, time, status) 2. Link reservation to user and ATM 3. Link reservation to transaction | <ul style="list-style-type: none"> 2. Account, ATMReservation 3. Transaction |
| ATMReservation | <ul style="list-style-type: none"> 1. Store ATM-specific reservation data 2. Help locate ATM for cash withdrawal | <ul style="list-style-type: none"> 1. Reservation 2. ATM |
| ATM | <ul style="list-style-type: none"> 1. Report ATM availability status 2. Verify reservations or QR/NFC info 3. Dispense cash | <ul style="list-style-type: none"> 2. Reservation, BiometricInfo 3. Account, Reservation |
| Transactions | <ul style="list-style-type: none"> 1. Record withdrawal or operation method 2. Log transaction with reservation | <ul style="list-style-type: none"> 2. Reservations |
| BiometricInfo | <ul style="list-style-type: none"> 1. Validate identity using biometric or QR code 2. Track QR code scan status | <ul style="list-style-type: none"> 1. ATM, Account 2. Reservations |

Section#14:



Section#15:

