Executive Summary -

Purpose-

UQPLAY will refresh how families and community members discover, borrow, and return items. The aim is to offer a simple, self-service experience for customers and a clear, consistent workflow for staff, while giving managers reliable insight into usage, costs, and community impact.

Scope-

This project contains three major areas:
A Customer portal for browsing the catalogue, checking availability, placing reservations, receiving reminders, renewing items, and making payments.
Staff workspace to ensure check-in/out, handle fines and fee waivers through the system, record maintenance reports, and manage customer enquiries all at one place.
Administration and reporting for catalogue setup, pricing and lending rules, user permissions, and dashboards. The scope includes email/SMS notifications, accessibility compliance, identity (single sign-on), and payment integration.

Major challenges.
Standardise processes across sites, clean/migrate member–catalogue–loan data, and prepare staff with training and clear policies (holds, renewals, fines). Protect personal data and ensure peak-time uptime. Keep the online journey so simple that families prefer it.

High-level solution.
Deliver in phases: MVP (catalogue, reservations, check-out, reminders), then renewals, payments, and analytics. Provide guided staff screens and a mobile-first customer portal, with automated notices, role-based access, audit trails, and dashboards. Roll out with targeted training and policy updates.

Deliverables

Service blueprint and operating policy pack.
Tested click-through prototypes and user journeys.
MVP release (catalogue, reservations, loans, reminders) with SSO and payments.
Data migration plan and rehearsal, with acceptance criteria.
Staff training materials with help content and quick-reference guides.
KPI dashboards like (fulfilment time, on-time returns, utilization) and a support plan with SLAs, incident playbooks, and a continuous-improvement backlog.

Expected outcomes
A faster, simpler lending service/software, for higher customer satisfaction; better use of stock; fewer overdues and write-offs; and decision-ready reporting for management and the board.

Table of Contents

Functional Requirements-

USER STORY-

F1: Real-Time Availability & Social Proof
User Story:

"As a parent I want to see Real time updates on toys availability, & past purchases of other parents so that I can make a Good and quick decision".

Acceptance Criteria:

- F1.1) The system must show a clear availability state (Available/Limited/Unavailable) and current quantity for the selected branch.
- F1.2) Availability must auto-refresh (or provide a refresh button) with a visible "Last updated" time.
- F1.3) The page must show anonymised social proof (e.g., "Borrowed 124 times in the last 90 days") without revealing identities.
- F1.4) The system must prevent over-allocation by reducing stock immediately after a successful booking.
- F1.5) If a toy is unavailable, the system must display the next expected return date or waitlist option.
- F1.6) Parents must be able to view availability at nearby branches for the same toy.

F2: Feedback & Ratings for Informed Choice
User Story:

"As a parent I want to see other parents' feedback & ratings on used products so that I can choose the best toys for my children."

Acceptance Criteria:

- F2.1) The toy page must display an average rating (1–5) and the total number of reviews.
- F2.2) Recent comments must be shown with date and rating, and reviewer identities must remain anonymous.
- F2.3) Reviews must be sortable and filterable (e.g., most recent, highest rated, with photos).
- F2.4) The system must allow reporting inappropriate content and hide it pending moderation per policy.
- F2.5) Feedback that mentions safety issues or damage must flag the toy for staff review and create/link a maintenance ticket.
- F2.6) A rating breakdown (1–5 stars) and common themes (e.g., "great for ages 3–5") must be displayed when sufficient data exists.

F3: New Stock & Restock Notifications
User Story:

“As a parent I want to get Notified whenever there is new stock launched or restock of existing product so that I don't miss out”.

Acceptance Criteria:

- F3.1) The system must allow parents to subscribe to alerts for specific toys and/or categories.
- F3.2) The system must let parents choose Email and/or SMS and change or unsubscribe anytime.
- F3.3) The system must send alerts only when stock is actually available to reserve.
- F3.4) The system must include toy name, branch, quantity status, and a “Reserve now” link in each alert.
- F3.5) The system must respect quiet hours for SMS and queue messages accordingly.
- F3.6) The system must log each alert with timestamp and delivery status on the parent’s account.

F4: Filter by Child’s Age & Interests
User Story:

“As a parent, I want to filter toys by my child’s age and interests so that I can quickly find the most suitable options for them.”

Acceptance Criteria:

- F4.1) The system must provide filters for age group and interests/genre that can be used together.
- F4.2) The system must update results immediately when a filter is changed.
- F4.3) The system must offer a “Clear all filters” action to return to the full list.
- F4.4) The system must display guidance when no results match, with suggestions to broaden filters.
- F4.5) The system must default the age filter to the child profile’s age range (if saved), editable by the parent.
- F4.6) The system must show current availability and branch on each result card.

F5: Reserve Online with Deposit
User Story:

“As a parent, I want to reserve a toy online and pay any required deposit so that my booking is confirmed instantly”.

Acceptance Criteria:

- F5.1) The system must require parents to select a loan period within policy limits before confirmation.
- F5.2) The system must verify stock for the chosen dates and block booking if unavailable.
- F5.3) The system must display the required deposit for high-value items and capture authorisation/payment before completing the booking.
- F5.4) The system must enforce member limits (e.g., maximum active loans) and block if exceeded.
- F5.5) The system must reduce available quantity immediately on confirmation and issue a booking reference.
- F5.6) The system must show pickup window, deposit status, and cancellation rules on the confirmation.

F6: Rate & Comment on Return
User Story:

“As a parent, I want to rate the toy and leave a short comment when I return it so that other families and staff know its condition and usefulness”.

Acceptance Criteria:

- F6.1) The system must prompt the parent to rate (1–5) and optionally comment after the toy is checked in.
- F6.2) The system must link each review to the completed loan to ensure authenticity (one review per loan).
- F6.3) The system must allow parents to edit or withdraw their comment within a short grace period.
- F6.4) The system must moderate or hide reported content according to policy.
- F6.5) The system must flag comments mentioning safety or damage for staff follow-up.
- F6.6) The system must update the toy’s average rating and show the review timestamp when published.

F7: Report Damaged or Missing Parts
User Story:

“As a parent or staff member, I want to report a toy as damaged or missing parts so that the system can flag it for inspection”.

Acceptance Criteria:

- F7.1) The system must collect toy ID, issue description, optional photos, and when the issue was noticed.
- F7.2) The system must create a maintenance ticket with a reference number upon submission.
- F7.3) The system must immediately set the toy to Unavailable if the report indicates a safety risk.
- F7.4) The system must notify the reporter with ticket details and current status.

- F7.5) The system must display new tickets in a maintenance queue with priority and due date.
- F7.6) The system must keep a timestamped audit trail of all actions taken on the ticket.

F8: Manage Customer Records (No Manual Re-entry)
User Story:

“As a librarian I want to manage customer records so that i don’t have to add details manually”.

Acceptance Criteria:

- F8.1) The system must allow librarians to search members by name, email, or member ID and auto-fill forms.
- F8.2) The system must support bulk import/update of member records with validation and error reporting.
- F8.3) The system must detect potential duplicate records and allow safe merging with approval.
- F8.4) The system must validate required fields and display clear error messages before saving.
- F8.5) The system must restrict editing of sensitive fields to authorised staff only.
- F8.6) The system must log all changes with staff ID, timestamp, and reason code.

F9: Search Toys by Product ID
User Story:

“As a librarian I want to search toys by their product ID so that i dont have to invest a lot of time finding a single toy”.

Acceptance Criteria:

- F9.1) The system must support exact lookup by product ID and barcode scanning at the desk.
- F9.2) The system must open the toy detail page within two clicks from the search.
- F9.3) The system must show the toy’s current status (Available/On loan/Inspecting) and branch location.
- F9.4) The system must display a clear message and suggestions when an ID is not found.
- F9.5) The system must show cross-branch stock for that product ID on demand.
- F9.6) The system must return search results within a defined performance target (e.g., ≤2 seconds on a stable network).

F10: Prevent Double-Booking with Real-Time Inventory
User Story:

“As a librarian I want to track real time inventory so that I can prevent double booking on a single Item”.

Acceptance Criteria:

- F10.1) The system must decrement available stock instantly when a booking is confirmed.
- F10.2) The system must ensure only one booking can succeed when multiple users attempt the last unit simultaneously.
- F10.3) The system must apply a temporary checkout hold with an auto-timeout to avoid race conditions.
- F10.4) The system must synchronise inventory across channels (web and desk) without manual refresh.
- F10.5) The system must provide a live inventory view showing available, on-loan, and inspecting counts by branch.
- F10.6) The system must record all inventory adjustments with timestamps and reason codes.

F11: Track Overdues & Send Alerts
User Story:

“As a librarian, I want the system to keep track of overdue toys and send reminders and alerts, so that members return them on time”.

Acceptance Criteria:

- F11.1) The system must mark loans as Overdue immediately after the due date/time.
- F11.2) The system must send automated reminders on a defined schedule (e.g., day 1,2,3).
- F11.3) The system must calculate overdue fees per policy and post them to the member account.
- F11.4) The system must escalate after a threshold (e.g., suspend new bookings) until the account is settled.
- F11.5) The system must provide a dashboard to filter overdues by days late, value, and member.
- F11.6) The system must clear overdue status and recalculate fees when the item is returned.

F12: See Booking & Deposit at Pickup
User Story:

“As a librarian, I want to see a member’s booking and deposit details at pickup so that I can hand over the toy without delays or mistakes”.

Acceptance Criteria:

- F12.1) The system must allow lookup by booking code, member name, or toy ID.
- F12.2) The system must display deposit amount and payment/hold status on the booking screen.
- F12.3) The system must verify member status (active/suspended) and loan limits before checkout.

- F12.4) The system must block checkout if the deposit is not authorised/paid and state the reason.
- F12.5) The system must complete one-click checkout, set status to On loan, and record staff ID and timestamp.
- F12.6) The system must issue a digital or printed receipt showing due date, key rules, and deposit summary.

F13: View Member Profile, History & Feedback
User Story:

"As a customer liaison, I want to view each member's profile, borrowing history, and feedback records so that I can quickly answer their queries and recommend suitable toys".

Acceptance Criteria:

- F13.1) The system must present a single profile view showing contact details, active bookings, and balances.
- F13.2) The system must list borrowing history with dates, condition notes, and any fees paid.
- F13.3) The system must display the member's submitted feedback and ratings (read-only for staff).
- F13.4) The system must provide quick recommendations based on age, interests, and past borrowing.
- F13.5) The system must restrict access to authorised staff and log all profile views.
- F13.6) The system must generate a printable or emailable summary upon request and consent.

F14: Maintenance Reports & Parts Needed (Purchasing Manager)
User Story:

"As a purchasing manager, I want maintenance reports to show damaged toys and parts needed so I can order replacements quickly."

Acceptance Criteria:

- F14.1) The system must include a parts list (name and quantity) on maintenance tickets.
- F14.2) The system must filter tickets needing parts by urgency and branch.
- F14.3) The system must capture estimated part costs and support approval before ordering.
- F14.4) The system must record vendor, order number, and order date when approved.
- F14.5) The system must track delivery status (ordered/shipped/received) for each ticket.
- F14.6) The system must notify when parts are received and update the ticket status.

F15: Immediately Mark Damaged Toys Unavailable (Maintenance Manager)
User Story:

“As a maintenance manager, I want toys that are reported as damaged to be marked unavailable straight away so that no one borrows them until they’re cleaned or fixed”.

Acceptance Criteria:

- F15.1) The system must set a toy to Unavailable immediately upon a safety-risk report.
- F15.2) The system must remove unavailable toys from search and booking results.
- F15.3) The system must schedule or prompt for inspection within a defined timeframe and show the ETA.
- F15.4) The system must notify members with active reservations and offer options (switch item, waitlist, or cancel).
- F15.5) The system must return the toy to Available only after repair and quality check with a full audit trail.
- F15.6) The system must mark unrepairable toys as Retired and notify purchasing to consider replacement.

Non Functional Requirements-

NF1: System Availability and Reliability
User Story:

“As a system administrator, I want the system to have high availability at all times, so users can reliably access toy library services anytime.”

Acceptance Criteria:
- System uptime is at least 99.9% during operational hours
- System recovers within 5 minutes after any failure/error
- Users experience no more than 1% of downtime during peak usage periods
- System provides clear messaging during scheduled maintenance windows
- Backup systems are set up to prevent the entire system from going down
- System administrators get alerts right away if something goes wrong

NF2: Usability and User Experience
User Story:

“As a registered member, I want the application to be easy to navigate, so I can quickly find and borrow toys without technical difficulties.”

Acceptance Criteria:
- User interface is intuitive with clear navigation menus and icons
- Help and FAQ sections are accessible from every page
- Search and filter functions respond within 2 seconds

- Mobile responsiveness ensures full usability on smartphones and tablets
- Users can complete toy reservation within 3 clicks from search results
- Consistent styling used throughout the application

NF3: Security and Data Protection
User Story:

“As a system user, I want secure authentication and data privacy, so my personal information and children's details are protected.”

Acceptance Criteria:
- All passwords are stored using industry-standard hashing algorithms
- System uses a standard for all data transmission
- User sessions expire after 15 minutes of inactivity
- Access to sensitive data is role-based and requires proper authorization
- Everyone's personal information is securely protected at all times
- The system keeps records of who accesses or changes personal data

NF4: Performance and Scalability
User Story:

“As a system administrator, I want the system to handle growing numbers of users and toys without performance degradation, so UQPLAY can expand its community reach”.

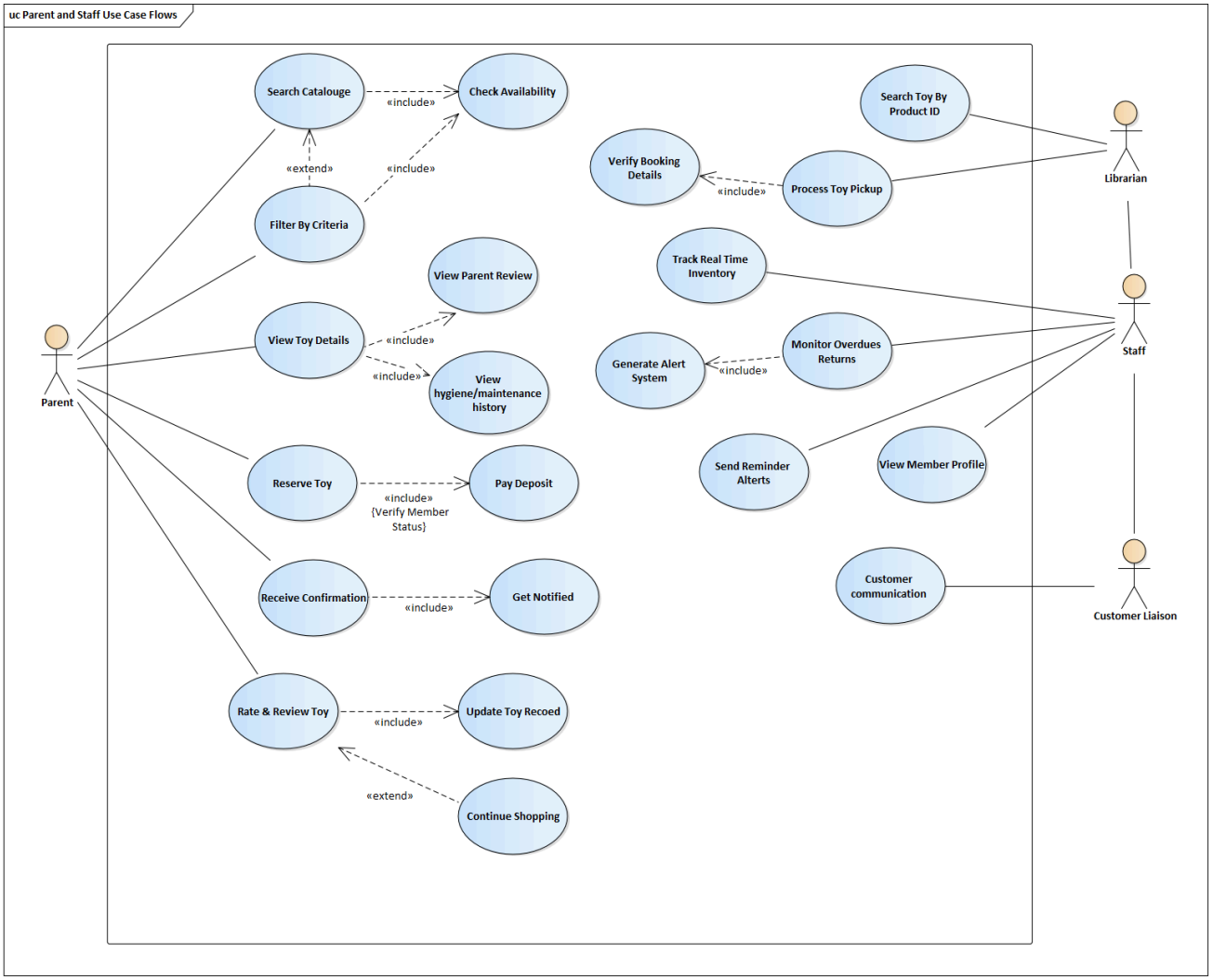
Acceptance Criteria:
- System response time remains under 3 seconds during peak load
- The system can easily add more capacity as more members join
- Searches run faster because the database is well organized
- The system can handle up to 500 users at once without crashing
- Due saved temporary data, popular pages load quicker.
- The system performance is monitored and notifies admins if issues happen

NF5: Maintenance and Operations Support
User Story:

“As maintenance staff, I want the system to provide timely notifications about toys needing cleaning or repair, so I can maintain toy quality and child safety promptly”.

Acceptance Criteria:
- Notifications are sent immediately when a toy is returned for maintenance
- Maintenance staff receive daily summaries of pending cleaning and repair tasks
- System allows prioritization of urgent repairs affecting child safety
- Complete history of maintenance actions is accessible per individual toy
- Automated alerts trigger when maintenance deadlines approach
- Communication logs are maintained for all maintenance-related activities

Use Case Diagram 1- Parent & Staff Flows (UQPLAY)



Description-

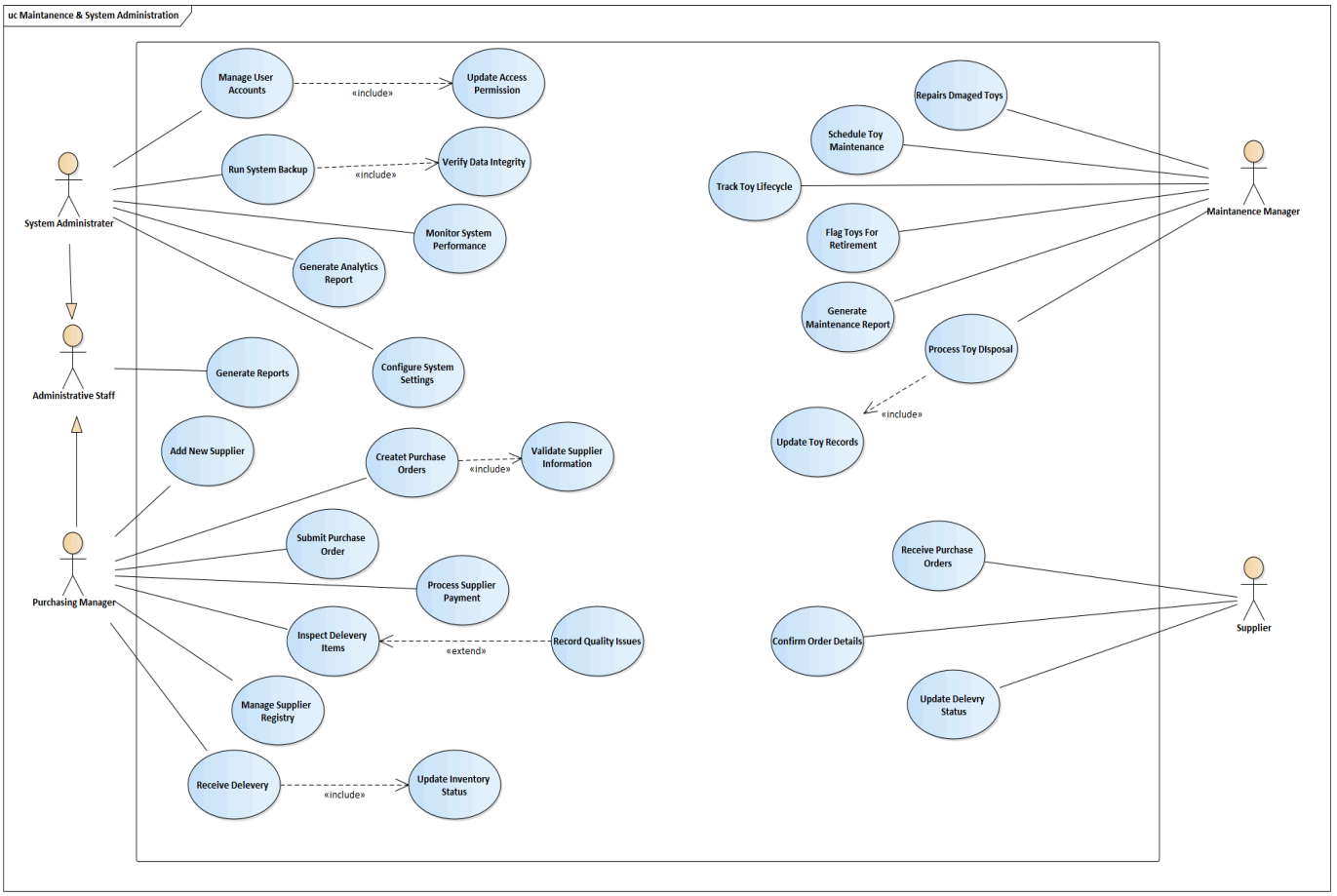
This use-case diagram shows how UQPLAY works across four roles—**Parent**, **Librarian**, **Staff**, and **Customer Liaison**—within one system boundary.

Parent journey: browse the catalogue, filter by age/interest, check availability, read parent reviews, view toy details (incl. hygiene/maintenance), then reserve and pay deposit where required. Parents receive booking confirmation, notifications, and later rate & review, which updates the toy record. Optional paths like continue shopping are modelled with «extend».

Staff operations: librarians search by product ID, verify booking details, and process pickup. Staff also track real-time inventory, monitor overdues, send reminders, and view member profiles. The Customer Liaison handles customer communication. Reusable, policy-driven actions (e.g., verification, reminders, record updates) are shown with «include».

Business value: ensures clear selection for families, accurate hand-over at the desk, controlled inventory to prevent double bookings, timely overdue management, and continuous quality improvement via feedback.

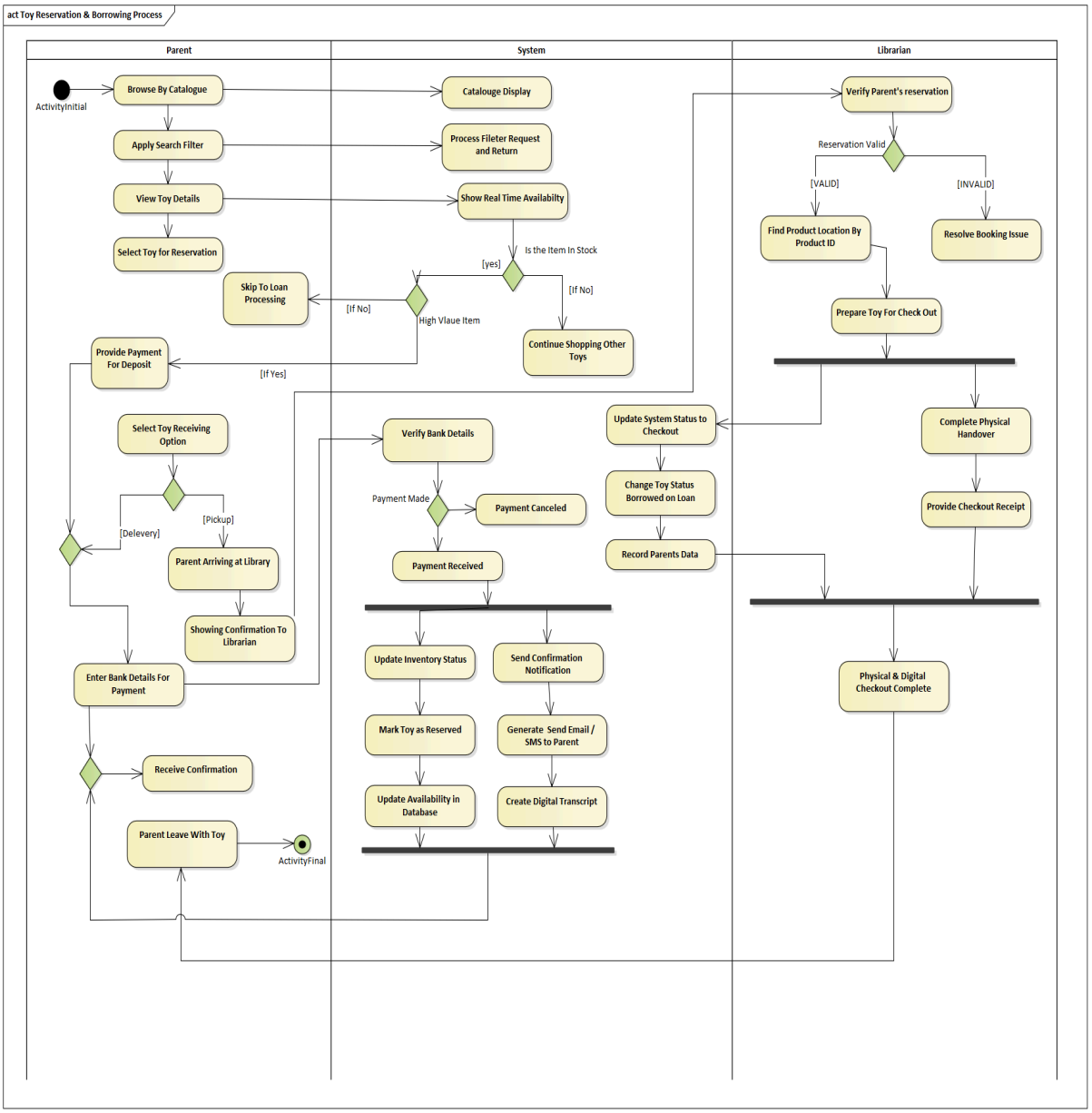
Use Case Diagram 2 - Maintenance & System Administration (UQPLAY):



Description -

This back-office use-case shows how UQPLAY stays secure, stocked, and safe.
Actors: **System Admin** (accounts/permissions, backups, data checks, performance, analytics); **Admin Staff** (config + operational reports); **Purchasing Manager** (supplier registry, POs, receiving/quality, payments); **Supplier** (confirm/ship/update status); **Maintenance Manager** (schedule repairs, update records, retire/dispose unsafe items).
Reusable flows: «include» standard steps like **Validate Supplier**, **Update Inventory Status**, **Update Toy Records**; «extend» handles exceptions such as **Record Quality Issues** during delivery inspection.
Business value: stronger control and compliance, timely repairs and safe retirements, accurate inventory and supplier accountability, with a full audit trail for governance.

Activity Diagram 1- Toy Reservation & Borrowing (UQPLAY).

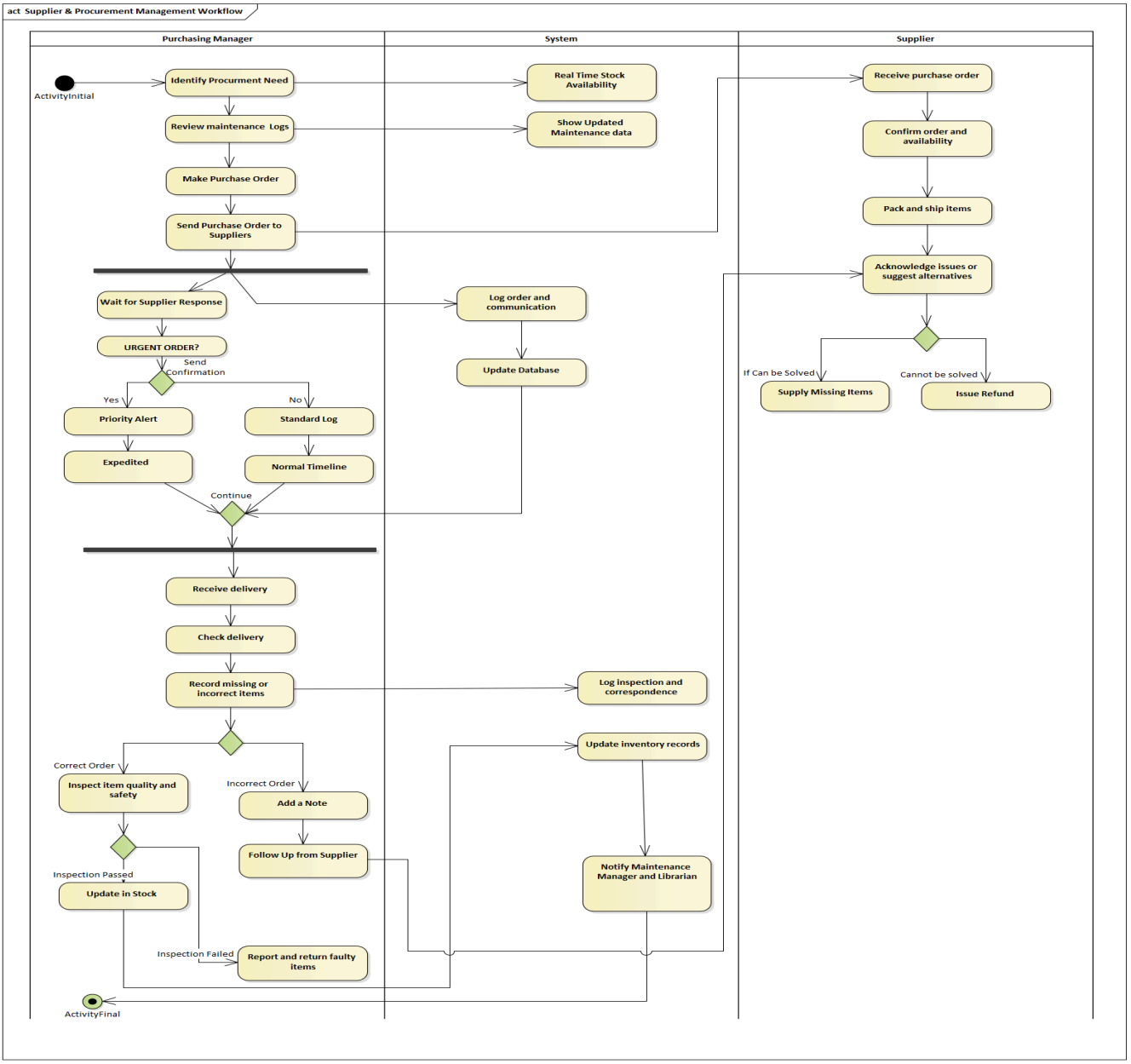


Description-

This diagram summarises the lending journey across **Parent**, **System**, and **Librarian** lanes. Parents browse and filter the catalogue, view item details, and see **real-time availability**. If the toy is in stock—and a **deposit** is required for high-value items—the parent chooses pickup or delivery, enters payment, and the System verifies it. Successful payment **reserves the toy**, updates inventory, and sends a confirmation; failed payment cancels the attempt. For pickup, the Librarian validates the reservation, locates the item, completes **handover**, and issues a receipt while the System marks the loan **Borrowed** and records the transaction. Final steps keep the **audit trail** and availability current.

Business value: dependable stock accuracy, secure payments, faster desk processing, and full traceability from reservation to handover.

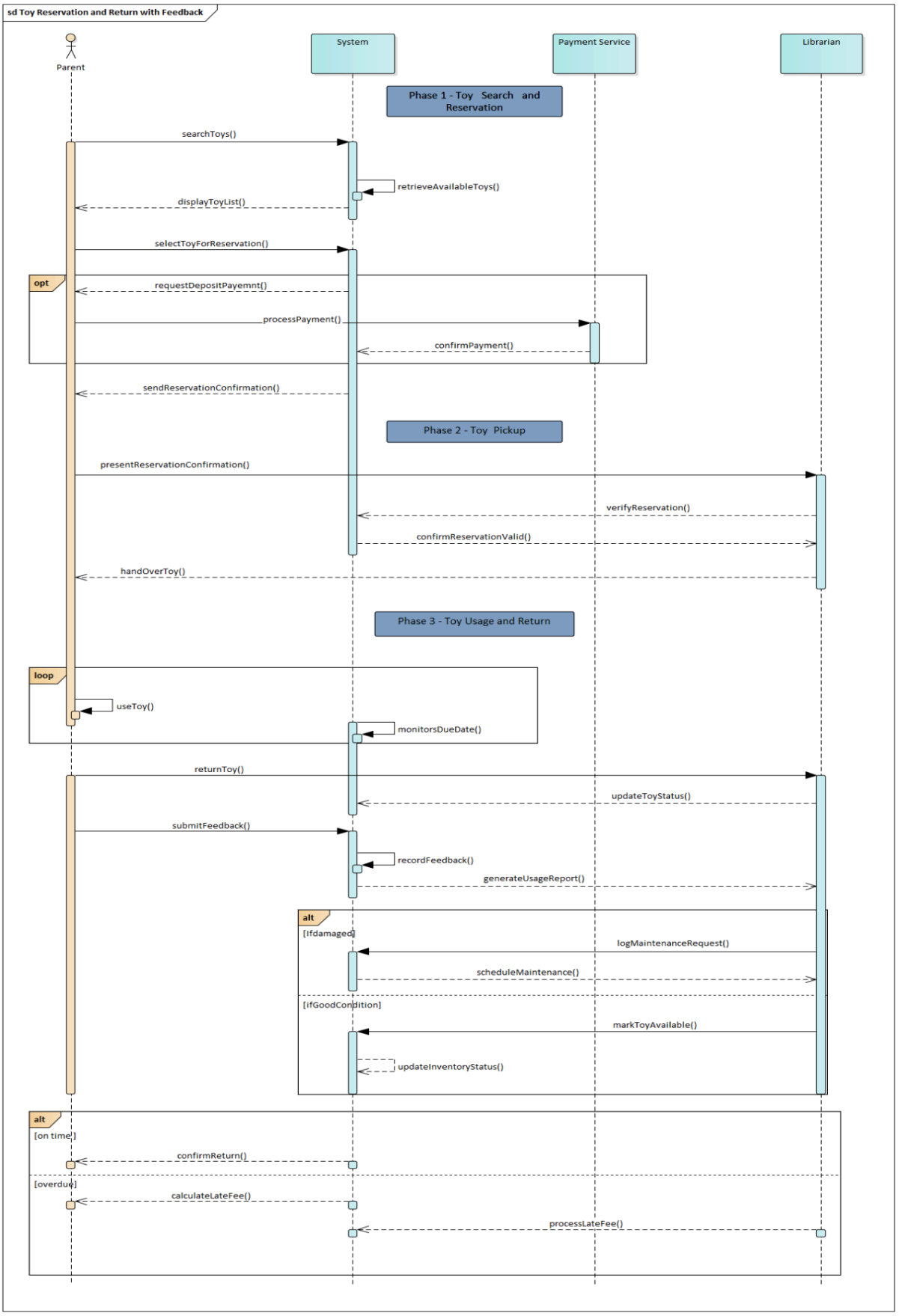
Activity Diagram 2- Supplier & Procurement Management Workflow (UQPLAY).



Description -

This diagram shows the procurement flow across **Purchasing Manager**, **System**, and **Supplier**. The Purchasing Manager identifies a need and issues a **PO** (urgent orders follow an expedited path). The **System** logs the PO and communications, updates stock/maintenance data, and provides traceability. The **Supplier** confirms availability, ships items, or flags issues; solvable gaps are filled, otherwise a **refund** is issued. On receipt, the Purchasing Manager **inspects**: correct orders get quality/safety checks and **stock updated**; incorrect or failed items are **reported and returned**. The System records inspections, updates inventory, and **notifies Maintenance/Librarian**. **Business value:** a controlled, auditable cycle that prioritises urgent needs, enforces quality, maintains accurate inventory, and resolves supplier issues quickly.

Sequence Diagram 1 - Toy Reservation & Return with Feedback (UQPLAY)



Description-

This sequence shows the full customer journey across four participants: **Parent**, **System**, **Payment Service**, and **Librarian**. It unfolds in three phases.

Phase 1: Search & Reservation
The parent searches toys; the System retrieves availability and displays results. After the parent selects a toy, an optional deposit may be requested. If required, the System processes payment via the Payment Service and waits for confirmation. The System then sends a reservation confirmation, which the parent can present at pickup.

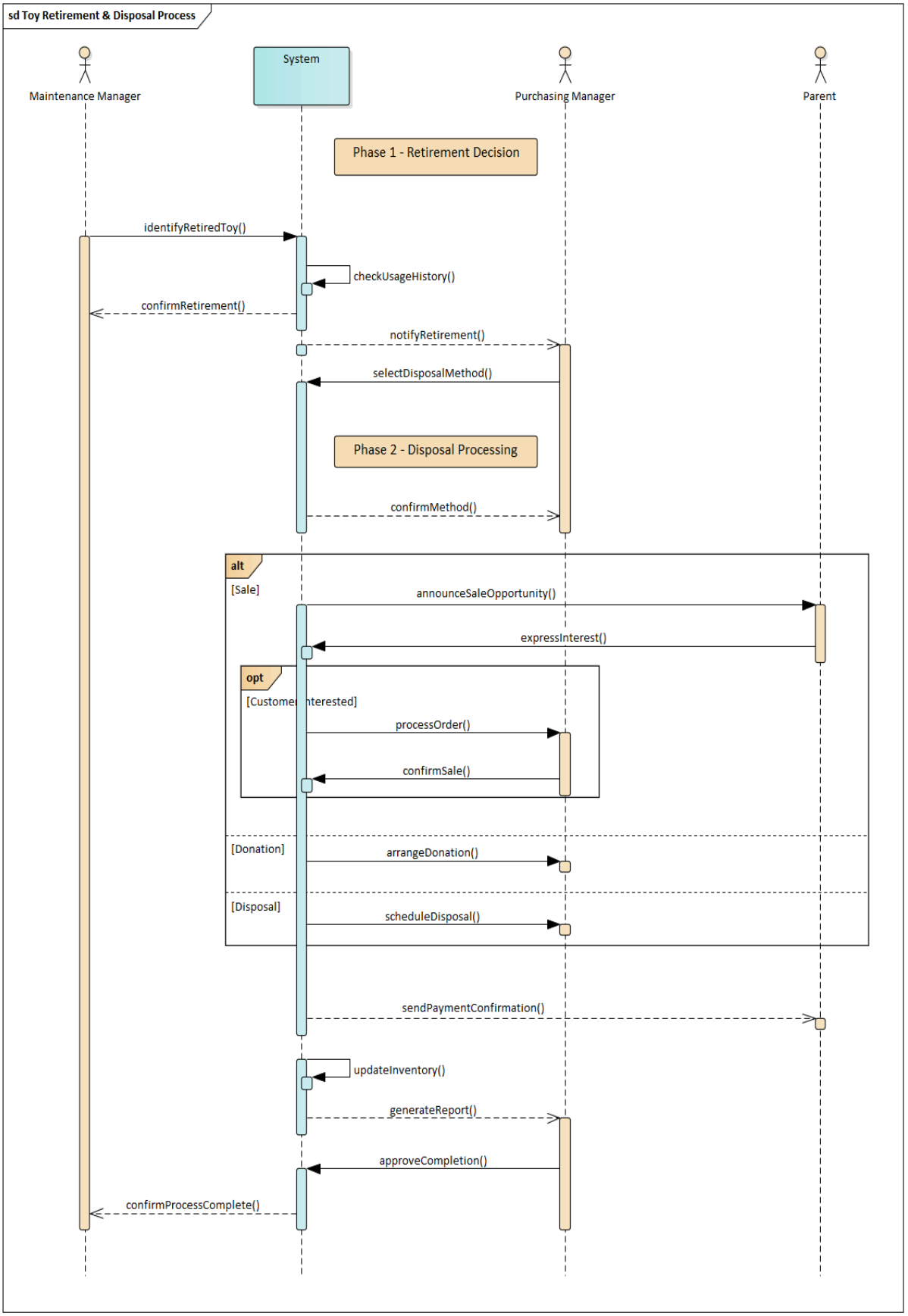
Phase 2: Pickup
At the desk, the Librarian verifies the reservation with the System. If valid, the toy is handed over and the System updates status to Checked out.

Phase 3: Use, Return & Feedback
While on loan, the System monitors the due date. The parent returns the toy; the System updates status and the Librarian finalises the check-in. The parent can submit feedback; the System records it and generates a usage report.
An alternative path handles condition:

- **If damaged:** the System schedules maintenance and the Librarian logs a maintenance request.
- **If good:** The System updates inventory and marks the toy available.
  A final alt handles timeliness:
- **On time:** the System confirms return.
- **Overdue:** it calculates and processes late fees.

Business value: clear handoffs between customer, desk, and payment; accurate inventory status; captured feedback; and automatic handling of damage and late returns.

Sequence Diagram 2 - Toy Retirement & Disposal Process (UQPLAY).

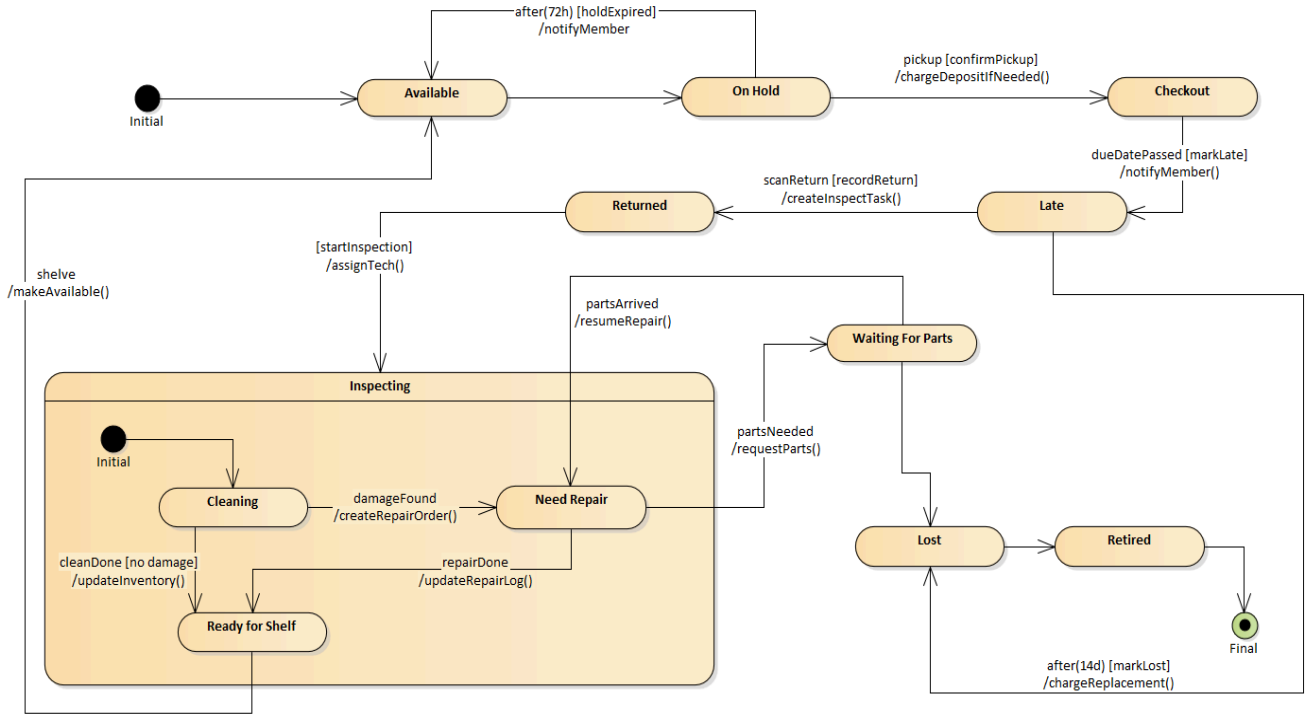


Description-

his sequence maps the controlled retirement of a toy across **Maintenance Manager**, **System**, **Purchasing Manager**, and **Parent**. First, Maintenance identifies an unsafe/end-of-life item; the System checks history, records the decision, and notifies Purchasing to choose a disposal path. The System then coordinates the chosen route: **sale** (announce, capture interest, process payment), **donation** (arrange handover), or **waste** (schedule compliant disposal). When finished, the System **updates inventory**, **issues a completion report**, Purchasing **approves**, and Maintenance receives **closure**.

Business value: rapid removal of unsafe items, accurate stock/financials, sustainability options prioritised (sale/donation), and a full audit trail for governance.

State Diagram - Toy Lifecycle

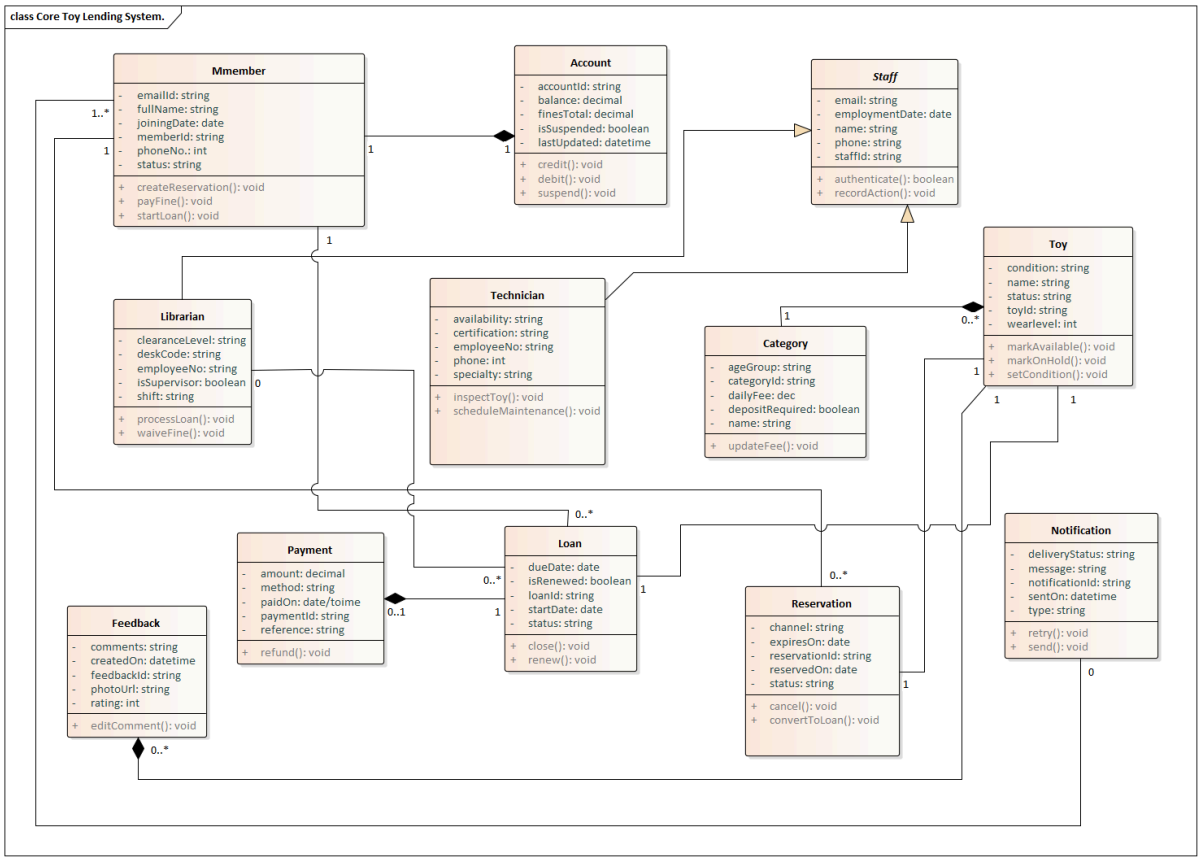


Description -

Operationally, each toy moves **Available → On Hold (72 h) → Checkout**; uncollected holds revert to **Available**. Post-checkout, due-date controls apply: **Checkout → Late → Lost (14 days) → Retired**. Every return enters **Inspecting** (Cleaning / Need Repair / Waiting for Parts / Ready for Shelf) before re-entering **Available**; unsafe or irreparable items are **Retired**.

Business value: predictable lending rules, accurate real-time inventory, enforced risk/safety controls, and auditability—driving reliable service and customer trust.

Class Diagram - Core Toy Lending System



The model groups concepts into **People**, **Catalogue**, **Transactions**, and **Comms**.
People: Members own exactly one Account (composition 1–1) and can have many Reservations and Loans. Staff is an abstract employee type; Librarian and Technician specialise it (generalisations)—librarians process loans; technicians inspect/repair toys.
Catalogue: Category groups many Toys (aggregation 1–0..). Each toy carries condition, wear level, and status. Members contribute Feedback that belongs to a single toy (composition 1–0..).
Transactions: A Reservation links one member to one toy; a Loan also links one-to-one with a toy and may have at most one Payment (composition 1–0..1).
Comms: Notification messages relate to exactly one member (0..*–1).
Multiplicities on connectors enforce business rules (no double ownership, one toy per loan, etc.), giving leaders a clear, auditable data foundation for operations and reporting.