Hand Me Down Clothing Documentation

1 - Informative part

1.1 - Team

1.2.1 Current Situation

Landfills and textile waste in Puerto Rico

- High waste volume: Approximately 250 million pounds of clothing and textiles are sent to Puerto Rico's landfills annually.
- High landfill rate: Similar to the global and U.S. trends, a very high percentage of discarded textiles, around 85%, end up in landfills, despite being largely recyclable.
- Low recycling rates: Puerto Rico's overall recycling rate is notably low, with some reports estimating it to be less than 10%. This is significantly lower than the U.S. national average.
- Overwhelmed landfills: Puerto Rico's landfills are facing a serious crisis, with many already at or over capacity. The high volume of textile waste contributes to this problem.

sources:

- investpr.org
- theenvironmentalblog.org

Poverty

- Overall Poverty: The poverty rate in Puerto Rico is alarmingly high, at around 41.7% as of 2022. This is over three times the U.S. national average.
- Child Poverty: A staggering 54.3% to 57.6% of children under 18 in Puerto Rico live in poverty. This is more than any U.S. state and indicates that a vast number of families cannot afford to consistently provide their children with properly fitting, weather-appropriate clothing and shoes.
- Persistent Poverty: All 78 municipalities in Puerto Rico are classified as "persistent poverty counties," meaning they have maintained a poverty rate of 20% or more for at least 30 years.

sources:

- centropr.hunter.cuny.edu
- geopoliticaleconomy.com

Homelessness:

- Homeless Population: Recent counts show the homeless population in Puerto Rico to be around 2,096 individuals. For these individuals, clothing is a constant and critical need.

Sources:

- periodismoinvestigativo.com

1.2.2 Need

The purpose of this section is to establish the fundamental needs that motivate the Hand Me Down project, expressed independently of any system-to-be. These needs are grounded in the resale domain and must reflect the concerns of students and families who participate in secondhand exchanges. The articulation of these needs will guide the subsequent development of domain descriptions, requirements, software architecture, and testing activities.

Stakeholders in this domain shall be understood as students and families seeking opportunities for affordable, accessible, and trustworthy secondhand exchanges. Their needs are not for a platform itself, but for solutions to the problems they encounter when attempting to exchange goods in local communities.

The following distinct needs are identified:

- Students and families must have affordable access to secondhand goods that support daily life, education, and well-being.
- Stakeholders must be able to rely on transparent information about the condition and history of pre-owned items.
- Exchanges shall be conducted in a manner that establishes trust, fairness, and safety between participants.
- Opportunities for accessibility and inclusivity must be available so that all families and students, regardless of economic background, will participate in the resale domain without barriers.
- Developers shall have clear requirements, descriptions, and architecture to build upon, since no structured system currently exists to organize this resale context.

These needs form the foundation for further project work. They are deliberately expressed at the domain level, independently of any particular solution, to ensure that subsequent design and implementation activities will remain aligned with the stakeholders underlying motivations. ==== **1.3.1 Scope & Span**

Scope

The Hand Me Down project will operate in the broad domain of online resale marketplaces. It will address the general problem of enabling individuals and communities to exchange secondhand goods in a structured, reliable, and sustainable manner. The scope will cover activities in domain engineering, requirements engineering, and software architecture to ensure a well-founded solution.

The project will emphasize the following areas: * Domain:: Resale of pre-owned items across categories such as clothing and accesories. * Requirements:: Identifying user needs related to affordability, sustainability, accessibility, and usability. * Architecture:: Defining a framework that supports secure and scalable interactions between sellers and buyers. * Project Activities:: Documentation, validation, and design processes that must accompany implementation.

Span

The span narrows the focus of the Hand Me Down project to **specific concerns and audiences** within the general resale domain. The platform must primarily serve individuals and families who wish to exchange items affordably, students and young adults seeking budget-friendly goods, and community members interested in sustainable consumption.

The span includes the following project-specific aspects: * User Interaction:: Individuals must be able to list, browse, and search for secondhand items. * Categorization:: Items will be organized into categories that facilitate discovery. * Transaction Support:: The system must provide structured means for negotiation, offers. * Trust and Transparency:: Item conditions and relevant metadata must be clearly described to support informed decisions. ==== **1.3.2 Synopsis**

This Synopsis provides overview of the Hand Me Down project from the perspective of students and families engaged in secondhand exchanges. It articulates the domain, affordability, accessibility, trust, safety and states that stakeholders must be able to discover, evaluate, and exchange pre-owned goods with transparent information about item condition and history. The project shall be conducted through structured domain acquisition to produce a domain description, a requirements prescription that specifies goals, constraints, and quality attributes with traceability to stakeholder needs and a software architecture that evaluates alternatives and justifies decisions, prototyping where necessary to mitigate risk. Component design and iterative implementation will realize prioritized capabilities while preserving traceability. Verification and validation shall include a test plan that covers functional fitness, usability, and trust/safety concerns, supported by versioned documentation, change control, risk tracking, and metrics. ==== **1.4 Other Activities than Just Developing Source Code**

This project will not be limited to writing source code. To satisfy the needs identified for affordability, accessibility, trust/safety, and transparency in the Mayagüez/UPRM context, the team shall execute the following activities in addition to implementation. Each activity is mandatory, tied to a stakeholder need and justified by the current situation.

Domain engineering

> The team shall elicit and model the domain of donation and resale of clothing and accessories for students and families (actors, workflows, vocabulary, constraints). **Need satisfied:** developers must share a precise vocabulary and mental model to preserve accessibility, affordability, and transparency. **Current situation:** rough sketches are based on team self-observation; no external interviews conducted yet; stakeholder roles are not enumerated; internal terminology seems consistent but remains unvalidated in the field. **Contributions to date:** condition labels and verification practices were researched; the **Sell** vs **Donate** category structure was standardized; initial personas were drafted to ground concepts. **Planned outcomes:** domain glossary, context diagram, concrete exchange workflows, and domain verification norms (tag photo, full-item photos, defect call-outs).

Requirements engineering

The team shall prescribe goals, user-level functional requirements (listing, browse/search, donation/resale flows, offer/negotiation) and quality attributes (trust/safety, transparency, usability, accessibility) with explicit traceability to needs and acceptance criteria. **Need satisfied:** developers must clearly understand system functionality and nonfunctional expectations that build trust and reduce effort. **Current situation:** no consolidated requirements baseline or acceptance criteria exist. **Contributions to date:** epics were linked to user stories (buyer/seller perspectives) against stakeholder needs; interface requirements at the system boundary were authored; measurable machine requirements (response time, uptime, user capacity) were drafted. **Planned outcomes:** requirements set with SHALL statements and acceptance criteria; traceability matrix (Need → Requirement → Test); nonfunctional thresholds made testable.

Software architecture

The team shall select and justify an architecture addressing security, privacy, modifiability, and campus-scale usage; architectural views and decision records will be maintained. **Need satisfied:** stakeholders must receive a reliable, maintainable basis for transparent, safe exchanges. **Current situation:** direction is leaning toward Supabase for authentication (Google sign-in compatibility) with a full custom backend; no UPRM hosting/privacy constraints identified; ADRs and C4 views are not yet written. **Contributions to date:** search and map integration approaches were evaluated and geolocation/privacy considerations documented; authentication backends (Firebase vs. Supabase) and session-management implications were analyzed; page-level layouts were produced to inform view composition and navigation flows. **Planned outcomes:** C4 views (context/container), Architectural Decision Records (auth, data, map/search), quality-attribute scenarios, and targeted risk spikes where uncertainty is high.

Component design

The team shall define modules, interfaces, and data contracts to preserve testability and changeability (catalog/search, profiles/auth, exchange/offer, reporting/moderation, “items circulated” metrics). **Need satisfied:** maintainable, verifiable components are required to deliver transparency (clear item/condition data) and accessibility (predictable flows). **Current situation:** boundaries and interfaces are only partially documented. **Contributions to date:** the user/auth schema (roles, profile fields, donation/sell history) was initiated and APIs for login/registration/logout were defined; search behavior and map-related data interactions were documented; wireframes and page designs (Homepage, About, Clothes Listing, Individual Item, Favorites, Checkout, Log In/Sign Up, Profile) clarify interface responsibilities and data needs. **Planned outcomes:** module responsibilities, interface specs (inputs/outputs/preconditions/postconditions), initial schemas with migration notes, and example queries.

Implementation planning

The team will establish a delivery roadmap, Definition of Done, contribution standards, and a branching/CI strategy suitable for a student-run service. **Need satisfied:** predictable, reviewable progress must be ensured to realize stakeholder value without regressions. **Current situation:** a branch is created per team with controlled pull requests and merges to main when working; no CI pipeline is in place; review checklist/PR template usage is minimal. **Contributions to date:** the AsciiDoc documentation structure and conventions were established; documentation issues with acceptance criteria were created; a step-by-step Node.js/npm installation and verification

guide was produced to bootstrap the development environment. **Planned outcomes:** roadmap with dates/owners, Definition of Done, CONTRIBUTING guidelines, PR template, and CI workflow for lint/tests on pull requests.

Testing and validation

The team shall produce a test plan spanning unit, integration, end-to-end, and usability/acceptance with students and families; trust/safety validations shall be included (e.g., prohibited items policy, condition/fit etiquette). **Need satisfied:** stakeholders must have confidence that behavior and quality attributes match the prescription. **Current situation:** no automated tests exist and the test plan is not started; usability/acceptance testing is deferred to later milestones; recruitment will be informal ("ask around UPRM"); top priority requirements for acceptance scenarios are not selected yet. **Contributions to date:** machine requirements were expressed in measurable terms (e.g., support ~100 simultaneous users) to anchor performance testing; trust-building practices (verification methods, condition labels) were documented to translate into validation checks. **Planned outcomes:** test plan, seeded test suites, acceptance scenarios (Given–When–Then) mapped to requirements, trust/safety validations, and a defect taxonomy with triage protocol.

Deployment considerations

The team will define dev/staging environments, configuration, seed/reset data, rollback procedures, and a minimal operations runbook for a student-operated service. **Need satisfied:** availability and safe adoption are necessary for accessibility and affordability benefits to materialize. **Current situation:** no documented path to deploy, recover, or roll back; backend selection work is informing environment and secrets management but is not yet consolidated in docs. **Contributions to date:** Docker usage was explored to standardize developer environments and setup was documented; backend evaluations (Supabase/Firebase) inform environment and secret management decisions. **Planned outcomes:** environment definitions, secrets/config guidance, release/rollback steps, seed scripts, and a basic ops runbook.

Stakeholder liaison and feedback (cross-cutting)

The team shall schedule and document periodic touchpoints with students and families in Mayagüez to validate assumptions early (quotes/anecdotes shall be recorded in §2.1.1). **Need satisfied:** continuous alignment is required to keep requirements correct and trust high. **Current situation:** no formal liaison cadence is defined; external interviews are not planned at this time; consent/ethics approach is undefined. **Planned outcomes:** contact cadence, feedback and decision logs, and lightweight consent notes for any future interactions.

Documentation & governance (cross-cutting)

The team shall maintain versioned documentation, change control, risk tracking, and metrics to ensure durable traceability across activities. **Need satisfied:** traceability is required to justify decisions and onboard contributors without rework. **Current situation:** a docs index/navigation page is considered established (initial draft); changelog and risk register are not started; project metrics beyond "items circulated" are not yet defined. **Contributions to date:** the docs/ layout and AsciiDoc style were standardized and most documentation issues were created; branding (logo, color palette, typography) was established to keep artifacts consistent and legible. **Planned outcomes:** docs index and navigation (maintained), changelog, risk register (e.g., technology choice risk, schedule slip, data/privacy misconfiguration), and basic metrics (e.g., items circulated as a primary signal). ==== **1.5 Derived Goals**

In addition to the primary goals (needs, scope, and core functionality), the project shall pursue secondary outcomes that respond to the realities of Mayagüez and the UPRM community. These outcomes are substantially different from core system behavior and emphasize long-term social, educational, and community benefits for students and families.

- Promote sustainability literacy and circular practices in Mayagüez:: The project shall normalize reuse, repair, and responsible disposal behaviors among students and families through donation and resale norms. **Broader impact:** item lifecycles will be extended and textile waste pressure will be reduced without prescribing any specific technical solution.
- Strengthen community engagement and mutual aid through UPRM-led outreach:: The project will cultivate equitable sharing practices (donation, fair resale) centered on UPRM as the primary touchpoint. **Broader impact:** social capital will increase and households will respond more effectively to clothing and accessory needs across semesters and seasons.
- Raise awareness of affordability and access constraints faced by local households:: The project shall make visible how structured sharing reduces acquisition cost and effort for students and families. **Broader impact:** schools and neighborhood groups will make more informed choices about drives, sizing priorities, and targeted outreach.

These derived goals will guide outreach, education, and validation activities alongside the primary objectives, and shall not be construed as mandates for any specific platform or implementation approach.

2 - Descriptive part

2.1 - Domain description

2.1.1 Domain Rough Sketches

> This section captures domain facts, phrases, anecdotes, and observations. It SHALL NOT mention features or designs of any future system. Interviews with external stakeholders are pending.

Stakeholder & Settings (roles only, no names yet)

- Team self-observation (students), Mayagüez/UPRM: identified a recurring need for affordable access to clothing/accessories among students and families.
- **No interviews conducted yet.** Contacts to schedule: students, families, school/university staff, local resale participants.

Observed Practices (how exchanges currently happen)

- Discovery: Facebook Marketplace; Facebook groups; WhatsApp groups; Instagram stories.
- Handoff: in-person meetups at UPRM (on/near campus) or at apartment complexes.

- Typical flow (as reported by students): look up item → contact seller → agree on specifics (price, size, time/place) → pick up item.

Artifacts, Condition Language, and Pricing

- Item types seen/expected: any clothing and accessories (no narrow category observed yet).
- Condition/fit phrasing used: “lightly used,” “like new,” **specific sizes** (size called out explicitly).
- Typical price bracket mentioned for clothing items: USD $8–$15 (symbolic/low-cost resale).

Trust, Safety, and Informal Norms

- Common concerns: item hygiene; no-shows; scams; unsafe meetups.
- Informal norms reported: include a photo of the size **tag**; include full-item photos (front/back/defects).
- Moderation: none observed in ad-hoc chats; Facebook groups **may** have basic moderation/house rules (unverified; needs follow-up).

Language & Access

- Languages used: Spanish + English (bilingual exchanges common).
- Access barriers reported so far: none explicitly identified by team; requires external confirmation.

Existing Channels (local)

- Facebook Marketplace (general Mayagüez and student-adjacent listings).
- Facebook groups (names to be captured during interviews).
- WhatsApp groups/lists (parent/student circles).
- Instagram stories (peer-to-peer sharing).
- Moderation/ownership of channels: unknown (except Facebook-controlled groups); to verify.

Micro-notes / Anecdotal Fragments (self-observations)

- Price sensitivity appears high; low-cost clothing listings ($8–$15) are common reference points among students.
- Meetups tend to prefer familiar, semi-public locations (campus spots, apartment lobbies).
- Sellers are expected to show a **tag photo** and **full product photos**; size clarity is a frequent pain point.

Small Data Points / Clippings (to attach later)

- (None documented yet.) If a metric or screenshot is captured (e.g., number of listings/day in a specific group), record with date/source here.

Open Questions (for later concept analysis)

- Which specific groups/chats drive most exchanges in Mayagüez/UPRM? Who moderates them and what rules exist?
- What concrete safety practices are considered “standard” locally (meetup spots, daylight hours, bringing a friend, ID at gates)?
- How is **condition** defined locally beyond “lightly used/like new”? (e.g., semester-used uniforms, defect call-outs, hygiene steps)
- Are there seasonal peaks (back-to-school, semester start, graduation, weather shifts)? What items spike, and when?
- For pricing, when do buyers/sellers treat $8–$15 as “firm” vs. negotiable (OBO, bundles)?
- Are there categories explicitly excluded by social norms (e.g., certain intimate apparel), and how is that communicated?
- Which language (Spanish vs. English) dominates in each channel, and does that affect participation?

2.1.2 - Terminology

The following terminology consolidates entities, events, functions, and behaviors in the domain. Each entry specifies the type of concept it represents and the phase in which it is introduced (domain, requirements, design, implementation). This approach avoids circular definitions and ensures alignment with both domain knowledge and system concerns.

Term	Concept Type	Phase Introduced	Definition / Notes
Donator	Entity	Domain	A person who provides clothing items for donation.
Collector	Entity	Domain	A person who purchases or claims a clothing piece. A person who will potentially purchase or claim a clothing piece.
Piece	Entity	Domain	An individual clothing item, defined independently of the system.
Listing	Representation	Design	A published representation of a Piece in the platform.
Donation	Event	Domain	Instantaneous occurrence when a Donator has just made a clothing item available.

Term	Concept Type	Phase Introduced	Definition / Notes
Collection	Event	Domain	Instantaneous occurrence when a Collector has just taken possession of a Piece.
Condition Rating	Attribute / Function	Domain	A measure (e.g., scale 1-10) of quality for a Piece.
Review	Artifact	Domain	Annotation (usually written text) associated with a transaction that complements a rating.
Locale	Entity	Domain	Physical location or organization where donations are deposited or distributed.
Type	Attribute	Domain	Category of clothing (dress, pants, shirt, etc.).
rate(Piece, ConditionRating) → ConditionRating	Function	Design	Updates the condition rating of a Piece using the new rating value; no pre-existing rating is required.
donate(Piece, Donator, Locale) → Donation	Event Function	Design	Function that triggers the event of donation: "A Piece has just been donated by a Donator at a Locale."
donate(Piece, Donator, Collector) → Donation	Event Function	Design	Function that triggers the event of donation: "A Piece has just been donated by a Donator to a Collector."
collect(Piece, Collector) → Collection	Event Function	Design	Triggers the event: "A Piece has just been collected by a Collector."

2.2.2 - Personas

A persona is a fictional yet plausible representation of a user for a platform. The following personas will help align development goals with user needs.

Adriana Gómez

- **Age**: 20 years old
- **Occupation**: University student on financial aid working part-time on campus
- **Build / Appearance**: Dark and straight hair, low to average height, dresses in vintage clothes and kitschy accessories
- **Personality**: Creative, unique, community-driven

Adriana loves expressing herself through her fashion, yet she struggles finding clothes that feel like her. She has an affinity for older clothing, so thrift stores are a common spot for her. However, she

struggles finding thrift stores in her area given that most of them don't have an online presence and, between her studies and her job, she doesn't have a lot of time to go out and look for them.

- **Pain Points**: Difficulty finding unique clothing items and accessories that don't break the bank, difficulty finding local thrift stores
- **Needs**: Access to trustworthy online listings, a way to find local thrift stores
- **Platform Interaction**: Browses listings from her phone during her breaks between classes

Manuel Torres

- **Age**: 35 years old
- **Occupation**: Middle school teacher
- **Build / Appearance**: Brown and curly hair, average height, frequently seen in polo shirts or t-shirts with witty quotes on them.
- **Personality**: Patient, funny, good with kids, adventurous

Manuel is moving to a new location and wants a fresh start. Even if he doesn't want a lot of his belongings anymore, he'd rather not throw them away. He wants to sell whatever he has that's still in good condition to help out with the expenses involvd in the move but can't find a way to do so.

- **Pain Points**: No low-hassle way to sell his belongings
- **Needs**: Access to a way to sell his belongings on his own terms
- **Platform Interaction**: Creates listings from his work computer for his pre-loved clothes

Daniela López

- **Age**: 27 years old
- **Occupation**: Nurse practitioner
- **Build / Appearance**: Long and wavy brunette hair, tall, dresses in comfortable clothes like baggy jeans or athleisure
- **Personality**: Outspoken, understanding, eco-conscious

Daniela is the type of person to own something until it falls apart. She is vehemently against fast fashion and tries to not contribute to it to the best of her ability. She believes older clothing was made to last longer and buys second-hand whenever she can, but her favorite local thrift store has just closed down and the closest is now too far away for her to visit frequently.

- **Pain Points**: Doesn't want to contribute to fast fashion, tired of the low quality of modern clothing items
- **Needs**: A way to purchase good quality vintage clothing items
- **Platform Interaction**: Browses listings using search filters to narrow down her results to her needs === 2.2.3 Domain Requirements

The system shall manage listings according to the inherent properties of categories, items, and taxonomy structure in the domain of classified and donation listings.

- DR1: The system must classify every listing under exactly one primary category, ensuring consistent organization and discoverability across the taxonomy.
- DR2: The system must allow categories to have hierarchical subcategories, reflecting the domain property of multi-level classification used in established marketplaces.
- DR3: The system must distinguish between **Sell** and **Donate** listing taxonomies, preserving the domain difference in category depth and item grouping.
- DR4: The system shall provide means to enforce item-to-category compatibility, ensuring that each listing aligns with an appropriate category (e.g., vehicles cannot be placed under clothing).
- DR5: The system must support category evolution, allowing the taxonomy to incorporate new categories or subcategories without invalidating existing listings.

Each of these requirements directly ties to observed domain properties: - DR1 reflects the necessity of a single, authoritative classification per item. - DR2 enforces hierarchical structures present in all reference taxonomies. - DR3 respects the distinction between selling and donating, observed in multiple platforms. - DR4 ensures semantic alignment between items and categories, preventing domain violations. - DR5 supports the domain need for scalability and adaptability as marketplaces evolve.

References

- **eBay**: https://www.ebay.com/n/all-categories
- **Facebook Marketplace (Meta)**: https://www.facebook.com/marketplace/
- **OfferUp**: https://offerup.com/
- **Craigslist**: https://www.craigslist.org/about/sites
- **Goodwill (Donation)**: https://shopgoodwill.com/all-categories === 2.2.4 Interface Requirements

Objective

The clothing marketplace must represent, initialize, and update domain concepts (e.g., clothing items, user accounts, transactions) in a consistent and testable manner. These requirements ensure that real-world phenomena (buying, selling, searching clothes) are accurately modeled inside the system.

Requirements

Representation Rules

- **Clothing items** - represented as a unique system entity with attributes: item ID, seller ID, title, description, category, size, price, condition, and availability status.
- **User account** - represented as a unique system entity with attributes: user ID, username, email, role (buyer, seller, or both), and transaction history.
- **Transaction** - represented as a unique system entity with attributes: transaction ID, buyer ID, seller ID, item ID, status (pending, confirmed, completed), and timestamp.

Initialization Rules

- **Listing a clothing item** - the system shall initialize the item entity with all required attributes. An item cannot exist in the system without a valid seller ID and price.
- **User registration** - when a new user registers, the system shall initialize a user entity with a unique user ID and default role "buyer." Role changes to "seller" require additional verification (e.g., valid payment info).
- **Purchase initiation** - when a buyer initiates a purchase, the system shall initialize a transaction entity with status = "pending" until confirmation.

Update Rules

- Item availability shall update automatically when a purchase is confirmed: availability status changes from "available" to "sold."
- Sellers may update item attributes (title, description, price). Updates to sold items are restricted.
- Transaction status shall update in predefined steps: "pending" → "confirmed" → "completed." Skipping states is not permitted.
- User accounts may update certain attributes (email, profile details) but transaction history shall be immutable once recorded.

Examples

1. **Initialization**: A seller lists a jacket. The system creates an item entity with attributes (ID=1001, seller=U123, category=outerwear, price=$50, status=available).
2. **Update**: A buyer purchases the jacket. The system updates the transaction status (T555: pending → confirmed), and the item status (I1001: available → sold).
3. **Restriction**: The seller attempts to change the price of the sold jacket. The system prevents this update because item availability = "sold."

Relation to Domain Requirements

- If a clothing item exists in the domain (a seller lists it), it must exist as a system entity with required attributes.
- If a buyer interacts with the system (e.g., initiates a purchase), a transaction entity must exist and follow state transitions.
- If a user registers in the domain, their account must exist in the system with consistent properties.

Justification

These interface requirements ensure that the system remains synchronized with real-world buying and selling activities. Initialization rules prevent incomplete or invalid entities. Update rules enforce consistency and protect critical data (e.g., preventing edits to sold items or completed transactions).

Testing Plan

- Verify that all clothing items created by sellers initialize with complete required attributes.
- Simulate purchase flows and confirm item and transaction entities update correctly (status changes).
- Attempt restricted updates (e.g., editing sold items, altering completed transactions) and confirm the system rejects them. === 2.2.5 Machine Requirements

Objective

The web server must support reliable and efficient operation of a React + JavaScript clothing marketplace, enabling users to buy, sell, and search for clothes. Requirements are defined in measurable, testable terms to ensure responsiveness, reliability, and scalability.

Requirements

Performance - The system shall return **search results within 2 seconds** on average, with a maximum of **4 seconds** under peak load (defined as 150 concurrent active users). - The system shall support **200 simultaneous browsing users** without response time exceeding 4 seconds, including actions such as searching, filtering, and viewing product details. - Checkout operations (add to cart, confirm purchase) shall complete within **3 seconds** on average.

Reliability - The web server shall maintain an uptime of **99.7% per month**, allowing no more than **2.1 hours** of unscheduled downtime. - Transaction integrity must be preserved: no more than **0.1% of transactions** may fail due to server errors. - Scheduled maintenance shall be limited to **3 hours per month**, announced with at least **48 hours of notice**.

Scalability - The system shall scale to support **500 concurrent users** performing mixed actions (browsing, searching, and checkout) while maintaining average response times ≤ 3.5 seconds. - The system shall handle a database of up to **50,000 clothing items** with no significant degradation (response time increase ≤ 20% compared to baseline). - The system shall allow vertical scaling (adding resources to a single server) and horizontal scaling (adding additional servers) without major architectural redesign.

Clarifications

- “Peak load” is defined as ≥ **150 concurrent active users** browsing/searching, with at least **10% engaged in checkout**.
- “Minimal outages” is quantified as ≤ **2.1 hours per month** of unplanned downtime.
- “Acceptable performance” is defined as ≤ **3.5 seconds response time** for 95% of requests.

Areas for Refinement

- Stress tolerance for **extreme traffic spikes** (≥ 1000 users during promotions or seasonal sales) remains under evaluation.
- Requirements for **mobile vs. desktop optimization** need further benchmarking, especially under limited bandwidth conditions.

Justification

The clothing web marketplace requires fast, reliable interactions to maintain user trust and ensure successful transactions. Defined thresholds balance user expectations (quick searches, seamless checkout) with the limitations of typical hosting environments for web applications.

Testing Plan

- Conduct **load tests** at 150, 250, and 500 concurrent users simulating real-world actions (search, filter, checkout).
- Perform **stress tests** with artificial traffic spikes to measure degradation patterns.
- Monitor uptime and downtime logs to confirm 99.7% reliability.
- Validate database query performance against a dataset of **50,000+ clothing items**.

3 - Analytic part

3.1 - Concept analysis

Description

The domain rough sketch was reviewed to identify recurring ideas and terminology. Ambiguities were noted, compared, and resolved by introducing consistent abstractions. This ensures traceability from observations to domain-level concepts while avoiding system-to-be details.

Clothing Item

- **Observation**: Notes reference “clothing,” “garments,” and “items” in different contexts.
- **Issue**: Terms overlap without clarity on whether they refer to a single piece or a category.
- **Resolution**: Standardized as **Clothing Item**, representing any individual piece of apparel.
- **Justification**: Provides a neutral, unambiguous unit of exchange within the domain.
- **Concept**: `Clothing Item` (entity).

Donation vs. Recycling

- **Observation**: Actions include “donating clothes,” “claiming items,” and “recycling textiles.”
- **Issue**: Donation and recycling are sometimes mentioned together, though they represent different flows.
- **Resolution**: — **Donation** = action of giving away clothing to others in the community. — **Recycling** = action of sending clothing to government/private services for textile reuse.
- **Justification**: Separation maintains clarity between peer-to-peer exchanges and organizational processes.

- **Concepts**: `Donation` (action), `Recycling` (action).

Services and Community

- **Observation**: Mentions of “government services,” “private services,” and “community sharing.”
- **Issue**: Ambiguity between individuals and organizations as actors.
- **Resolution**: — **User** = individual participant (donor or claimant). — **Service Provider** = organizational actor (government or private) that manages recycling/donation.
- **Justification**: Differentiation enables consistent treatment of human vs. institutional participation.
- **Concepts**: `User` (actor), `Service Provider` (actor).

Terminology Resolution

- **Clothes**, **garments**, **items**: standardized as **Clothing Item**.
- **Donation** vs. **Recycling**: separated to reflect community exchange vs. institutional process.
- **Users** vs. **Services**: clarified as **User** (individual) and **Service Provider** (organization).

Conclusion

The domain analysis produced a clear vocabulary: - `Clothing Item` as the primary entity. - `Donation` and `Recycling` as distinct actions. - `User` and `Service Provider` as actors.