

# Refinement of Association Directionality

## (Lecture Topic: Communication and the Use of Language)

This section documents and justifies the adjustments made to the Hand Me Down domain model to comply with the lecture principles on semantic directionality, unidirectional associations, and avoiding unjustified bidirectional links. After reviewing the milestone documentation, several definitions and function descriptions contained implicit Buyer ↔ Seller or Listing ↔ Review structural associations that were not justified by the domain narratives or rough sketches.

The following refinements ensure that all associations reflect actual usage patterns in the domain and preserve the intended meaning with minimal necessary structure.

### 1. `expressInterest` Definition (Section 2.1.2 – Terminology)

The terminology row for `expressInterest` originally described the action as creating a "persistent Interest relationship between Buyer and Seller," implying a symmetric, long-lived association between the two actors.

This is incompatible with the domain: buyers do not form persistent relationships with sellers. Instead, the interaction always occurs **through a Listing**, and the Seller is identified by the Listing's seller reference.

To correct this, the definition was revised so that:

- Interest references **Buyer and Listing**, not Buyer ↔ Seller.
- The Seller is obtained indirectly via the Listing.
- No structural Buyer ↔ Seller link is implied.

This aligns with the lecture guidance that association direction should match expressed domain language and should not introduce inverse relationships unless strictly necessary.

### 2. Interest Entity Definition (Section 2.1.2 – Terminology)

The row for **Interest** stated that it "connects Buyer ↔ Seller during the coordination stage," which incorrectly imposed a symmetric, persistent link between the two roles.

However, the domain narrative makes clear that:

- The Buyer expresses interest **in a Listing**.
- The Seller is known because the Listing references its creator.
- Buyer and Seller do not possess a direct, structural connection.

The definition was rewritten to characterize Interest as an association object that references the Buyer and Listing involved, with the Seller inferred from the Listing. This adjustment removes the unjustified symmetric association.

### 3. expressInterest Function Semantics (Section 2.1.6 – Function Signatures)

Two directionality issues appeared in the function signature:

**The Description** originally stated that an Interest “creates a persistent relationship between Buyer and Seller,” mirroring the incorrect implication in the Terminology table.

**The Postconditions** similarly claimed that **InterestExpressed** is recorded “linking Buyer, Seller, and Listing,” suggesting a triadic, persistent structural link.

Both statements were revised so that:

- Interest references **Buyer and Listing** only.
- Seller is derived from the Listing and not structurally linked.
- No direct Buyer → Seller or triadic association is introduced.

This ensures that the function semantics match the domain reality and that the structure of associations is consistent across the documentation.

### 4. review Function Semantics (Section 2.1.6 – Function Signatures)

The original Postconditions stated that “ReviewSubmitted is attached to the parties,” which could be interpreted as Listings or Sellers containing their reviews.

This contradicts the intended directionality:

- Reviews are **about** a Listing and a Seller (reviewed party).
- Reviews point **to** their subjects.
- Listings and Sellers do not structurally store collections of Reviews.

The Postconditions were revised to state that:

- ReviewSubmitted references the Listing and reviewed User.
- Neither Listing nor Seller contains Reviews.
- Any view of “reviews for a listing” is a query, not a stored association.

This change enforces the lecture principle that the flow of meaning should guide association direction.

### 5. Clarification of Listing Structure (Section 2.1.2 – Terminology)

Although the Listing definition did not explicitly imply bidirectionality, it lacked clarity on association direction.

A clarifying note was added to state that:

- A Listing references its Seller and Piece.
- Sellers and Pieces do **not** contain or track Listings.

This removes ambiguity and ensures structural consistency across terms and function signatures.

## Summary of Corrections

The documentation now uses meaning-preserving, unidirectional associations:

- Listing → Seller
- Listing → Piece
- Interest → Listing
- Interest → Buyer
- Review → Listing
- Review → User (reviewed party)

The following implicit or explicit bidirectional associations were removed:

- Buyer ↔ Seller
- Listing ↔ Review
- Listing ↔ Piece
- Direct triadic Buyer–Listing–Seller structural links
- Review “attached to the parties”
- Interest connecting Buyer ↔ Seller

These refinements ensure alignment with the domain language, the rough sketch, and the lecture’s requirements for clear, unidirectional, meaning-driven modeling. They preserve the functional capabilities described by the system while correcting the direction in which meaning flows across entities and events.