

- **User Registration and Authentication:**

- **Constraint 1:**

- Description: Each user must have a unique username.
- OCL: `User.allInstances()->forall(u1, u2 | u1 <> u2 implies u1.username <> u2.username)`

- **Product Management:**

- **Constraint 2:**

- Description: Products must have unique identifiers.
- OCL: `Product.allInstances()->forall(p1, p2 | p1 <> p2 implies p1.id <> p2.id)`

- **Shopping Cart and Checkout:**

- **Constraint 3:**

- Description: Items in the shopping cart must belong to the logged-in user.
- OCL: `ShoppingCart.allInstances()->forall(sc | sc.user = currentUser)`

- **Payment Gateway Integration:**

- **Constraint 4:**

- Description: Payment must be authorized before completing the checkout process.
- OCL: `Payment.allInstances()->forall(p | p.status = 'AUTHORIZED' or p.status = 'COMPLETED')`

- **Order Management:**

- **Constraint 5:**

- Description: Each order must have at least one item.
- OCL: `Order.allInstances()->forall(o | o.items->size() > 0)`

- **Reviews and Ratings:**

- **Constraint 6:**

- Description: Ratings must be between 1 and 5.
- OCL: `Review.allInstances()->forall(r | r.rating >= 1 and r.rating <= 5)`

- **Search and Filtering:**

- **Constraint 7:**

- Description: The search query must return relevant results.

OCL: (This could be implemented in the search algorithm rather than in OCL.)

- **Responsive Design:**

- **Constraint 8:**

- Description: The platform interface must adapt to various screen sizes.

- OCL: *(This is more of a design consideration and may not be expressed in OCL.)*