Nonfunctional Requirements

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| Non-Functional ID | Requirements Category | Requirements Description | Acceptance Criteria | Verification Method |
| NFR-001 | Performance | The system shall have an average response time of 2 seconds for product searches. | Product search results are displayed within 2 seconds on average. | Performance testing |
| NFR-002 | Reliability | The system shall have a minimum uptime of 99.9% and shall restore full functionality within 5 minutes after a failure. | The system is available 99.9% of the time over a given period. Full system recovery is confirmed within the 5-minute time frame. | Uptime monitoring, recovery testing |
| NFR-003 | Security | User passwords shall be stored securely using one-way hashing with appropriate salt. | Passwords are hashed and salted before storage, ensuring security. | Security testing, code inspection |
| NFR-004 | Security | Payment information shall be transmitted securely using SSL/TLS encryption. | Payment data is encrypted during transmission and verified by security tests. | Security testing, code inspection |

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| NFR-005 | Security | The system shall ensure data privacy and access control by implementing role-based access control (RBAC). | Only authorized users can access specific data and functionalities based on their roles. | Security testing, access control testing |
| NFR-006 | Usability | The system shall display user-friendly error messages for all user input errors. | All user input errors are accompanied by clear and helpful error messages. | User interface testing, user feedback |
| NFR-007 | Usability | The system shall ensure intuitive navigation with clear and consistent visual design. | Users can navigate the app intuitively with a consistent visual design across all screens. | Usability testing, user feedback |
| NFR-008 | Usability/  Robustness | The system shall handle incomplete or incorrect input gracefully, prompting the user for correct input. | The system displays error messages, prompting for correct input without crashing. | Input validation testing |
| NFR-009 | Performance | The system shall maintain performance under load conditions. | System performance remains within acceptable limits. | Load testing, stress testing |

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| NFR-010 | Scalability | The system shall be scalable to handle increasing user loads and data volumes. | System performance does not degrade significantly as user loads and data volumes increase. | Scalability testing, load testing |
| NFR-011 | Maintainability | The system shall have a mean time to repair (MTTR) of less than 1 hour and support deployment updates with minimal downtime. | System issues are resolved within 1 hour on average, and updates cause less than 10 minutes of downtime. | Maintenance testing, deployment testing |
| NFR-012 | Data Consistency | The system shall ensure data consistency. | Data remains consistent and accurate across product listings, cart, and order summaries. | Data consistency testing |
| NFR-013 | Testability | The system shall be testable with automated testing tools for continuous integration and deployment. | The system supports automated testing. | Automated testing. |