Group symbol: **W04IST-SI4023P-3**

Team: **3.1**

Project title: **Market of Things**

Team members (*filled by PM, Team Leader*):

No	Name	Surname	Student ID	Role
1	Daniil	Kuznetsov	266943	*PM, Team Leader*
2	Volodymyr	Shepel	266617	*Full Stack Developer, DevOps*
3	Valentina	Bolbas	268891	*Business Analyst, Full Stack Developer*

2. Requirements specification **(F2)**

2.1. Functional Requirements Specification

In this section, provide the table for functional requirements, including symbol, type (e.g. business logic, user interface, data exchange, etc.) description, significance (MoSCoW) and source (Stakeholder).

Stakeholders: Admin, Customer – buyer, we don't have a Seller, its role is taken by Admin

UI – User Interface

BL – Business Logic

DAL – Data Access Layer

Symbol	Type	Description	Significance (MoSCoW)	Stakeholder
1	UI/BL/DAL	Manage products: view products (a list with pagination), add / delete products, view product details, edit product details	Must	Admin
2	UI/BL/DAL	Search, filter, sort products in the list	Should	Admin
3	UI/BL/DAL	Manage product categories: view, add, edit, and delete	Must	Admin
4	UI/BL/DAL	Manage product manufacturers/brands: view, add, edit, and delete	Must	Admin
5	UI/BL/DAL	Manage orders: view orders (a list with pagination), change order status, cancel and refund orders	Must	Admin
6	UI/BL/DAL	Search, filter, sort orders	Should	Admin
7	UI/BL/DAL	Manage user accounts: view users (a list with pagination), search, view details, ban accounts	Must	Admin
8	BL/DAL	Receive emails: new order, order refund request, message from customer	Could	Admin
9	UI/BL/DAL	View messages from customers about orders, reply to messages	Could	Admin
10	UI/BL/DAL	Moderate product reviews	Could	Admin
11	UI/BL/DAL	Create and manage discounts, promotions, and coupon codes for specific products	Won't	Admin
12	UI/BL/DAL	View a list of available products with pagination with their brief details: name, price, category, manufacturer/brand, and thumbnail image	Must	Customer
13	UI/BL/DAL	Search products by keywords, filter products by categories, price ranges, manufacturers/brands	Should	Customer
14	UI/BL/DAL	Sort products by price asc and desc	Should	Customer
15	UI/BL/DAL	View product details: name, images, description, price, manufacturer/brand, specification, availability status	Must	Customer
16	UI/BL/DAL	Manage cart: add to cart, view cart items, delete from cart, edit quantity of items per product	Must	Customer
17	UI/BL/DAL	Manage order: initiate / cancel, checkout, purchase order	Must	Customer
18	UI/BL/DAL	Request order refund	Should	Customer
19	BL/DAL	Receive emails: order confirmation, status change, message from the seller	Must	Customer
20	UI/BL/DAL	View orders' history	Should	Customer
21	UI/BL/DAL	Rate a product, write a review of a product	Could	Customer
22	UI/BL/DAL	View product rating and reviews on the product details page	Could	Customer
23	UI/BL/DAL	Sort products by rating	Could	Customer

24	UI/BL/DAL	Add a product to favourites, view favourites, open products from favourites	Could	Customer
25	UI/BL/DAL	Send a message to the seller on a specific order	Could	Customer
26	UI/BL/DAL	View similar products	Won't	Customer
27	UI/BL/DAL	View comparison of selected products	Won't	Customer
28	UI/BL/DAL	Communicate with a chat bot	Won't	Customer

2.2. Non-Functional Requirements

In this section provide the table for non-functional requirements that includes symbol, type (e.g., efficiency, standards, constraints, etc.), description, significance (MoSCoW) for the project, source (Stakeholder). Each requirement should also have specified a verification method – a description of a confirmation method whether a requirement has been fulfilled or not in the most measurable and objective way.

Symbol	Type	Description	Significance	Source	Verification Method
1.	Performance	**Response Time:** The e-commerce web page shall achieve rapid loading times, with a maximum allowable response time of 2 seconds for its primary landing page.	Ensures a fast and responsive user experience.	Customer	Monitoring+comparison of results
		Scalability: The system shall be capable of handling a minimum of 500 concurrent users during peak periods, without exceeding an average response time of 4 seconds for page loads. The system should also provide a seamless user experience, with a 99% uptime guarantee, even when the traffic spikes up to 1,000 concurrent users.	Ensures the system can handle increased user loads and traffic without significant performance degradation.	Admin	Metrics comparison
2.	Availability	**Uptime:** The e-commerce website shall guarantee uninterrupted availability, operating 24/7. Scheduled downtime for routine maintenance shall not exceed 1 hour per week, occurring during off-peak hours.	Ensures continuous service availability.	Admin	Logging monitoring + comparison of results

		Redundancy: The system shall incorporate redundant infrastructure components, including at least two load-balanced servers and failover mechanisms. Redundancy measures shall ensure automatic switching to backup components within 5 seconds in case of a component failure.	Mitigates the risk of downtime due to infrastructure failures.	Admin	Logging monitoring + comparison of results
3.	Reliability	The system shall minimize errors, system crashes, and data loss to achieve a reliability level of at least 99.99%. Comprehensive backup and disaster recovery procedures shall be established, including regular data backups at a frequency of at least once every 24 hours, stored securely off-site. In the event of disruptions, the system shall aim for a maximum downtime of no more than 4 hours for full system restoration.	Ensures a consistent and reliable user experience.	Customer	Loging monitoring + comparison of results
4.	Security	**Authentication:** Stringent user authentication measures, including password complexity requirements and account lockout policies after a maximum of 5 failed login attempts.	Enhances platform security and protects against unauthorized access.	Admin	Passing unit/integration test
		Authorization: Access control mechanisms shall be enforced, regulating user privileges based on predefined roles and permissions.	Ensures only authorized users have access to specific system resources.	Admin	Metrics comparison
5.	Usability	**User-Friendly Interface:** The website shall feature an intuitive, user-friendly interface with fast page load times, clear navigation menus, and search functionality.	Enhances user satisfaction and ease of use.	Customer	Monitoring + comparison of results
		Cross-Browser Compatibility: The website shall be compatible with the latest versions of popular web browsers, ensuring consistent user experiences across them.	Ensures a consistent user experience across different browsers.	Admin	Metrics comparison

		Responsiveness Across Devices: The website shall be responsive, adapting to different screen sizes and resolutions on desktop computers, mobile phones, and tablets.	Ensures a seamless user experience across various devices.	Admin	Monitoring + comparison of results
6.	Scalability	**Expanding Product Catalog:** The system should handle a growing number of products, categories, and variations without causing delays.	Ensures smooth management and display of an increasing number of products.	Customer	Metrics comparison
		Growing User Base: The system should handle an increasing number of concurrent users efficiently.	Supports a larger customer base without performance degradation.	Admin	Monitoring + comparison of results
		Increasing Transaction Volumes: The system should remain responsive and reliable as transaction volumes increase.	Ensures efficient handling of orders, payments, and inventory updates.	Admin	Logging monitoring + comparison of results
7.	Compatibility	The system shall maintain compatibility with a wide range of operating systems, including Windows (7 and newer), macOS (X and newer), and Linux (Ubuntu 18.04 and newer). Compatibility with legacy versions shall be ensured. The website should be compatible with popular web browsers, including Google Chrome, Mozilla Firefox, Apple Safari, and Microsoft Edge.	Ensures broad accessibility and consistent functionality across different platforms and browsers.	Customer	Metrics comparison
8.	Monitoring and Logging	**Performance Monitoring:** The system shall continuously monitor response times, server load, and database query execution times at 1-minute intervals.	Allows real-time tracking of system performance.	Admin	Monitoring + comparison of results
		Anomaly Detection: Automated alerts shall be triggered for predefined performance thresholds, and anomalies will be logged in real-time.	Enables timely identification and resolution of performance anomalies.	Admin	Logging monitoring + comparison of results
		Logging and Issue Resolution: Comprehensive logs shall be retained for 180 days and integrated with issue tracking for timely problem resolution.	Facilitates issue resolution by maintaining detailed logs.	Admin	Monitoring + comparison of results

9.	Load Handling	**Performance During High-Demand Events:** The system shall handle a minimum of 1,000 concurrent users during high-demand periods with an average response time of under 5 seconds. Automated load-balancing mechanisms shall be in place to distribute workloads effectively.	Ensures smooth operation during peak events and prevents system degradation.	Customer	Metrics comparison
10.	Performance Testing	Regular and systematic performance testing shall be executed at least once every quarter, measuring key performance indicators (KPIs) such as page load times, response times, and server resource utilization. The objective is to ensure the website consistently meets or exceeds defined performance benchmarks.	Identifies and addresses performance bottlenecks and operational issues.	Admin	Passing unit/integration test

2.3. Use Case Diagram

You should prepare the use case diagram in UML 2.5 depicting the roles of stakeholders who are users of the project. It should also present the high-level concept of system usage divided into modules. Use case diagram should not cover common business logic (e.g. registration and logging in, CRUD operations).