POLISH-JAPANESE ACADEMY
OF INFORMATION TECHNOLOGY

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Information technology

Database specialisation

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Bachelor

Web-application «Favorit LTD»

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Introduction

The diploma consist to develop a modern and practical web-application for the agricultural company "Favorit". The project aims to replace the existing web-app of the company, with the goal of meeting the needs of both clients and the business during buying and selling operations. The project will utilise current technologies and solutions to enhance the user experience while purchasing products. Additionally, the project prioritises ease of maintenance and improvement for the technical staff of the company. The project aims to address the issue of an obsolete and heavily maintained current company website, which uses outdated versions and non-current technologies for support. The backend of the application, built using Spring framework, will handle and process sensitive data, including user information, product detailed descriptions, 3D models of products, and order information. The frontend of the application, built using React framework, will provide an intuitive and user-friendly interface for clients and managers to access the backend resources and data. The project will also utilise PostgreSQL as the database management system to store and manage data efficiently and securely. The project will also include a Telegram bot to facilitate client communication with the business office and technical support.

1.Aims and objectives

1.1. Design

- Research modern trends front-end design, find sites of popular nowadays brand with suitable or interesting details and features.
- Choose and install additional CSS libraries
- Clarify all details of web-app (fonts, colour theme, design features).
- Create sample in Figma

1.2. Data

- Create template for products to classify them, store in database and use in the project
- Visualise products as 3D models
- Form detailed instruction and description of each product and/or each detail of the product

1.3. Technical aspects

- Create and finish all main points of the project separately (if this possible), paying attention to the details and features of each individual component.
- Form component relationship structure and component relationship structure for users point of view.
- Test all possible users actions on all steps in the web-app.

2.Context

2.1. History of the company

High-quality agricultural machinery from the "Favorit" company is designed for work of various levels of complexity. For more than 11 years, "Favorit" equipment embodies the combination of cost, quality and reliability.

The equipment purchased from us will be able to fully satisfy the needs of the most demanding customers. Each model of equipment is a set of unique characteristics and operational qualities that allow you to perform various types of work as quickly and efficiently as possible.

2.2. Goal of the company

Engage in the production of agricultural machinery and spare parts of the highest quality, which would improve the lives and facilitate the work of our customers.

2.3. Problems we dealing with

The problem, this whole project is created for, is to redesign and fully remake from zero already working web-app. The technical solutions and design elements of the current version of the web-app are not suitable for modern customer needs and requirements. This part covers both design and technical errors and bugs (most of the technical part will be bugs that the user may encounter).We will discuss the various issues that have been identified with the current web app of our agricultural company. The main issues include an overwhelming use of similar secondary colors that detract from the emphasis on products and information, elements that are unnecessary or duplicated, language options that do not work correctly, a lack of organization and structure for important user information, and outdated development methods and limitations imposed by the platform-constructor used to create the site. These issues are not only detrimental to the user experience, but also impede the potential for future expansion and development of the project.

- The main colour scheme of the company is dark-orange and black (these colours are used in the palette of the office, products, as well as the company's website). However, there are a lot of secondary similar colours in the design that override the emphasis on products and information. Ex. Dark- yellow, yellow, red-orange.
- Some elements are useless or duplicated. Ex. Cart icon and link for comment section on the top of the header.
- The option to change the language does not work correctly and there is no ENG . Ex. When you change the language, only the names and descriptions of products change, the text of the main interface (sections, sidebars, navigation, etc.) does not change.
- A large amount of information important to the user is scattered randomly around the site and is often repeated. Ex. Contact phone numbers are located on header(main page), sidebar(main page), footer(main page), contacts page.
- The structuring of the site does not meet development standards, which can make it difficult for the user to navigate the site and find needed information.
- The site was created on a platform-constructor (prom.ua), which limits the development and the possibility of expanding the project. Also, outdated methods were used in the development (frames and div-only constructions)

3.Functional requirements

3.1. Compatibility

The finished application should be suitable for all modern browsers [1]. It is important that the design, data and, in general, the original view of the project remain unchanged, and all the features of the web page must be preserved for the user, regardless of the device or browser. The application is considered mainly for desktop computers, laptops or any other device with a relatively large display width, since the web page contains a huge number of elements. At the same time, there are more

smartphone users (both in percentage and in total), so it is important to adapt the look of the application to this.

3.2. Company attributes

The website should include all essential attributes of the company including characteristic company colour scheme and already designed logo (Figure 3.1). The interface of the application should be filled with company attributes, but at the same time, it should be modern, easy to understand and minimalistic.

Figure 3.1

3.3. Products representation

The company has a huge number of products that must be represented properly. The user should see a list of products, with their description, price and photos. At the same time, the user must have the authority to sort products using filters by category or use the embedded search string. This will simplify and improve the user experience on the site and will help the customer quickly find the products they are interested in.

3.4. Scalability

The project is planned to complete the current volume of customers and orders that the firm serves. Nevertheless, it is worth paying attention to the factor of allowing the clientele of the company, from which an influx of new users of the site is possible, as well as the possible addition of new functionality to the backend / frontend of the application. The application should be able to handle a large number of users and a large amount of data. It should be able to adapt to the changing needs of the business as it grows, and be able to handle an increasing number of requests.

3.5. Data management

Data management is a critical aspect of the agricultural technology web- application project. The application will handle a large amount of data, including user information, product detailed descriptions, 3D models of products, and order information. Therefore, it is important to have a system in place to effectively manage this data.

- Data Backup: The application should have a system in place to regularly backup all of the data, in case of any data loss or corruption. The backup data should be stored in a secure location, such as a cloud-based storage service, and should be easily accessible in case of a disaster recovery scenario.
- Data security: The application should ensure the security of the data by using encryption, secure socket layer (SSL) certificates, and firewalls. This will protect the data from unauthorised access and ensure data integrity.
- Data validation: The application should validate all incoming data to ensure it is accurate and complete. The application should also check for errors and inconsistencies in the data, and provide appropriate error messages or warnings.
- Data storage: The application should use a relational database management system (RDBMS) such as PostgreSQL to store all of the data. This database should be optimised for high performance and data integrity.

3.6. Security

Backend security is an essential aspect of the agricultural technology web-application project, which uses Spring as the backend framework, React as the frontend framework and PostgreSQL as the database. The backend of the application is responsible for processing and storing sensitive data, and it is crucial that it is protected from unauthorised access and misuse.

- Authentication and Authorisation: The Spring framework provides built-in support for authentication and authorisation using Spring Security. The backend should use Spring Security to implement user authentication and access control for resources.

The backend should also ensure that only authorised users can access the data and resources.

- Data encryption: The backend should encrypt sensitive data such as user information, financial transactions and access to resources, to protect it from unauthorised access. This can be achieved by using the encryption feature provided by the PostgreSQL database.
- Secure communication: The backend should use the HTTPS protocol to encrypt the communication between the frontend and the backend. This will ensure that the data is not intercepted or tampered with during transmission.
- Input validation: The backend should validate all incoming data to ensure it is accurate and complete. Spring provides support for input validation through Bean Validation, which can be used to validate user input and to handle errors.
- Secure coding practices: The backend should follow secure coding practices, such as using prepared statements to prevent SQL injection attacks, and avoiding the use of hard-coded credentials. Spring provides built-in support for prepared statements and other security features.
- Compliance: The backend should comply with industry standards and regulations, such as the General Data Protection Regulation (GDPR) and Payment Card Industry Data Security Standard (PCI DSS) to ensure the protection of data and the business. Spring provides support for compliance

4. Nonfunctional requirements

4.1. Maintainability

As mentioned in the context, the main problem with the current web application that the company uses is its outdated development technologies. The company has a technical department that should be able to easily handle development, support, and project resolution if required. When choosing the technologies needed to create this project, it is important to look at current trends and at the same time choose the most comfortable technologies for further development.

4.2. Availability of information

It is critically important to give the user information that may affect the purchase (discounts from the company, guarantees, government programs that can provide free technical maintenance of equipment). Also important information for review should include general information about the company, contact details and the physical address of the office. At the same time, the information flow does not occupy a large percentage of the web page, as this can distract the user's attention, as well as worsen the appearance of the site. Information should be shown in a minimalistic, eye-pleasing way and at the same time have a clear message. An unregistered user must have exactly the same access to all data as a registered user. This is a significant issue, since the target audience of the company is adults who do not have the skills of an advanced Internet user.

4.3. Telegram bot

The Telegram bot is a functional requirement that allows users to interact with the company through the Telegram messaging platform. This feature can provide many benefits to both the users and the business, such as:

- Order updates: The Telegram bot can send notifications to users about the status of their orders, such as when the order has been shipped or delivered.
- Order tracking: The Telegram bot can provide users with real-time tracking information for their orders, including the estimated delivery date and the current location of the package.
- Customer support: The Telegram bot can assist users with troubleshooting issues, answering questions, and providing general support. Tech support can provide a personalised experience for users by using their name, order history, and other information to tailor the conversation.
- Convenience: The Telegram bot allows users to interact with the company at any time and from any location, as long as they have an internet connection.

5. Class diagram discussion

An agro technical company needs site to sell their Products. They have a big amount of products (tractors, seeders, cultivators etc) and details for them. Each Product should have name, few photos, price, description, 3D model(optional) and availability. Also it is essential to have a list of Details for every product (if it is possible) that are also available for sell. Each Detail should have name, price, availability and product compatibility list.

Users can buy Products on site without registration or logging. However, they can register and login to track their orders, get feedback from Managers (if needed) and get discounts for the future orders.

Customer (User who is registered in the system) has name, surname, phone number, email and ID (auto-generated by System). After log in to the system, Customer will have access to private cabinet. There he/she can see their previous orders and status of current orders. System will count total sum of all orders for each customer. Also system will show list of all customers and list of customers for some criteria (total sum of orders, name, surname). Order has list of the products or details, name, surname and phone number of User (if the order was made by the Customer, then order has only ID of the Customer) , total sum of the order (calculated by the system), order date and estimated date of delivery to the client.

Managers should be added by Admin. They have permission to have information about Orders, contact the Customers and Users, who placed Order, and the ability to add Users to the blacklist. System automatically once per month send statistics from all Users,Customers and Orders (total amount of Users and Customers, new Users, new Customers, total sum of all Orders, percentage difference between the previous month). Also Managers could create Order by themselves. If Customer or User wants to contact a company by phone or by email, Manager could create Order manually by given from Customer/User information.

Admin is unique role. Admin has all rights and permissions. Furthermore, he is the only one, who can delete, add or update , Products and Orders.

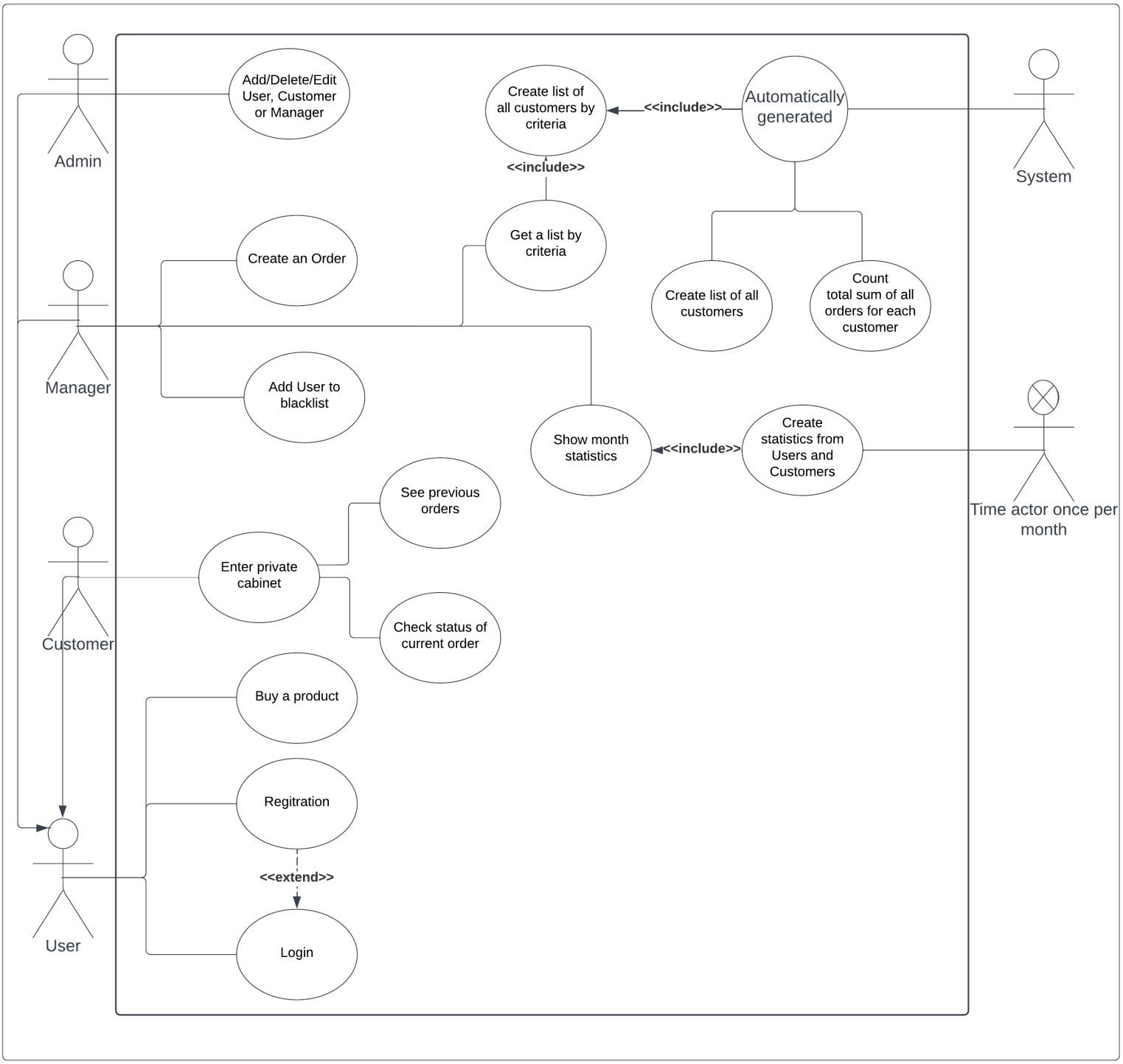

Diagram 1. Class diagram