



ITU

## Application design

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## Theme

### Authors

We wanted to do this project in a team of three, but one of our members decided to have a second team at the beginning of October. We don't want to name him so we can make his grade worse, but because of that, we have to do the project in pairs. The authors of the project are **Neonila Mashlai** and **Maksym Podhornyi**.

### Theme

#### Each chosen theme

##### **Maksym:**

I decided to build a to-do list web app to help people manage their daily tasks more efficiently. It's a straightforward solution for staying organized and keeping track of what to do next in our busy lives. The app is designed to be flexible, with the potential for adding new features over time. Since everyone has a smartphone these days, the app can sync across devices, making sure users can access their lists anytime, anywhere. This tool is not only practical for individual use but can also be customized for different needs, making it useful for everyone.

##### **Neonila:**

I'm developing a garage sale web app to make buying and selling second-hand items easier and more accessible for everyone. It connects people in local communities online, giving sellers a broader audience and buyers more options beyond their local area. The app fits well with the growing trend of sharing and reusing goods, which is both eco-friendly and community-focused. Essentially, it updates the classic garage sale for the digital world, making the whole process smoother and more communal.

#### Selected theme

We've decided on a garage sale web application as our project theme because the market for to-do list apps is already saturated with established players like Notion. By focusing on garage sales, we address an underserved niche that leverages the online shift in how people buy and sell goods. This approach not only introduces a modern twist to traditional buying and selling but also taps into the current market gap in the Czech Republic. Our application aims to create a localized online marketplace that resonates with the values and needs of our community, offering a fresh alternative to global e-commerce giants. It's an opportunity to create a tailored solution that supports the circular economy while adapting to the unique cultural context of the Czech market.

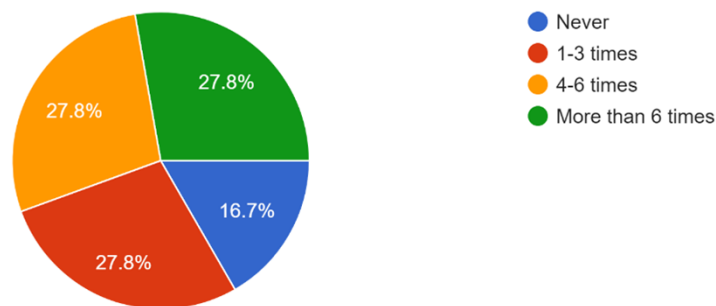
# Research

## Research analysis

We conducted a survey using a Google Form to gauge interest in our selected topic among users. We disseminated this questionnaire among our friends and acquaintances and collated the results into diagrams for analysis. Additionally, we engaged in discussions with a few relatives to gain more insights. In total, 18 individuals participated in the survey. Here are the findings:

How often do you attend garage sales in a year?

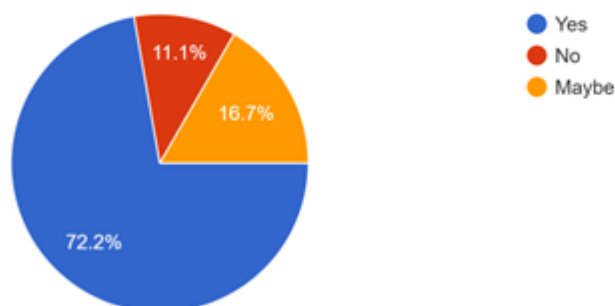
18 responses



The pie chart above illustrates the frequency of garage sale attendance among the respondents. A small fraction, only 16.7%, reported that they never visit garage sales. The majority attend infrequently, with 27.8% going more than once every two months on average. Prompted by these findings, we asked a follow-up question:

Would you attend garage sales more often if you could do it online?

18 responses

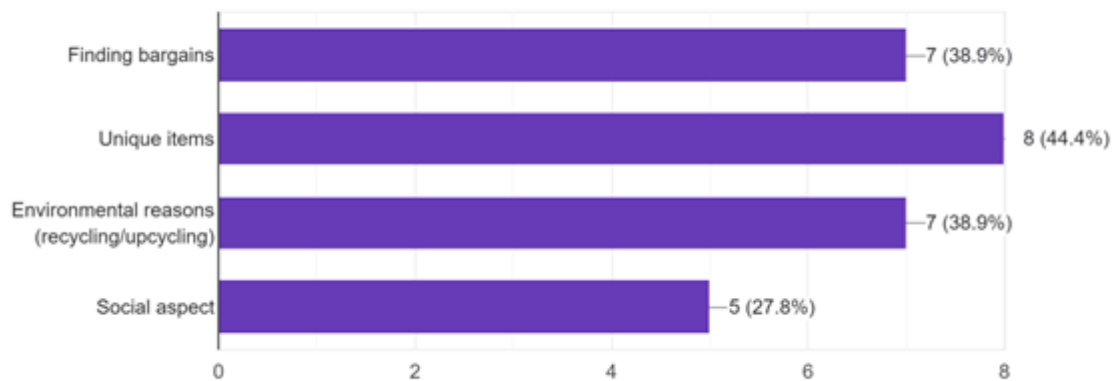


The second diagram inquires whether the availability of online garage sale options would influence visitation habits. A significant 72.2% of participants expressed that they would be more inclined to attend garage sales if they could do so online, and 16.7% were unsure.

This data suggests that an online platform for garage sales could potentially increase participation. In particular, for the Czech Republic market, where online marketplaces like eBay or Etsy are not as prevalent, such a platform could fulfill an unmet need. These insights suggest that our project has a strong rationale and could address a specific gap in the market.

### What attracts you to garage sales?

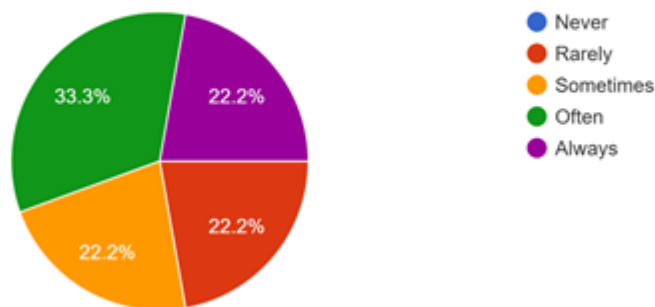
18 responses



The bar graph highlights the main reasons people attend garage sales. Unique items are the primary draw for 44.4% of respondents, emphasizing the value placed on originality. Bargains and environmental reasons, each cited by 38.9% of participants, indicate a strong preference for cost-effectiveness and sustainability. The social aspect, though less predominant, is still important to 27.8% of those surveyed, hinting at the communal nature of garage sales. This data suggests that an online garage sale platform should focus on uniqueness, savings, and eco-friendliness to appeal to its audience.

### How often do you purchase second-hand items (e.g., from thrift stores, online platforms, etc.)?

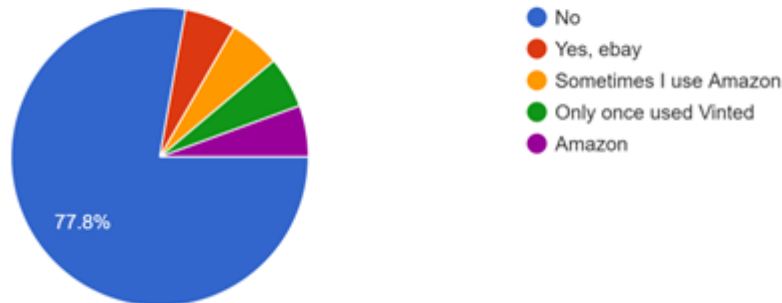
18 responses



The pie chart provides insight into the frequency of purchasing second-hand items among survey participants. A plurality, with 33.3%, report they sometimes buy used items, indicating occasional engagement in the second-hand market. Equally, 22.2% of respondents state they often indulge in such purchases, matching the percentage of those who rarely or never do. This diversity in buying habits underscores a balanced second-hand shopping culture with room for growth in regular consumer participation. The findings are instrumental for strategies aiming to convert occasional buyers into regular customers on an online platform for second-hand goods.

### Do you currently use any mobile applications or websites to buy or sell second-hand items?

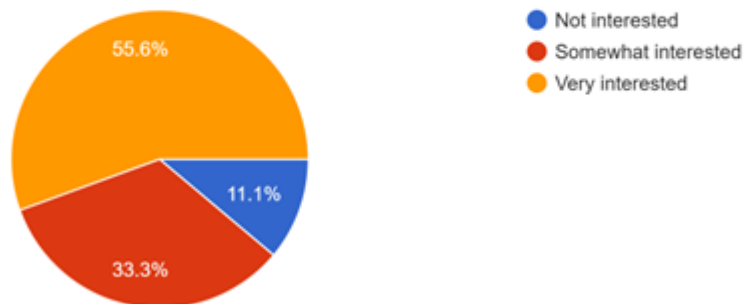
18 responses



This pie chart reveals a significant opportunity in the market for second-hand goods. A majority of respondents do not use existing platforms for buying or selling used items. This gap demonstrates the potential for a new, user-friendly thrift store application to meet untapped demand. Our project is poised to fill this niche, offering a specialized service that could encourage more people to engage in the circular economy. With unique features tailored to the second-hand market, our app is set to become a go-to solution for those looking to explore the world of pre-owned goods.

### Would you be interested in an app specifically tailored to garage sales?

18 responses



The feedback reflects a strong community interest in a bespoke garage sale application, revealing a substantial portion of the market is open to new tools that enhance their experience. This insight is pivotal for our project, confirming a tangible opportunity to connect with a community that values the distinctive character of garage sales. By creating an app that emphasizes easy discovery and the social dynamics of these sales, we can capitalize on this interest and deliver a platform that resonates with both casual and committed garage sale enthusiasts.

## Comparison with other applications

### **Maksym:**

GlobalThriftApp is a well-known international platform for buying and selling second-hand goods. While it boasts a large inventory and operates in many countries, it may not be optimized for the Czech market due to several reasons.

Why Our Application Is Superior for the Czech Republic:

- **Localization:** GlobalThriftApp may not offer a Czech language interface, whereas our application is fully localized to support Czech speakers natively, providing a more comfortable and accessible user experience.
- **Cultural Relevance:** Our application is designed with an understanding of the local culture and shopping habits, providing features that cater to the preferences of Czech users, such as local payment methods and support for local pick-up points.
- **Community Building:** Our app focuses on building local communities and connecting people through garage sales and thrift experiences, which is an integral part of the Czech shopping culture, whereas GlobalThriftApp's broader focus might lack this personal community engagement.

### **Neonila:**

EuroSecondHand is a Europe-centric platform that facilitates the buying and selling of used items. While it caters to a European audience, it may not serve the Czech Republic's specific needs effectively.

Why Our Application Is Superior for the Czech Republic:

- **Market Focus:** EuroSecondHand might not prioritize the Czech market, potentially offering limited inventory from the region. Our application, on the other hand, is tailored to the Czech Republic, offering a rich and varied local inventory.
- **User Experience:** EuroSecondHand may have a one-size-fits-all approach to its user interface and features. In contrast, our application is developed based on the preferences and feedback from Czech users, ensuring a user experience that resonates with local users.
- **Integration with Local Services:** Our application integrates with local Czech services and businesses, providing a seamless experience for users, from browsing to the final transaction. This could include local delivery options, partnerships with Czech thrift stores, and features that support the local economy.

## Conclusion

Our research into the Czech thrift store application market has highlighted several critical insights and identified key opportunities for a streamlined, user-friendly app. Here's a simplified conclusion based on our findings:

### Identified Issues:

- **Community Connection:** There's a need for an app that enhances the social aspect of thrift shopping, which is currently underserved.
- **Integration with Local Services:** Most existing apps lack seamless integration with Czech services, leading to a disjointed user experience.
- **Diverse Shopping Patterns:** Users exhibit varied levels of engagement with the second-hand market, from casual to regular shoppers, which aren't adequately addressed.
- **Digitalizing Garage Sales:** There's significant interest in online garage sale experiences, but no clear leader in providing such a service effectively.

### Simplified Strategy for Our App Development:

- **Focus on Functionality:** Our app stands out by offering straightforward functionality and being available in English, making it accessible to both local and expatriate communities.
- **Basic Community Engagement:** Without overcomplicating things, we'll incorporate basic social features to connect users and foster the communal spirit of garage sales.
- **Simplified Local Integration:** Our app will focus on essential partnerships that add value without overwhelming users with options.
- **Catering to All Users:** We aim to serve the full range of thrift shoppers with a simple and engaging interface that doesn't overwhelm.
- **Online Garage Sale Feature:** We'll introduce a basic yet effective feature set to bring the garage sale experience online, making it more accessible.
- **Environmental Consciousness:** The app will subtly encourage eco-friendly shopping habits through its promotion of second-hand goods.
- **Intuitive Design:** We'll maintain a straightforward, easy-to-navigate design that appeals to everyone, regardless of their tech experience.

Our thrift store app is deliberately crafted to provide a seamless and user-friendly shopping experience, specifically fine-tuned to meet the needs of the Czech community. Stripping away the complexity that often clutters other apps, we offer a platform where simplicity and functionality go hand-in-hand. This approach ensures that every user, regardless of their technical prowess, can navigate our app with ease and confidence.

Furthermore, by introducing a streamlined online garage sale experience, we're not just digitizing an existing marketplace; we're elevating it to new heights, making it more accessible and engaging. We recognize the growing interest in eco-friendly shopping practices, and our app subtly champions this cause by facilitating the purchase and sale of second-hand goods.

In summary, our thrift store application doesn't just fill a gap in the market; it leads the way with a refined, approachable platform that stands out for its clarity and ease of use. With our app, participating in the Czech Republic's second-hand economy becomes a straightforward, enjoyable, and community-oriented experience that sets a new standard for the industry.

## **Division of work**


Neonila: Backend, Frontend, Dokumentace, Research, Mockup testing Maksym: Backend, Frontend, Mockup, Research, Mockup testing



## Application mockup

Garage sale

MenWomenKids



Name:

Edit

Surname:

Edit

E-mail:

Edit

Phone number:

Edit

Date of birth:

Edit


Adress:

Edit

ADD NEW ITEM


My items for sale

Edit




Air Jordan 1 Mid  
€139.99

Edit




Air Jordan 1 Mid  
€139.99

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€139.99

The page is a user profile and listing management interface. It offers straightforward functions for users to edit personal information and manage their sale items, aligning with the strategy of simplicity and accessibility. The “Add New Item” button simplifies adding new products, supporting the app’s goal to streamline the online garage sale experience.

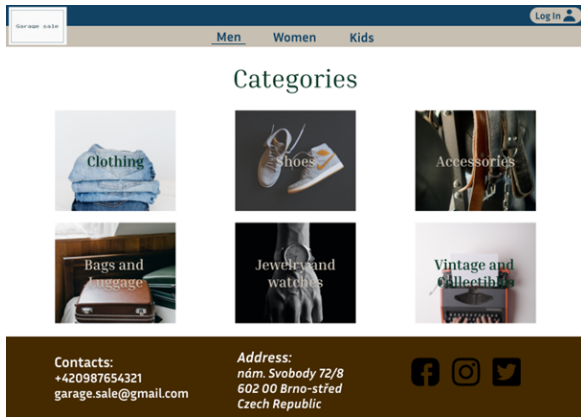
(a) Adding an item

(b) Editing an item

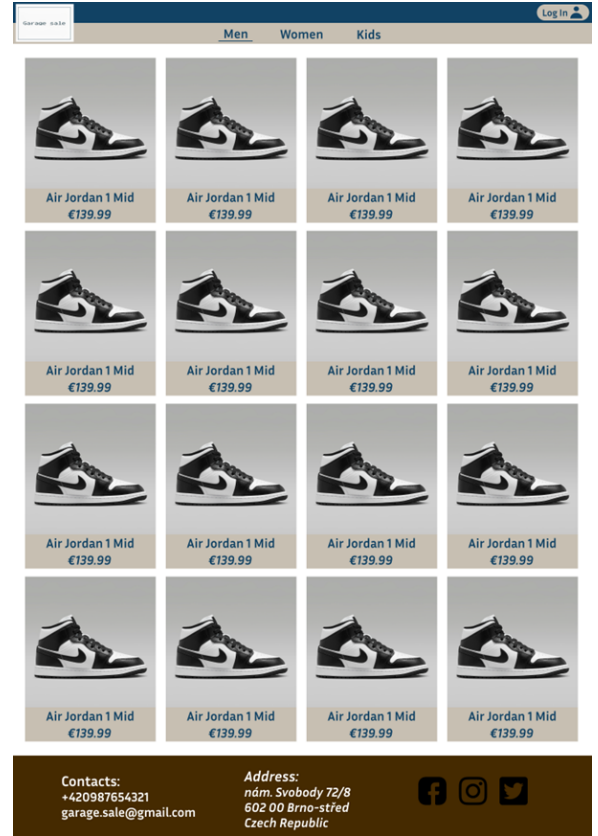
Figure 1: Item management in the application

Figure 1a and Figure 1b illustrate two distinct interfaces accessible from the user profile and listing management interface, as seen on the previous user page. By selecting the "Add New Item" button, users are directed to the interface shown in Figure 1a, where they can input details for a new item to be listed in the marketplace. This page is designed for simplicity, allowing users to quickly add new products to their listings, which facilitates the app's aim to streamline the online garage sale experience.

Figure 1b displays the editing interface, which can be accessed by clicking the "Edit" option associated with each item in the user's current listings. This functionality provides users with the ability to update or modify the details of their already listed items, ensuring that their sale items remain up-to-date and relevant. Both of these interfaces embody the app's commitment to user-friendly design and efficient management of online sales.



(a) Categories



(b) Items listing page

Figure 2: Items scrolling

The images showcase two main features of a thrift store app aimed at providing a seamless shopping experience for the Czech community. Figure 2(a) displays the "Categories" page, which simplifies the user's search for specific types of items. It's designed for effortless navigation, catering to both occasional and frequent second-hand shoppers and enhancing the online garage sale vibe by mimicking the category-based browsing of a physical sale. Figure 2(b) shows the "Items listing page," an intuitive display of products for sale that supports easy scrolling and selection. It promotes a user-friendly marketplace for second-hand goods, reflecting the app's commitment to environmental friendliness and streamlined local shopping. Both pages prioritize a simple, intuitive interface that encourages community engagement and supports varied shopper engagement levels without overwhelming the user, facilitating participation in the Czech Republic's second-hand economy.

## Mockup testing

### Set of metrics we used:

1. Usability:
  - Task Success Rate: Percentage of tasks completed without errors.
  - Time on Task: Average time to complete key actions.
2. Engagement:
  - Click-Through Rate (CTR): Frequency of clicks on actionable items.
  - Drop-off Rate: Points where users exit the flow.
3. Design and Aesthetics:
  - Visual Appeal Ratings: User-rated attractiveness of the design.
  - Consistency Checks: Uniformity of design elements.
4. Conversion:
  - Conversion Rate: Ratio of users taking the desired action.
5. Accessibility:
  - Accessibility Compliance: Adherence to standards like WCAG.
6. User Feedback:
  - User Satisfaction: Direct user ratings on their experience.
  - Net Promoter Score (NPS): Likelihood of users recommending the app.
7. Performance:
  - Load Time: Speed at which the mockup loads.

Neonila tested for 4 first metrics, Maksym for three others. We have tested our mockup on two peoples.

### First 4 metrics results:

Usability:

Task Success Rate:

User A: 90% (User A was able to complete 9 out of 10 tasks successfully.)

User B: 75% (User B completed 7.5 out of 10 tasks successfully, indicating some difficulty.)

Time on Task:

User A: 2 minutes average per task (Quick and efficient.)

User B: 3.5 minutes average per task (Slower, possibly due to less familiarity with such interfaces.)

Engagement:

Click-Through Rate (CTR):

User A: 35% (Clicked on 35% of items viewed, showing moderate interest.)

User B: 25% (Clicked on 25% of items viewed, indicating selective interest.)

Drop-off Rate:

User A: 10% (Mostly completed tasks, dropped off at the payment section.)

User B: 50% (Dropped off halfway through tasks, possible usability issue.)

Design and Aesthetics:

Visual Appeal Ratings:

User A: 4/5 (Likes the color scheme and layout.)

User B: 3/5 (Finds the font choice to be less appealing.)

Consistency Checks:

User A: Consistent (Finds the design elements uniform.)

User B: Mostly consistent (Noticed a few discrepancies in button styles.)

Conversion:

Conversion Rate:

User A: 20% (Signed up for an account and added an item to sell.)

User B: 10% (Signed up for an account but did not add any items.)

### **Three other metric results:**

Accessibility:

Accessibility Compliance:

User A: Fully compliant (No issues encountered with provided accessibility features.)

User B: Mostly compliant (Struggled with some color contrasts.)

User Feedback:

User Satisfaction:

User A: 4.2/5 (Very satisfied with the experience.)

User B: 3.5/5 (Satisfied but noted some areas for improvement.)

Net Promoter Score (NPS):

User A: 8/10 (Would likely recommend the app to friends.)

User B: 6/10 (Might recommend, but with reservations.)

Performance:

Load Time:

User A: 1.5 seconds (Fast and acceptable.)

User B: 2 seconds (Within an acceptable range but noted it could be faster.)

### **Post-testing changes:**

1. Navigation: Simplified user flow for quicker task completion.
2. Design: Updated fonts and colors for better readability and appeal.

3. Engagement: Enhanced visuals and personalized recommendations to improve interaction.
4. Conversion: Streamlined checkout process for higher conversion.
5. Accessibility: Adjusted for full WCAG compliance, focusing on color contrast and navigation.
6. Feedback System: Implemented real-time user feedback collection.
7. Performance: Backend optimization to achieve faster load times.
8. Consistency: Standardized design elements across the platform.

## Technical Solution

### Used technologies:

#### Frontend:

- HTML5 (Standard markup language for web pages; ensures compatibility across various browsers.)
- CSS3 (Stylesheet language that allows for responsive and dynamic design.)
- React framework (A powerful JavaScript library for building interactive user interfaces efficiently.)

#### Backend:

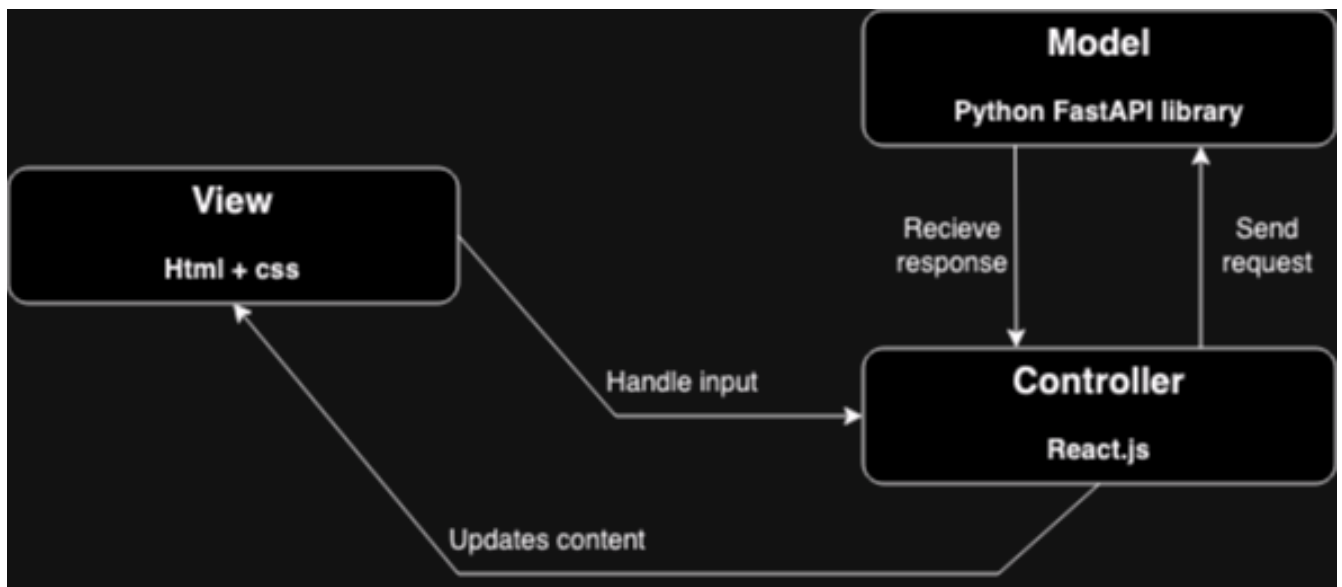
- Python3 (A high-level programming language known for its readability and scalability.)
- FastApi library (A modern, fast web framework for building APIs with Python 3.6+ that are easy to develop and scale.)
- Docker (Containerization platform that enables consistent environments and easy deployment across systems.)

#### Database:

- Sqlite3 (A lightweight, file-based database that's ideal for smaller-scale applications, offering a simple setup and requiring minimal configuration.)

These technologies combined offer a modern, robust, and scalable stack that is ideal for developing a web application with interactive features, a service-oriented backend, and an easy-to-maintain database.

For collaboration and code sharing, we used GitHub. It's a highly reliable platform that facilitates version control, issue tracking, and team collaboration through pull requests and code review processes, making it an industry standard for managing software development projects.





API				
Endpoint	Method	Request body	Response	Description
/api/v1.0/user/unauthorized	POST	None	Code 200 if guest user added to database Code 500 if an error occurred	Add guest user to database
/api/v1.0/register	POST	{username : username, password : password}	Code 200 if user registered Code 400 if username or password is empty Code 409 if user already exist Code 500 on internal error	Add new registered user to database
/api/v1.0/login	POST	{username : username, password : password}	Code 200 if user logged successfully Code 404 if user doesn't exist Code 401 if username or password is incorrect Code 500 on internal error	Login
/api/v1.0/items	GET	None	Code 200 and list of items	Get all items
/api/v1.0/items/{item_id}	GET	item_id as a part of URL	Code 200 if success + returns item Code 404 if item with this id not found	Get target item
/api/v1.0/items	POST	{name: name, description : description, price : price, contact_email : contact_email, contact_phone : contact_phone, image : image}	Code 200 if item created Code 500 on server error	Create item
/api/v1.0/items/{item_id}	DELETE	item_id as a part of URL	Code 200 if item deleted Code 500 on server error	Delete item
/api/v1.0/items/{item_id}	PUT	item_id as a part of URL {name: name, description : description, price : price, contact_email : contact_email, contact_phone : contact_phone, image : image}	Code 200 if item updated + return updated item Code 500 on server error	Update item