PROJECT REPORT

On

"LOST AND FOUND"

Department of Computer Engineering & Applications

GLA UNIVERSITY

GLA University
Mathura- 281406, INDIA
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Declaration

We hereby declare that the work which is being presented in the MERN Project "**LOST AND FOUND",** in partial fulfilment of the requirements for MERN Project viva voce, is an authentic record of our own work carried by the team members under the supervision of our mentor Mr. Mandeep Singh. Group Members:

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Certificate

This is to certify that the above statements made by the candidates are correct to the best of my/our knowledge and belief.

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Project Mentor Program Coordinator

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About the Project

A lost and found website for colleges and universities is an online platform designed to assist the process of reporting lost items and reuniting them with their rightful owners within the campus community. This website provides a central location for students, faculty, and staff members to report items they have lost or found on campus.

Misplacing personal belongings is common on college and university campuses, and a lost and found website can streamline the process of recovering lost items. The website allows users to provide a detailed description of the item, the location where it was lost or found, and the date and time. This information is then stored in a database, which can be searched by other users who are looking for lost items.

A lost and found website for colleges and universities can promote a sense of community responsibility and help reduce the stress and inconvenience associated with lost possessions. It can also be a valuable resource for campus security and management teams in identifying and returning lost items to their rightful owners.

Motivation

The motivation for a lost and found website is to create a centralized platform where people can report and search for lost items. Losing something important can be a stressful and frustrating experience, and a lost and found website can provide a helpful resource for individuals who have lost an item or are trying to locate a lost item for someone else. By creating a platform where individuals can report lost items, the website can help to increase the chances of the item being found and returned to its rightful owner. Additionally, a lost and found website can help to reduce the workload on local lost and found departments and organizations, as well as provide a more convenient and accessible way for individuals to report lost items. Overall, a lost and found website can serve as a valuable tool for reuniting people with their lost belongings.

Requirements

a). Software Requirements:

- Technology Implemented: MERN
- Languages/Technologies Used: MongoDB, Express, React, node
- IDE Used: VS Code
- Web Browser: Google Chrome

- GitHub: GitHub is a code hosting platform for version control and collaboration. It lets you and others work together on projects from anywhere. GitHub Repository: A GitHub repository can be used to store a development project. It can contain folders and any type of files (HTML, CSS, JavaScript, Documents, Data, Images). A GitHub repository should also include a license file and a README file about the project. A GitHub repository can also be used to store ideas, or any resources that you want to share.

- VS Code: Visual Studio Code is a lightweight but powerful source code editor which runs on your desktop and is available for Windows, macOS and Linux.

b). Hardware Requirements:

- Processor Required: Intel i3
- Operating System: Windows 10
- RAM: 4GB
- Hardware Devices: Computer System
- Hard Disk: 256GB

Acknowledgement

We thank the almighty for giving us the courage and perseverance in completing the project. This project itself is an acknowledgement for all those people who have given us their heartfelt co-operation in making this project a grand success.

We extend our sincere thanks to Mr. Mandeep Singh, Technical Trainer at “GLA University, Mathura” for providing his valuable guidance at every stage of this project work. We are profoundly grateful towards the unmatched services rendered by him. And last but not least, we would like to express our deep sense of gratitude and earnest thanks giving to our dear parents for their moral support and heartfelt cooperation in doing the project.

LOST AND FOUND

Abstract

A lost and found website for colleges and universities provides an efficient and convenient way for students, faculty, and staff members to report lost items and potentially recover them. By submitting details about lost or found items, users can help facilitate the process of reuniting lost items with their owners.

In addition, a lost and found website can serve as a central location for campus security and management teams to monitor and respond to lost item reports. This can help improve campus safety and enhance the overall experience of campus life for members of the community.

Contents

Introduction

A lost and found website can provide a more accessible platform for individuals to report lost items. Instead of having to physically visit a lost and found office or make a phone call, individuals can quickly and easily report their lost items from their computer or mobile device.

Increased chances of recovery: By creating a centralized platform for lost and found items, the website can help to increase the chances of an item being recovered and returned to its rightful owner. This is because more people will be able to see the item and potentially recognize it if they come across it.

Reduced workload: A lost and found website can help to reduce the workload on local lost and found departments and organizations. Instead of having to handle each individual report separately, these organizations can direct individuals to the website and potentially save time and resources.

Community building: A lost and found website can help to build a sense of community by allowing individuals to come together to help each other locate lost items. This can help to foster a sense of goodwill and mutual support among community members.

Potential revenue stream: Depending on the website's design and implementation, a lost and found website could potentially generate revenue through advertising or other means.

Overall, a lost and found website can be a valuable resource for individuals, organizations, and communities. By providing a centralized platform for reporting and locating lost items, the website can help to reduce the stress and frustration associated with losing something important and increase the chances of the item being recovered and returned to its rightful owner.

Technologies Used

MERN

MERN Stack is a Javascript Stack that is used for easier and faster deployment of full-stack web applications. MERN Stack comprises of 4 technologies namely: MongoDB, Express, React and Node.js. It is designed to make the development process smoother and easier.

It is a contraction for four different technologies as mentioned below:

- M - MongoDB
- E - ExpressJS
- R - ReactJS
- N - NodeJS

There are four component of MERN Stack:

- The first component is MongoDB, which is a NoSQL database management system.
- The second MERN stack component is ExpressJS. It is a backend web application framework for NodeJS.
- The third component is ReactJS, a JavaScript library for developing UIs based on UI components.
- The final component of the MERN stack is NodeJS. It is a JS runtime environment, i.e., it enables running JavaScript code outside the browser.

MongoDB

MongoDB, the most popular NoSQL database, is an open-source document-oriented database. The term 'NoSQL' means 'non-relational'. It means that MongoDB isn't based on the table-like relational database structure but provides an altogether different mechanism for storage and retrieval of data. This format of storage is called BSON (similar to JSON format).

SQL databases store data in tabular format. This data is stored in a predefined data model which is not very much flexible for today's real-world highly growing applications. **Modern applications are more networked, social and interactive than ever**. Applications are storing more and more data and are accessing it at higher rates.

Relational Database Management System(RDBMS) i**s not the correct choice when it comes to handling big data by the virtue of their design since they are not horizontally scalable**. If the database runs on a single server, then it will reach a scaling limit. NoSQL databases are more scalable and provide superior performance. MongoDB is such a NoSQL database that scales by adding more and more servers and increases productivity with its flexible document model.

Features of MongoDB:

- **Document Oriented**: MongoDB stores the main subject in the minimal number of documents and not by breaking it up into multiple relational structures like RDBMS. For example, it stores all the information of a computer in a single document called Computer and not in distinct relational structures like CPU, RAM, Hard disk, etc.
- **Indexing**: Without indexing, a database would have to scan every document of a collection to select those that match the query which would be inefficient. So, for efficient searching Indexing is a must and MongoDB uses it to process huge volumes of data in very less time.
- **Scalability**: MongoDB scales horizontally using sharding (partitioning data across various servers). Data is partitioned into data chunks using the shard key, and these

data chunks are evenly distributed across shards that reside across many physical servers. Also, new machines can be added to a running database.

- **Replication and High Availability**: MongoDB increases the data availability with multiple copies of data on different servers. By providing redundancy, it protects the database from hardware failures. If one server goes down, the data can be retrieved easily from other active servers which also had the data stored on them.
- **Aggregation**: Aggregation operations process data records and return the computed results. It is similar to the GROUPBY clause in SQL. A few aggregation expressions are sum, avg, min, max, etc

Where do we use MongoDB?

MongoDB is preferred over RDBMS in the following scenarios:

- **Big Data**: If you have huge amount of data to be stored in tables, think of MongoDB before RDBMS databases. MongoDB has built-in solution for partitioning and sharding your database.
- **Unstable Schema**: Adding a new column in RDBMS is hard whereas MongoDB is schema-less. Adding a new field does not effect old documents and will be very easy.
- **Distributed data** Since multiple copies of data are stored across different servers, recovery of data is instant and safe even if there is a hardware failure.

ExpressJS

Express.js is a small framework that works on top of Node.js web server functionality to simplify its APIs and add helpful new features. It makes it easier to organize your application's functionality with middleware and routing. It adds helpful utilities to Node.js HTTP objects and facilitates the rendering of dynamic HTTP objects.

Why Express ?

- Develops Node.js web applications quickly and easily.
- It's simple to set up and personalise.
- Allows you to define application routes using HTTP methods and URLs.
- Includes a number of middleware modules that can be used to execute additional requests and responses activities.
- Simple to interface with a variety of template engines, including Jade, Vash, and EJS.
- Allows you to specify a middleware for handling errors

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ReactJS

React is a declarative, efficient, and flexible JavaScript library for building user interfaces. It is an open-source, component-based front-end library that is responsible only for the view layer of the application. ReactJS is not a framework, it is just a library developed by Facebook to solve some problems that we were facing earlier.

React is a declarative, efficient, and flexible JavaScript library for building user interfaces. It is a Model-View-Controller (MVC) architecture-based library that plays the role of "V" which means view. It designs simple views for each state in your application, and React will efficiently update and render just the right component when your data changes. The declarative view makes your code more predictable and easier to debug.

React Features:

- **Use JSX:** JSX is faster than normal JavaScript as it performs optimizations while translating to regular JavaScript. It makes it easier for us to create templates.
- **Virtual DOM:** Virtual DOM exists which is like a lightweight copy of the actual DOM. So for every object that exists in the original DOM, there is an object for that in React Virtual DOM. It is exactly the same, but it does not have the power to directly change the layout of the document. Manipulating DOM is slow, but manipulating Virtual DOM is fast as nothing gets drawn on the screen.
- **One-way Data Binding:** One-way data binding gives you better view over your application.
- **Component:** A Component is one of the core building blocks of React. In other words, we can say that every application you will develop in React will be made up of pieces called components. Components make the task of building UIs much easier.
- **Performance:** ReactJS use JSX, which is faster compared to normal JavaScript and HTML. Virtual DOM is a less time taking procedure to update webpages content.

NodeJS

NodeJS is an open-source and cross-platform runtime environment built on Chrome's V8 JavaScript engine for executing JavaScript code outside of a browser. You need to recollect that NodeJS isn't a framework, and it's not a programing language. It provides an event-driven, non-blocking (asynchronous) I/O and cross-platform runtime environment for building highly scalable server-side applications using JavaScript.

Most people are confused and understand it's a framework or a programing language. We often use Node.js for building back-end services like APIs, Web App, or Mobile App. It's utilized in production by large companies like Paypal, Uber, Netflix, Walmart, etc.

Features of NodeJS:

- **Easy Scalability:** NodeJS is built upon Chrome V8's engine powered by Google. It allows Node to provide a server-side runtime environment that compiles and executes JavaScript at lightning speeds.
- **Real time web apps:** Today the web has become much more about interaction. Users want to interact with each other in real-time. Chat, gaming, constant social media updates, collaboration tools, eCommerce websites, real-time tracking apps, marketplace- each of these features requires real-time communication between users, clients, and servers across the web.
- **Fast Suite:** As we have discussed that NodeJS is highly scalable and lightweight that's why it's a heavy favorite for microservice architectures. In a nutshell, microservice architectures mean breaking down the application into isolated and independent services.
- **Easy to learn and code:** No matter what language you are using for the backend application you're gonna need JavaScript for front-end anyway so instead of spending your time learning a server-side language such as Php, Java or Ruby on Rails, you can spend all your efforts in learning JS and mastering in it.
- **Data Streaming:** NodeJS comes to the rescue since it's good at handling such an I/O process which allows users to transcode media files simultaneously while they are being uploaded. It takes less time compared to other data processing methods for processing data.

- **Corporate Support:** It's an independent community aimed at facilitating the development of NodeJS core tools. The foundation of NodeJS was formed to speed up the development of NodeJS, and it was intended to allow broad adoption of it.

Learning JavaScript is necessary these days in the development field. Anyhow you have to use JavaScript on the front end. So it is better to learn NodeJS rather than learn other backend technologies like PHP, JAVA, Ruby, etc. NodeJS is the hottest technology across the world, especially in Silicon Valley. It is the perfect skill to open up amazing career opportunities for any software developer.

CSS

This CSS Tutorial is curated for beginners, in this tutorial we covered all the properties, selectors, functions, and media queries. it is used to make web pages presentable, without using CSS a web page will look unattractive.

CSS (Cascading Style Sheets) is used to styles web pages. Cascading Style Sheets are fondly referred to as CSS. The reason for using this is to simplify the process of making web pages presentable. It allows you to apply styles on web pages. More importantly, it enables you to do this independently of the HTML that makes up each web page.

Styling is an essential property for any website. It increases the standards and overall look of the website that makes it easier for the user to interact with it. A website can be made without CSS, as styling is MUST since no user would want to interact with a dull and shabby website. So for knowing Web Development, learning CSS is mandatory.

CSS Key Features:

- CSS specifies how HTML elements should be displayed on screens.
- The Major key feature of CSS includes styling rules which are interpreted by the client browser and applied to various elements.
- Using CSS, you can control the color text, the style of fonts, spacing between elements, how columns are sized, variation in display for different devices and screen size as well as a variety of other effects.

JSON web token | JWT

A JSON web token(JWT) is *JSON Object* which is used to securely transfer information over the web(between two parties). It can be used for an authentication system and can also be used for information exchange.The token is mainly composed of *header, payload, signature*. These three parts are separated by dots(.). JWT defines the structure of information we are sending from one party to the another, and it comes in two forms – **Serialized, Deserialized**.

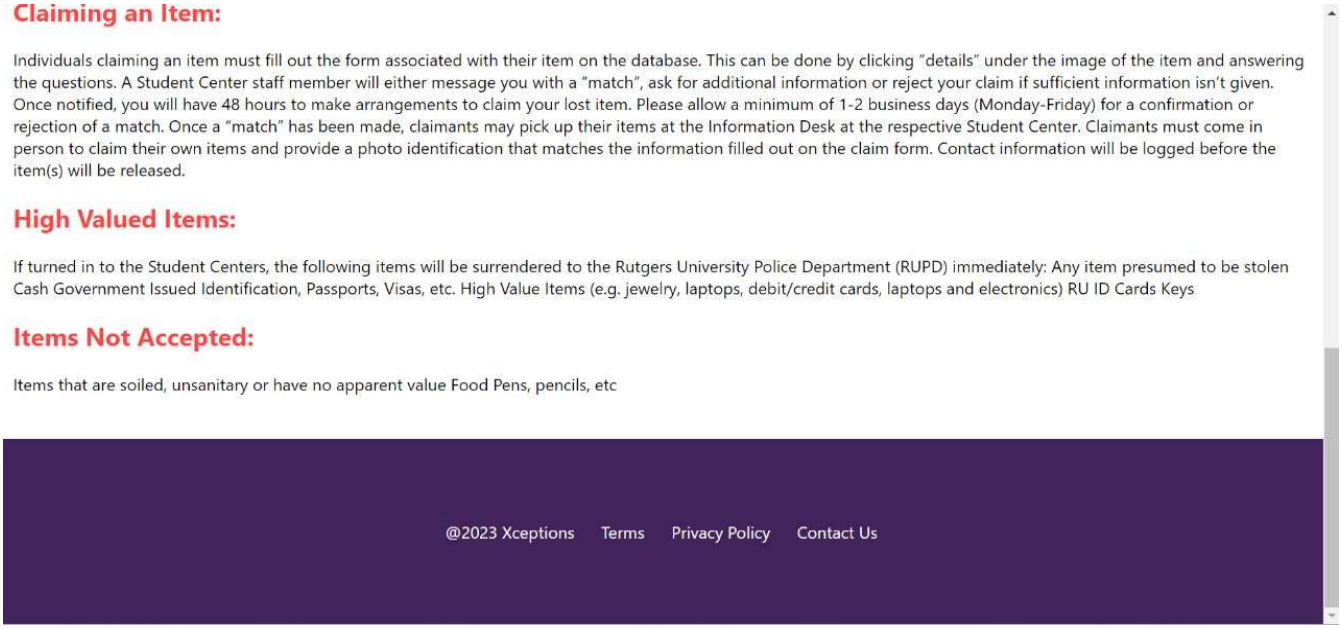
The Serialized approach is mainly used to transfer the data through the network with each request and response. While the deserialized approach is used to read and write data to the web token.

A header in a JWT is mostly used to describe the cryptographic operations applied to the JWT like signing/decryption technique used on it. It can also contain the data about the media/content type of the information we are sending.This information is present as a JSON object then this JSON object is encoded to BASE64URL. The cryptographic operations in the header define whether the JWT is signed/unsigned or encrypted and are so then what algorithm techniques to use.

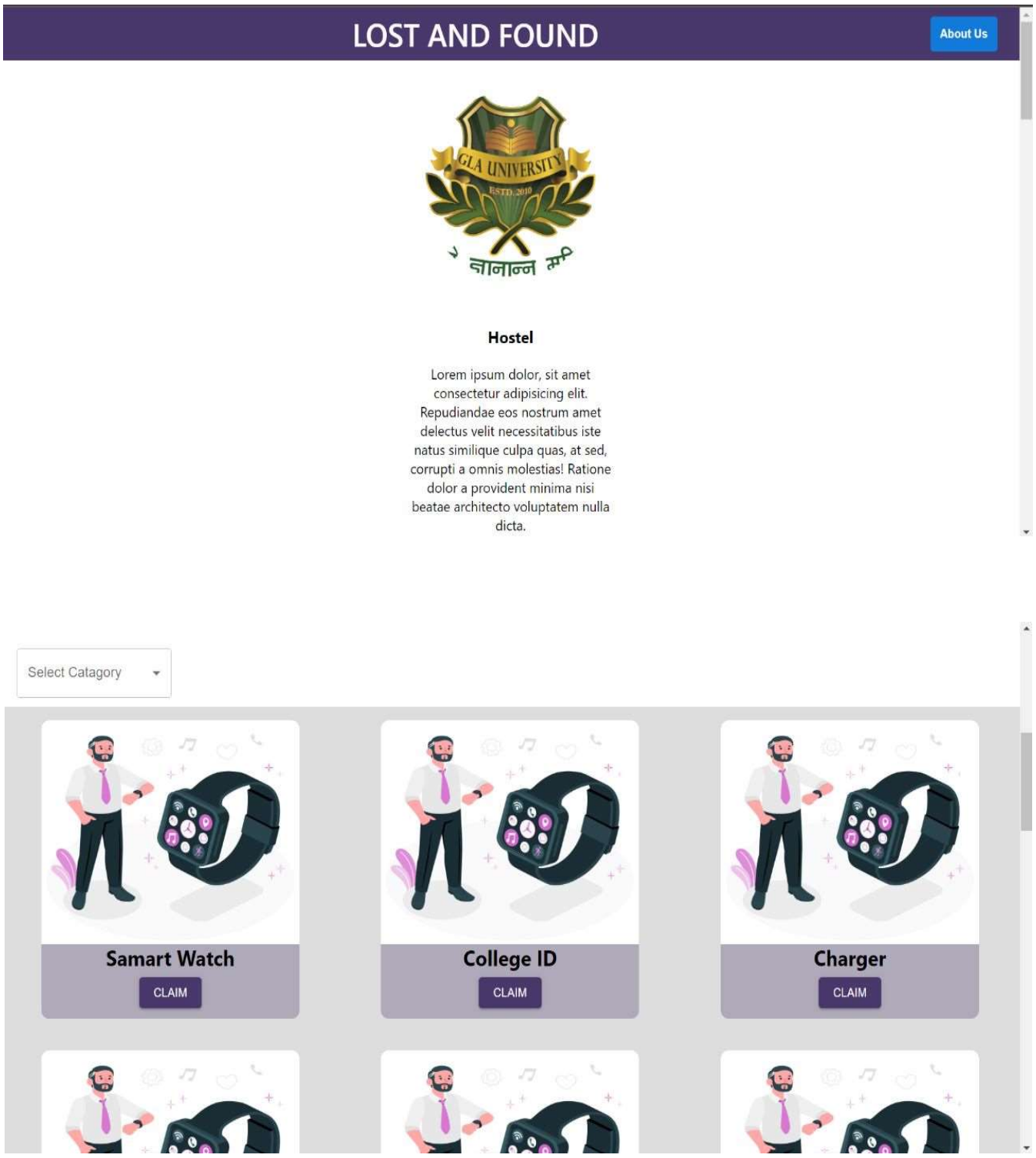
The payload is the part of the JWT where all the user data is actually added. This data is also referred to as the 'claims' of the JWT.This information is readable by anyone so it is always advised to not put any confidential information in here. This part generally contains user information. This information is present as a JSON object then this JSON object is encoded to BASE64URL. We can put as many claims as we want inside a payload, though unlike header, no claims are mandatory in a payload.

List of Figures

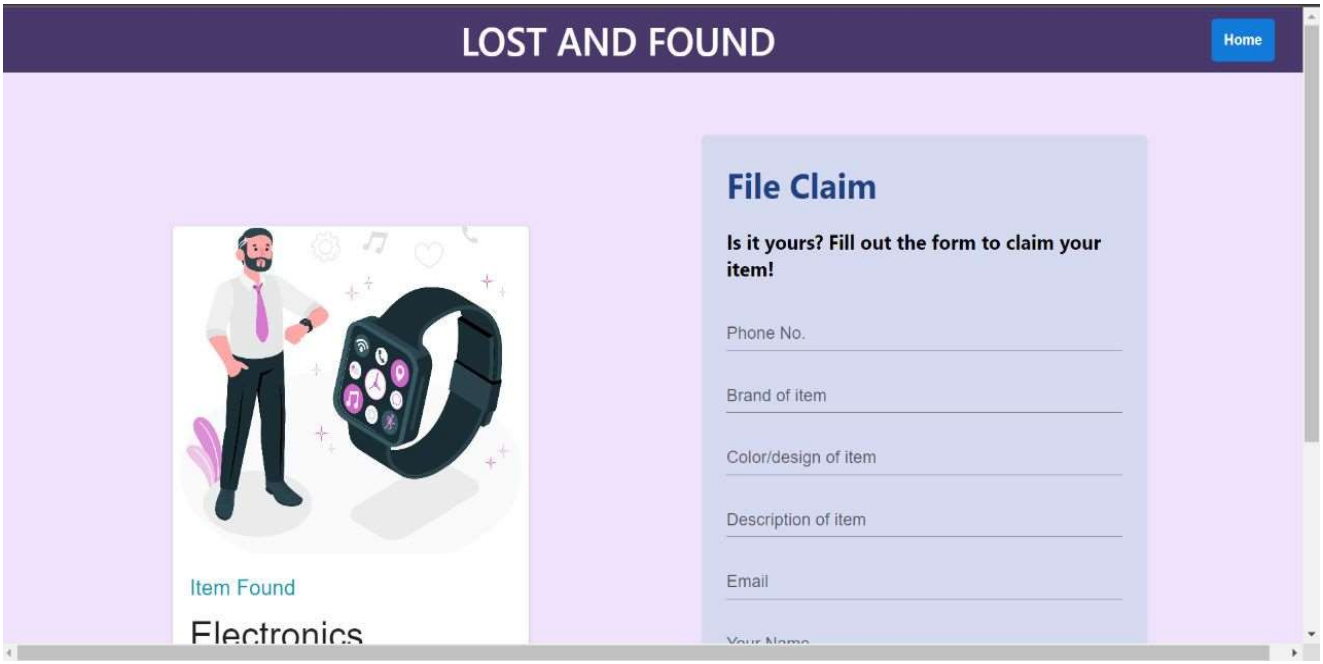
1. Home page



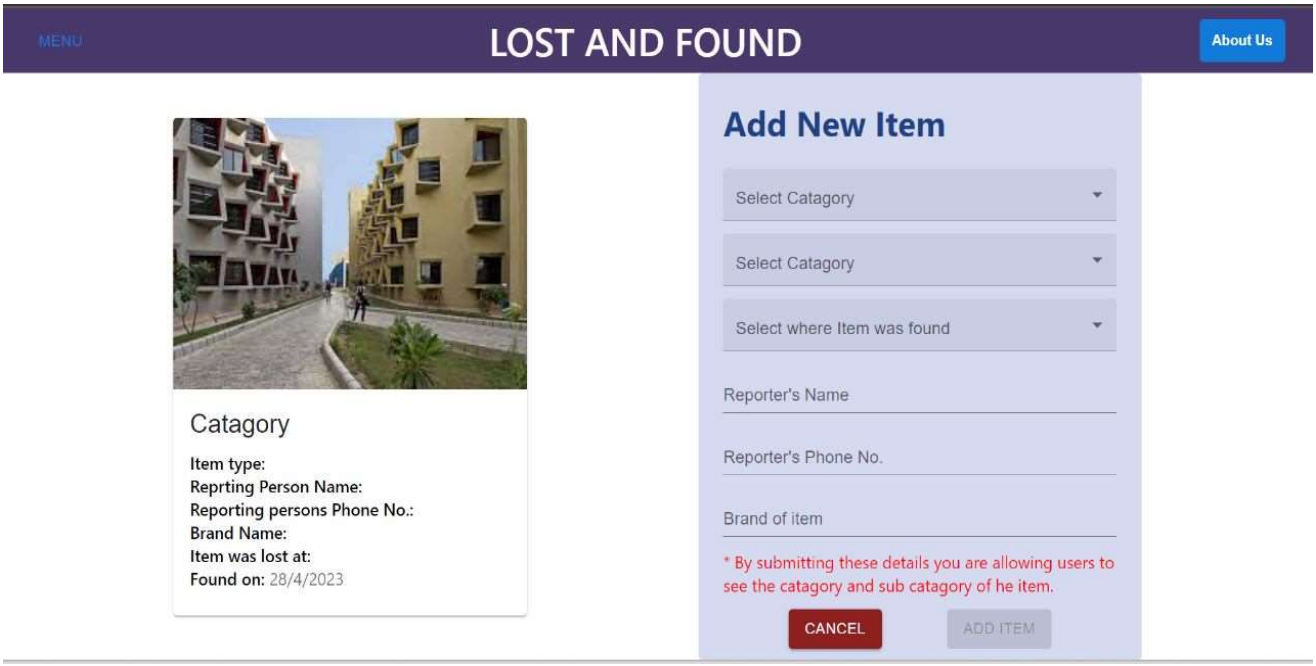
2. Category Page



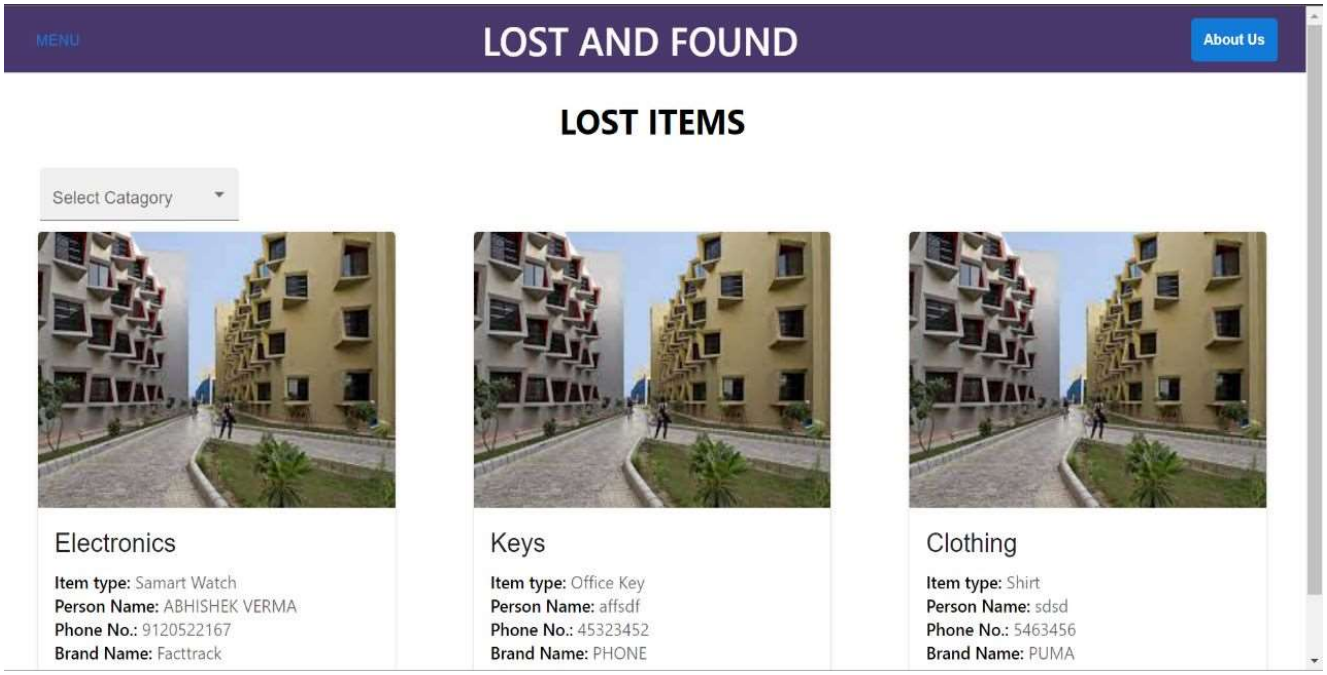
3. Claim File



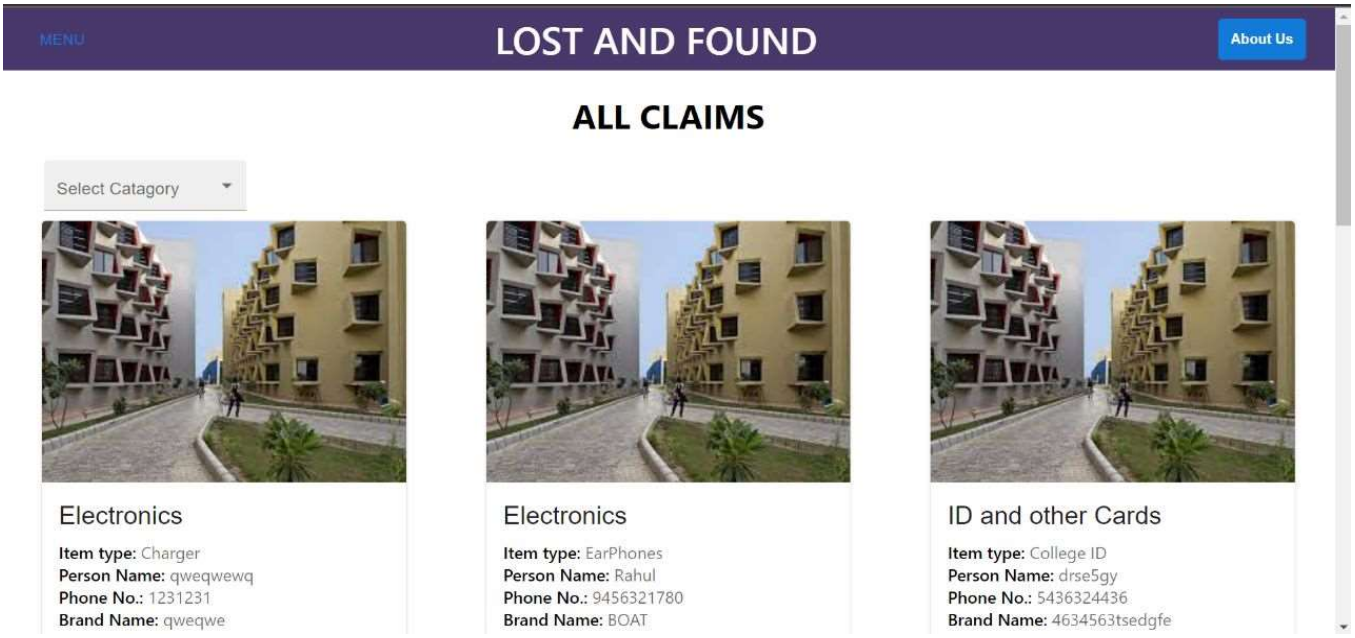
4. Add New Item



5. Lost Items



6. All Claims



Conclusion

We have completed our project within time limit with the coordination of our team members under the supervision of our mentor Mr. Mandeep Singh.

Our project repository is available at

https://github.com/Rahulbishnoi0014/LostAndFound

Bibliography

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www.youtube.com