Project 6

Website URL: https://gaiborjosue.github.io/ui-group-six/

1. User Analysis

- Identify the characteristics of your user population using personas. Describe age, gender, education, physical limitations, computer experience, motivation, domain experience, where they will use the software, if there are any factors distracting them, relationships, and communication patterns. Describe **one persona per user class**.

So our project focuses on car maintenance and information. Where users can find accessible information regarding their cars. This is a broad market, since we are not targeting any specific car, or any specific driver. For this reason we have identified 1 main user class:

1. Daily drivers: Need information regarding their car maintenance, and keep up with any scheduled services.

This user class allowed us to structure personas for our targets, these personas are:

Persona #1: Daniel Perez

Age	Gender	Education	Occupation	Vehicle	Computer Experience	Domain Experience
21	Male	College Student	Part time worker + student	2016 Toyota Corolla	Moderate: Uses personal devices daily and laptop for school work.	Low

Daniel Perez is a 21-year-old male college student who owns a car mainly for commuting to school and work. He has moderate computer experience and uses his phone and laptop daily but doesn't know much about car maintenance other than the basic scheduled oil changes. Daniel does not have any physical limitations and typically looks up information on ChatGPT or Google Gemini on his phone. His main motivation is to avoid expensive repairs and keep his car reliable without feeling overwhelmed by all the requirements, since he barely can pay for tuition with his part time job. He usually checks for car information at home only if a warning light appears, but not often at all since his focus is mainly on school. He tends to search for simple questions like "When should I change my brakes?", and normally relies on ChatGPT's answer.

Persona #2: Emilia Lee

Age	Gender	Education	Occupation	Vehicle	Computer Experience	Domain Experience
27	Female	Bachelor's Degree	Full-time Software Engineer	2012 Honda Civic Si	Advanced: Uses desktop and technical tools daily for work and personal projects.	Moderate to High

Emilia Lee is a software engineer who owns her car for both commuting and personal interest in vehicles. She has advanced computer experience and regularly uses her desktop and laptop for both professional and personal coding projects. She is comfortable researching technical information online and she performs basic maintenance herself, such as oil changes and brake replacements. She does not have any physical limitations and typically looks up car information at home or in her garage while planning maintenance tasks. Her main source of information comes from technical forums. Her main goal is to extend the lifespan of her vehicle, avoid unnecessary dealership costs, and make informed decisions based on data and other professional input online. She is always on alert for any scheduled maintenance, and tries to avoid at all costs to wait until there is a light or warning. Her search uses technical phrases like "OEM brake pad lifespan for 2012 Civic Si" and she doesn't always rely only on the first source she finds.

- **Interview at least 3 representative users** who face the problem you are tackling (at least one from each user class if you have multiple user classes). Don't identify the users you interviewed by name unless you get their permission to do so.
- If possible, observe them dealing with the problem in their real work environment. Don't provide a narrative of these sessions. Instead, offer your conclusions, and justify them when you can by referring to observations. For example, "grocery shoppers may be distracted by children; one mother was repeatedly harassed by her son to buy some candy.

Interview #1:

We interviewed one user from User Class #1. The participant is a PhD student who owns a 2024 Mitsubishi Outlander. She is not a car enthusiast and primarily uses her vehicle for commuting between home, campus, and daily responsibilities. Her vehicle is viewed as more of

a functional necessity rather than a hobby, other than the occasional camping. She values her car mostly because of the reliability across seasons and that she can go anywhere she wants with her friends. Previous car was a Ford Focus 2016.

Some of the conclusions we got from this interview is:

1. Cost avoidance is one of her main motivations: She always tries to avoid unnecessary expenses and reduces spending whenever possible. She mentioned occasionally purchasing car accessories but prioritizes essential maintenance only. The only accessory she has purchased is more for like sensors or a camera that helps her park since her car didn't come with a rear camera.

2. Information is not organized: Her main source of information is quick Google searches. She does not use specialized automotive platforms. She keeps most of the info she needs written down on a sticky note, in her car.

3. Maintenance tracking is minimal but valued: She currently writes maintenance notes on paper or sets calendar reminders. She said that it would be helpful to have a centralized dashboard where maintenance schedules are automatically organized and updated based on specific car components.

4. Low investment: She does not spend free time researching about car topics. The car serves strictly as taking her from point A to point B.

5. Reliability is one of the main priorities too: Her primary goal is to ensure the car lasts as long as possible. She is not focused on performance upgrades or modifications. She cares more about how the car would perform in the long run.

Interview #2:

We interviewed a 52 year old mother of 2 from User Class #1. She uses her car to commute to work, run errands, and for occasional road trips with the family. To her, a car is an end to a means, just something to get her from point A to point B. She is not attached to it, and is not particular about what car she has, so long as it runs and drives. Currently owns a 2014 Ford Escape that she has owned for most of the car's lifetime.

Conclusions:

1. Automated maintenance updates or notifications could be crucial for users. Service records for her consist of mechanic bills from previous repairs stored in a drawer, alongside other miscellaneous records unrelated to the car. This makes it difficult to

know if the car needs any maintenance, or if the mechanic is trying to suggest parts that don't need replacing in order to charge a bigger bill.

2. Due to a lack of knowledge about cars, helpful explanations or an intuitive UI for inputting records would enable less tech-savvy users to reliably keep track of service history.

3. A printable summary of the history would also benefit. When a new mechanic works on a car, the service history is crucial when diagnosing potential solutions to a problem, as most issues are not as simple as replacing a specific part. Often, mechanics are forced to play a game of "whack-a-mole" where they replace certain parts until the issue is resolved, mainly due to limited or nonexistent service history.

Interview #3:

From User Class #1, we interviewed a 28 year old electrician. He uses his car to work, often travelling to multiple job sites a day. He is mechanically inclined, and will attempt to fix any issue with the car himself, mostly in order to save costs and trips to the mechanic. When his car breaks down or has an engine light, he scans the codes and spends time online researching common repair solutions, avoiding the mechanic unless absolutely necessary. He owns a 2002 Ford Ranger with high mileage.
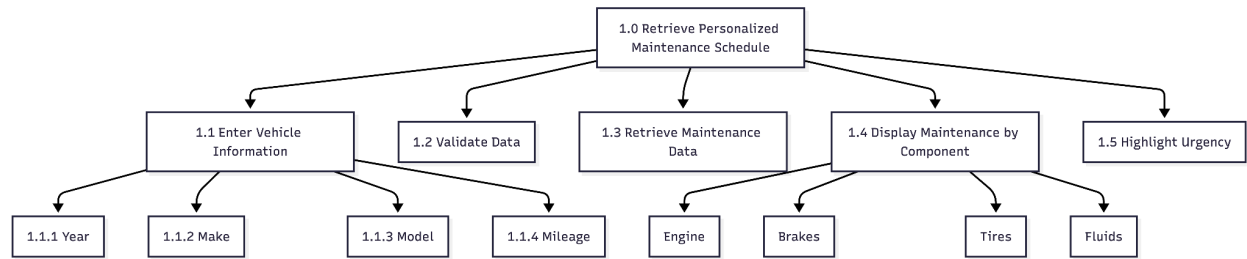
Conclusions:

1. Repair information related to common issues associated with engine codes. Would help initiate the research process when diagnosing an issue with the car.

2. A helpful part list based on service history would allow owners to be well prepared for upcoming repairs. Car owners looking to perform repairs themselves could buy parts ahead of time to replace and stay up to date on maintenance, instead of waiting for a part to fail first.

3. Issues or durability of parts could be organized by urgency. Due to work, he only has designated times to work on his car. A clear priority list would allow him to focus on the main issues, and delay other ones if he is tight on a budget or time.
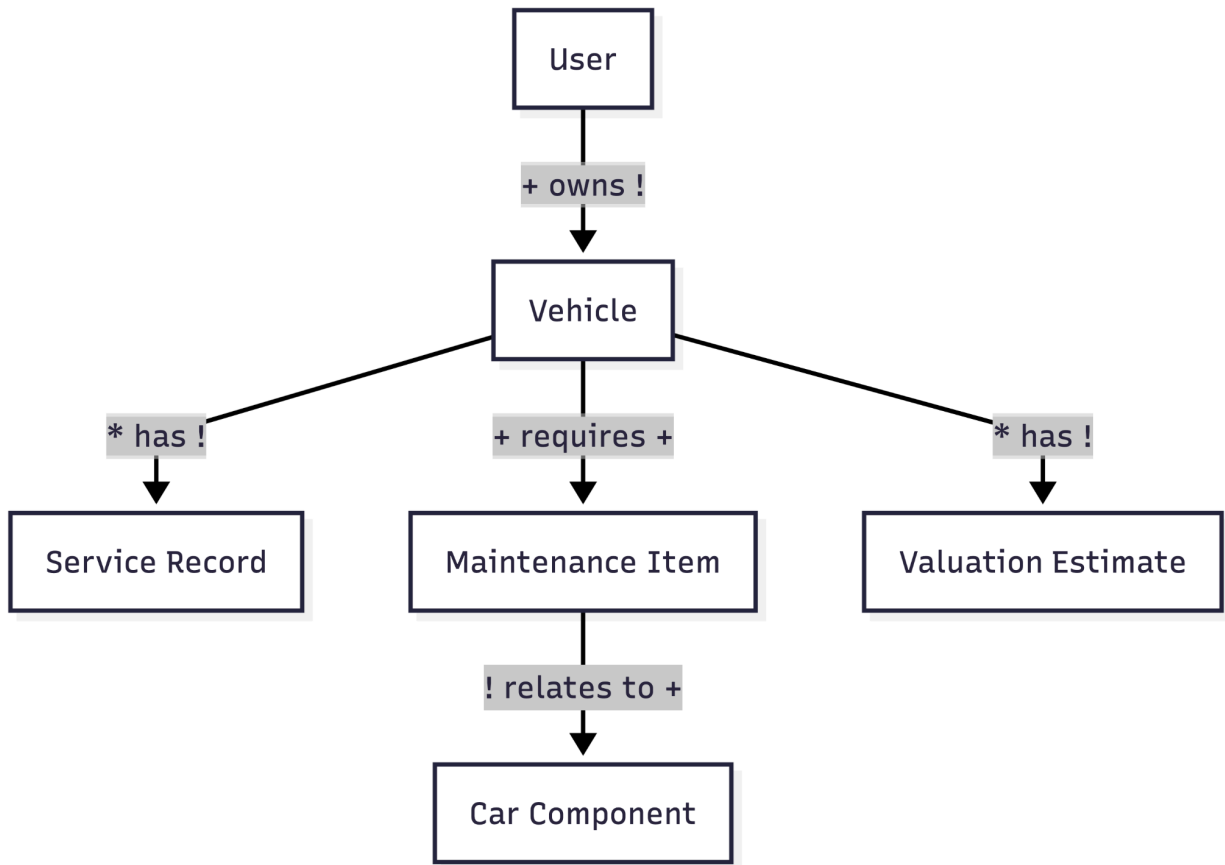
2. Task Analysis

● Determine the tasks of the problem you've chosen and identify **at least 3 high-level tasks**. Make a detailed task analysis for these tasks with **diagrammatic HTA** (Hierarchical Task Analysis). The selected tasks should not be as simple as login/logout etc. For example, in a recipe site, the most central, interesting tasks might be editing a recipe, finding a recipe, and using a recipe (to actually cook). If you can't find 3 interesting tasks, then your problem may be too small to serve as a good project, and

you should rethink it. Every task should have a goal and subtasks.

3. Domain Analysis

- Determine the important entities and relationships of your problem domain and show them in an **entity-relationship diagram**.

- Include multiplicities where important. Include text that defines entities or relations that aren't obvious.

```mermaid
flowchart TD
    User
    User -->|+ owns !| Vehicle
    Vehicle -->|* has !| ServiceRecord[Service Record]
    Vehicle -->|+ requires +| MaintenanceItem[Maintenance Item]
    Vehicle -->|* has !| ValuationEstimate[Valuation Estimate]
    MaintenanceItem -->|! relates to +| CarComponent[Car Component]
```

This analysis captures the core entities involved in maintenance and their relationships. It shows how users can manage their vehicles, how vehicles are directly connected to maintenance tasks and service records, and how valuation estimates depend on vehicle data. The multiplicities include the ownership, tracking, and reuse relationships within the system we are trying to build.

AI Use Disclosure

We used AI for the diagram generation, since its simpler and easier to generate diagrams with mermaid code. AI was used explicitly to generate the code of the diagram. Not to generate the diagram content itself entirely. Various feedback and revision loops were implemented so that we can ensure that the charts communicated our process and what we wanted. The tool used was Mermaid AI. Its open source.