University of British Columbia, Vancouver
Department of Computer Science

CPSC 304 Project Cover Page

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Group Number: 6

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. (In the case of Project Milestone 0, the main purpose of this page is for you to let us know your e-mail address and then let us assign you to a TA for your project supervisor.)

In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia

AI Declaration: AI tools (ChatGPT) were used to improve wording of sentences and fix formatting of the document for the milestone.

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Domain of the application

The domain of this application is automotive racing engineering and team management, specifically focusing on the maintenance of the data of development and innovation of the racing vehicles. This system also models the intertwinement of the technical aspects of engineering and the competing aspects of racing of a team. The primary goal for this application is to enable systematic tracking of the implementation of various projects and upgrades in different vehicles, ensuring efficient team collaboration and performance improvement. The application will also allow teams to seamlessly manage these aspects across different categories of racing by serving as a dynamic database system.

For example, teams such as Toyota Gazoo Racing race across many divisions such as endurance racing, rally racing, and rally raid where within each, the type of vehicles differ and improvements for them (e.g. aerodynamic improvements, engine optimizations, etc.) are constantly assigned to and developed by research teams to gain an advantage over other teams. This results in a large amount of data that keeping track of is extremely important and efficient management is difficult. This database aims to serve as a solution.

Database Specifications

The database models several key entities and their relationships:

1. **Vehicle**: Each vehicle (cars, trucks, motorcycles) is owned by a **Team** and driven by a **Driver**. Each vehicle also has their own respective **Upgrades**.
2. **Project**: Research projects focused on improving vehicular performance are tracked based on status (*not started, in progress, completed, etc.).* These projects would then supply **Upgrades** to specific **Vehicles**.
3. **Upgrades**: Upgrades (engine improvements, new tires) are applied to vehicles as part of **Projects**. They are identified by the upgrade's brand and that brand's product's number specification.
4. **Racing Teams**: **Teams** participate in different **Racing Series**, are funded by various **Sponsors**, and own different **Vehicles**.
5. **Sponsorships**: Sponsorships fund different **teams** and may vary in the amount of funding provided (primary, secondary, etc.).
6. **Engineer**: Engineers work in **Research Teams** in **Projects**. For the purposes of simplicity, an engineer is either a regular engineer with their own specialty or a **lead engineer**, which leads a **research team**.
7. **Research Teams**: Research Teams consist of multiple engineers and are led by a lead engineer. They all work together on **projects** which may involve developing **upgrades.**

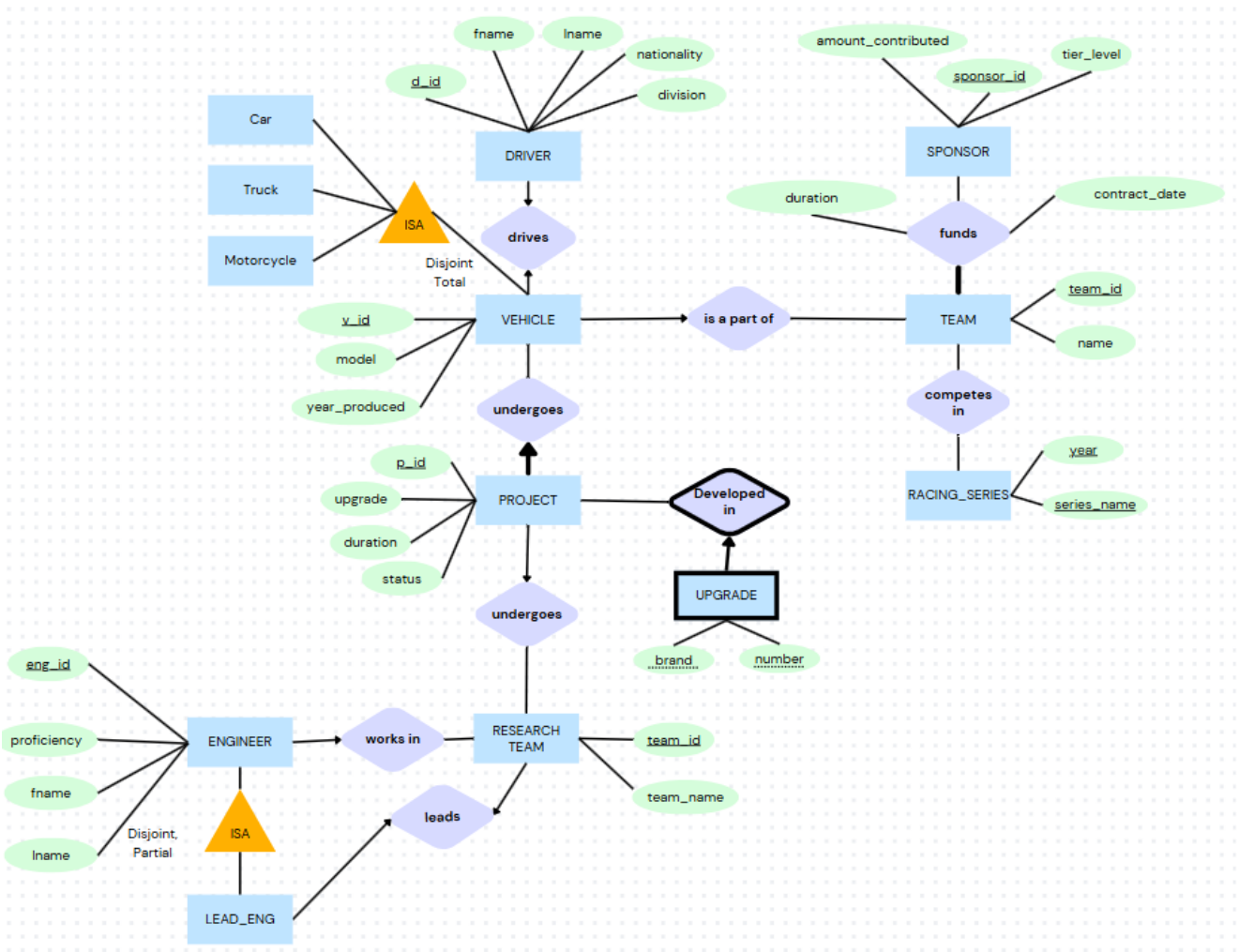
8. **Drivers**: Drivers in a team are assigned to their respective **vehicles**, which race in specific **Racing Series**: Vehicles race in their specific series, which are identified by their series name (WRC, F1, etc.) and year (2023, 2024, etc.)

A real-world example of this application is the **team** called *Red Bull Racing*. It was primarily **sponsored** by *Oracle*, alongside other secondary sponsors such as *Tezos*, *Mobil1*, and others. In the series, they entered the powerful *RB20*. They had two models, both of which are driven, respectively, by **drivers** *Max Verstappen* and *Sergio Perez.* They raced in the **racing series** *Formula 1 2024.* It has multiple **upgrades**, such as the *Honda RBPTH002* engine and *Pirelli F1* tires. One of the car's main **research teams**, the technical team, was led by **lead engineer** *Adrian Newey* and consists of regular **engineers** such as *Ben Hodgkinson*, who specialized in the car's power unit. Assuming the series was still underway, they could be handling a new **project** to create a new **upgrade** (like a *front wing*) for the car.

Example queries that the database will support:

- *"List all upgrades applied to a specific vehicle."*
- *"Find all research projects currently in progress."*
- *"Retrieve sponsorship details for a specific racing team."*

ER Diagram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ISA
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