

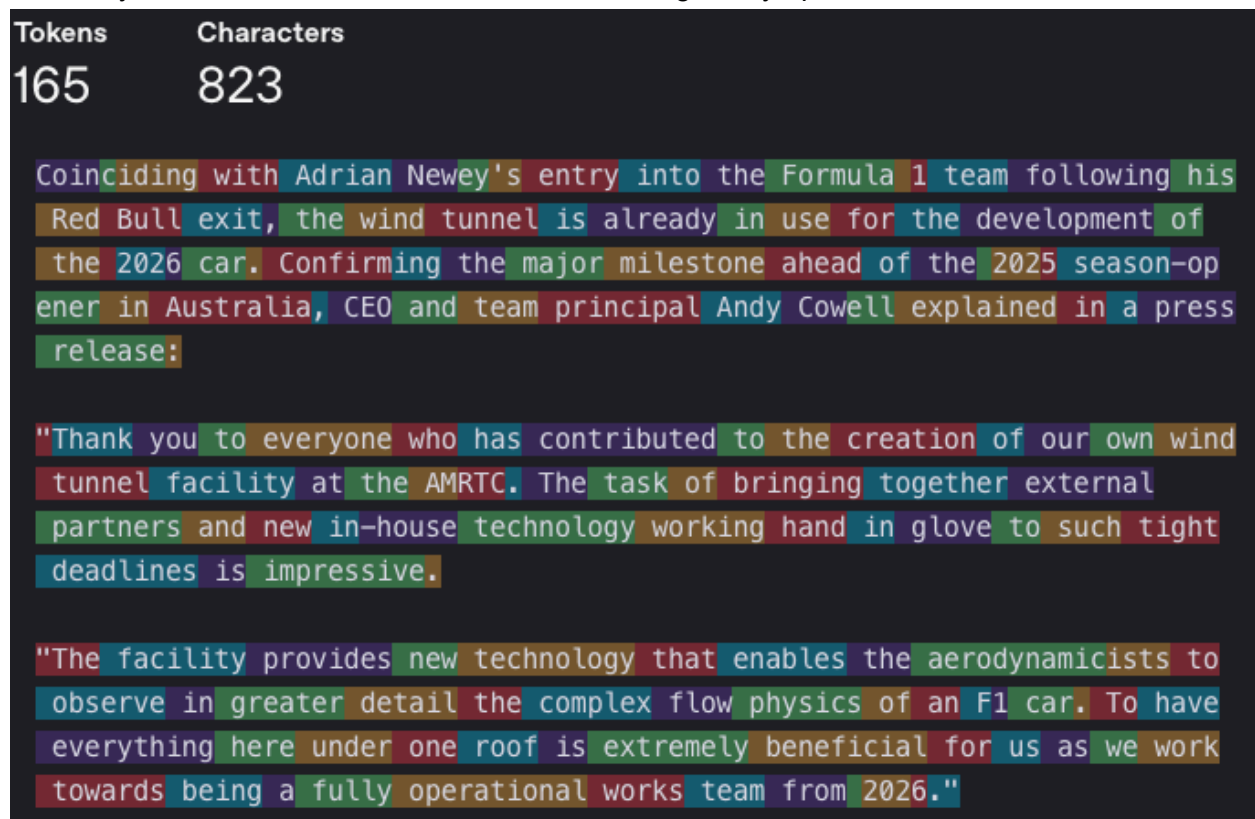
Project: Putting Your LLM Knowledge to Work

Project 1: Exploring Tokenization and Embeddings

Chosen text: Coinciding with Adrian Newey's entry into the Formula 1 team following his Red Bull exit, the wind tunnel is already in use for the development of the 2026 car. Confirming the major milestone ahead of the 2025 season-opener in Australia, CEO and team principal Andy Cowell explained in a press release:

"Thank you to everyone who has contributed to the creation of our own wind tunnel facility at the AMRTC. The task of bringing together external partners and new in-house technology working hand in glove to such tight deadlines is impressive.

"The facility provides new technology that enables the aerodynamicists to observe in greater detail the complex flow physics of an F1 car. To have everything here under one roof is extremely beneficial for us as we work towards being a fully operational works team from 2026."



Tokenized using <https://platform.openai.com/tokenizer>

Word count: 137

Tokens: 165

Some words that split into subwords: Confirming → Confirm + ing, Aerodynamicist → Aerodynamic+ists, Coinciding → Coin + c + iding

Project 2: Crafting the Perfect Prompt

Generic Prompt: Explain Formula 1

RESPONSE:

Formula 1 (F1) is the pinnacle of single-seater motorsport, where the best drivers in the world race on highly technical and challenging circuits. It is a global championship series that features both drivers and teams competing in a series of races called Grands Prix (GPs) on various tracks around the world.

Key Elements of Formula 1:

1. **The Cars:** F1 cars are engineered for speed, precision, and aerodynamics. They are built by top teams like Mercedes, Ferrari, Red Bull, and McLaren. These cars are powered by hybrid turbocharged engines and are some of the most advanced vehicles on the planet in terms of technology.
2. **The Teams:** Formula 1 teams consist of drivers, engineers, and other specialists who work together to develop the car, strategize for races, and execute during the competition. Each team typically has two drivers.
3. **The Drivers:** The drivers are among the best in the world, competing not only for race victories but for the World Drivers' Championship. Names like Michael Schumacher, Ayrton Senna, Lewis Hamilton, and Max Verstappen are legendary in the sport.
4. **The Races:** Each F1 season is made up of a series of Grands Prix (usually between 20 and 23 races). These races take place in various countries, each with its own unique track and conditions. Some famous races include the Monaco Grand Prix, the British Grand Prix, and the Italian Grand Prix.
5. **The Scoring System:** Points are awarded based on finishing positions in each race. The driver and the team with the most points at the end of the season win the Drivers' and Constructors' Championships, respectively.
6. **The Strategy:** F1 races are often decided by strategy, including tire choices, pit stops, and racecraft. Teams must quickly adapt to changing conditions, such as weather or tire wear, and make split-second decisions to gain an edge over their competition.
7. **Technology:** F1 is a testbed for cutting-edge technology. Innovations in aerodynamics, hybrid engine systems, materials, and data analysis often trickle down into consumer vehicles. The sport is heavily regulated to maintain safety and fairness, but teams push the limits of the rules to gain performance advantages.

Overall, Formula 1 is a combination of speed, technology, and strategy, making it one of the most exciting and challenging sports in the world.

Detailed Prompt with context: Formula 1 racing is a global motorsport with a rich history. Explain to me about the sport, its history, its teams, and the racing season.

RESPONSE:

Formula 1 (F1) is the pinnacle of international single-seater open-wheel motorsport. It is a highly competitive, high-tech sport that combines cutting-edge engineering, strategic teamwork, and exceptional driving skills. Here's an overview of the sport, its history, teams, and the racing season:

What is Formula 1?

Formula 1 is a series of races known as the *Formula 1 World Championship*. The sport involves drivers racing single-seater cars built by a mix of manufacturers, such as Ferrari, Mercedes, Red Bull Racing, and more. The cars are designed to be lightweight, fast, and aerodynamically efficient to achieve the highest speeds possible on various circuits around the world. The races are conducted on both purpose-built racing tracks and, at times, public roads (known as street circuits).

F1 cars are known for their advanced technology, from hybrid power units (combining internal combustion engines and electric systems) to complex aerodynamics, which make them some of the fastest and most sophisticated machines in the world.

History of Formula 1

The roots of Formula 1 date back to the early 20th century. However, the formal beginning of the Formula 1 World Championship began in 1950, when the inaugural F1 season took place. The sport quickly became popular due to its high-speed action, cutting-edge technology, and glamour, with drivers and teams becoming global stars.

Here's a brief history timeline:

- **1950s:** The first Formula 1 World Championship was held, with the first race at Silverstone in the UK. The legendary Italian driver **Alberto Ascari** and the **Ferrari** team dominated the early years.
- **1960s-1970s:** The sport evolved with advancements in car design and safety. Iconic drivers like **Jackie Stewart** and **Ayrton Senna** rose to prominence. The introduction of turbocharged engines in the 1970s marked a significant technological shift.
- **1980s-1990s:** The competition grew even fiercer with the arrival of major teams like **McLaren**, **Williams**, and **Ferrari**. The era also witnessed legendary rivalries between drivers like **Ayrton Senna** and **Alain Prost**. Michael Schumacher also began his rise, dominating the sport in the late 1990s and early 2000s with **Ferrari**.
- **2000s-Present:** The sport continued to evolve with increasing emphasis on technology, hybrid power units, and global marketing. Dominance by teams like **Red Bull Racing** and **Mercedes** in recent years has shaped the modern era. **Lewis Hamilton**, in

particular, has become one of the most successful drivers of all time, setting numerous records and winning multiple championships.

Formula 1 Teams

F1 teams are integral to the success of the sport. Teams design, build, and race the cars, while also employing talented drivers, engineers, and strategists. Some of the most successful and popular teams in F1 history include:

1. **Ferrari** – One of the oldest and most successful teams, known for its passionate fan base and long history of winning titles. They have been active since the beginning of the sport in the 1950s.
2. **Mercedes** – A powerhouse in the hybrid era, Mercedes has dominated the sport since the mid-2010s, with drivers like **Lewis Hamilton** achieving extraordinary success.
3. **Red Bull Racing** – After entering F1 in 2005, Red Bull quickly became one of the sport's leading teams, with multiple championships under their belt, particularly in the 2010s.
4. **McLaren** – Known for their historical success in the sport, McLaren has won numerous constructors' and drivers' titles, with legends like **Ayrton Senna** and **Alain Prost** racing for them.
5. **Alpine (formerly Renault)** – Alpine (and previously Renault) has been a competitive force in F1, winning championships and providing a platform for talented drivers.
6. **Williams** – A team with a rich history of success, Williams has been a key player in F1 during the 1980s and 1990s, though they have struggled in recent years.

The Racing Season

The F1 season consists of a series of races, known as *Grands Prix* (GP), held in various countries across the world. The races are typically held on weekends, and the season spans from March to December.

Structure of the Season

1. **Race Weekend Format:**
 - **Friday:** Practice sessions, where drivers learn the track and fine-tune their cars.
 - **Saturday:** A final practice session followed by *Qualifying*, where drivers compete for the best starting positions for the race.
 - **Sunday:** The race day, where the drivers go head-to-head for points in the race.
2. **Scoring System:** Drivers earn points based on their finishing position in each race. The top 10 finishers in each race receive points (25 for 1st, 18 for 2nd, 15 for 3rd, and so on down to 1 point for 10th). There are additional points for the fastest lap and for pole position in qualifying.
3. **Championships:**

- **Drivers' Championship:** This is awarded to the driver who accumulates the most points over the course of the season.
 - **Constructors' Championship:** This is awarded to the team with the most points across all their drivers.
4. **Locations:** The races take place in countries around the world. Some of the most iconic and popular venues include the Monaco Grand Prix (a street circuit), the British Grand Prix at Silverstone, the Italian Grand Prix at Monza, and the German Grand Prix at Hockenheim.

Key Elements of F1

- **Technology and Innovation:** Formula 1 is known for its cutting-edge technology. Teams constantly push the boundaries of aerodynamics, engines, and materials. Innovations from F1 often make their way into consumer products, particularly in the automotive industry.
- **Strategy:** Races are not just about driving fast; teams also employ complex strategies, including pit stops for tire changes, fuel management, and race tactics to secure the best possible outcome.
- **Safety:** Over the years, F1 has made significant advancements in driver safety, from the introduction of the HANS device (to prevent neck injuries) to improvements in car design and track barriers.

Conclusion

Formula 1 is more than just a motorsport; it's a global spectacle that blends technology, speed, skill, and strategy. Its history is rich with legendary drivers, teams, and moments that have made it one of the most thrilling and prestigious sports in the world. The competition between teams, the changing of eras, and the relentless pursuit of perfection make F1 a unique and exciting experience for fans around the globe.

Highly specific prompt with clear instructions and boundaries: Enlighten me on the 2024 F1 season. Focus on the final race that highlights the constructor championship and driver championships. Keep your response under 300 words.

RESPONSE: The 2024 Formula One season concluded with a thrilling finale at the Abu Dhabi Grand Prix on December 8, where both the Drivers' and Constructors' Championships were decided.

Lando Norris of McLaren dominated the race, leading from pole position to secure victory. This win was pivotal, as it propelled McLaren to their first Constructors' Championship since 1998, ending a 26-year title drought. citeturn0news32

In the Drivers' Championship, Max Verstappen clinched his fifth consecutive title despite finishing sixth in Abu Dhabi. He accumulated 437 points over the season, surpassing runner-up Norris, who amassed 374 points. Ferrari's Charles Leclerc secured third place with 356 points. citeturn0search23

The Abu Dhabi race also marked significant milestones for Ferrari. Carlos Sainz Jr. finished second, and Charles Leclerc took third, both delivering strong performances that underscored Ferrari's competitiveness in the season's latter half. citeturn0search23

Overall, the 2024 season was marked by McLaren's resurgence, Verstappen's continued dominance, and Ferrari's resurgence as a formidable competitor.

navlistMcLaren Triumphs in 2024 F1 Season Finaleturn0news32,turn0news17

REFLECTION:

The generic prompt gives information on the sport in general. There is no direction and hence the LLM gives a very general overview of the sport.

The detailed prompt with context specifies some areas that the user wants to focus on, and the LLM responds by giving answers according to the specified context, giving details on every context such as the sport, the history, and the racing season.

The highly specific prompt with clear instructions and boundaries allows the user to have full control over the output. This includes the length and the topic scope. My prompt requested to focus on the 2024 season, especially the final race with respect to the driver and constructor championship, and the LLM responded just as I prompted, with a 300-word limit to keep it brief and direct.

REFINED PROMPT: Provide an overview of the 2024 F1 season, highlighting the final race that decides both the Constructors' and Drivers' Championships. Summarize the key moments and drivers' performances in under 300 words.

1. Provide an overview: More direct, giving clarity and focus
2. highlighting the final race that decides both the Constructors' and Drivers' Championships: preserved
3. Summarize the key moments and drivers' performances: focus on the tone and direction of the response
4. in under 300 words: word count constraint ensuring concise and digestible response.

Project 4: Advanced Prompt Techniques

1. Task: Generating poem. Prompt: Make me a poem.
 - a. Output: Sure! Here's a poem I crafted for you:

Whispers of the Night

The moonlight dances, soft and bright,
A silver kiss to the cloak of night.
Whispers drift on a breeze so free,
Carrying secrets across the sea.

Stars are stories, old and wide,
Glowing gently, where dreams reside.
The world sleeps, yet the heart still sings,
Of hidden wonders that night brings.

In the quiet, find your peace,
Let the rush of day now cease.
For in the dark, there's a spark to find,
A stillness that calms the restless mind.

2. Apply advanced prompt techniques
 - a. Chain of thought prompting: 1. Ask them a generic prompt. 2. Specify the length of the poem (4-line). 3. Shift the tone to informal. 4. Ask the LLM to include sensory. 5. Ask them to rhyme the last words of each line.
 - b. Role play: You are a poet who has a uniquely savage style of writing. I want you to write me a 4-line poem about the growth of EV.
 - i. Output:

Electric hums buzz through the veins of the earth,

We tore out the guts of gas, now feel the rebirth.

Flesh of the future, slick with electric fire,

Rolling like thunder, we no longer tire.

3. Comparing result: From this exploration, a generic prompt without any specifics is random in nature. With ChatGPT, I explored both in normal and incognito mode. With the normal mode (a model I frequently use and hence some memory is stored), the LLM responded in a conversational manner, first asking me about any specific theme in mind. With the incognito mode where no memory is stored, the LLM just randomly gave me a poem. I also explored a few techniques including role play. With roleplay, the LLM was able to get down to business, doing exactly what the prompt asked, and this specific task has made setting the poem's tone easy. I just have to specify what type of a poet they

should role play as, and the tone is defined immediately. Chain of thought prompting, in which I applied the dynamic prompts technique, I see that I am able to have full control over the LLM every step of the way, with it behaving as I prompt. Quality-wise, the role play and chain of thought prompting both give quality output and will be useful according to the needs. At the end of the day, giving context to the prompt is a great way to increase the chance of getting a quality response.