CONTENTS

PRODUCING	READING MORE
Write an illustration essay: Benefits and challenges of autonomous vehicles *p12* **Academic writing skill:** Writing an illustration essay *p12*	**Reading 1:** From sci-fi to reality: Autonomous driving in China *p14* **Reading 2:** Paving the road for autonomous vehicles *p16*
Write a report: Healthy lifestyle guide *p28* **Academic writing skill:** Writing a report *p28*	**Reading 1:** Treasure of health and wellness – Traditional Chinese medicine *p30* **Reading 2:** Unlocking the mystery of depression *p32*
Conduct a debate: Whether or not AI will be a threat to humanity *p44* **Academic speaking skill:** Conducting a debate *p44*	**Reading 1:** AI – Not a bang but a whimper *p46* **Reading 2:** Bracing for AI's work revolution *p48*
Make a presentation: Promoting awareness of cultural heritage *p60* **Academic speaking skill:** Making an effective presentation *p60*	**Reading 1:** Heritage at sea *p62* **Reading 2:** Intangible treasures – China's cultural legacy *p64*
Write a project proposal: A pathway to enhancing life on earth *p76* **Academic writing skill:** Writing a project proposal *p76*	**Reading 1:** Navigating the space junk jungle *p78* **Reading 2:** Mysteries and myths of dark matter *p80*
Write a problem-solution essay: Sustainable solutions to the food crisis *p92* **Academic writing skill:** Writing a problem-solution essay *p92*	**Reading 1:** The future of feeding the world *p94* **Reading 2:** The Edible Prairie Project – Baskets of hope for Wyoming *p96*

Autonomy on wheels

Learning objectives

After studying this unit, you will be able to:

· illustrate the benefits autonomous vehicles bring to us and the possible challenges in their deployment;

· listen for the main points of an academic talk;

· skim an academic article to get its main ideas;

· write an illustration essay about the benefits and challenges of autonomous vehicles.

Setting

Autonomous vehicles utilize a combination of sensors, cameras, radar, and artificial intelligence (AI) to perceive their surroundings, interpret data, and navigate to different locations. Their application is revolutionizing transportation and has the potential to transform people's everyday lives and society as a whole. Worldwide, many countries are exploring this field and have made great progress. With continuous technological innovation and policy support, China has made steady strides in the autonomous-driving industry. Given these developments, **what benefits can autonomous vehicles bring to our lives, and what are the challenges or obstacles in their application?**
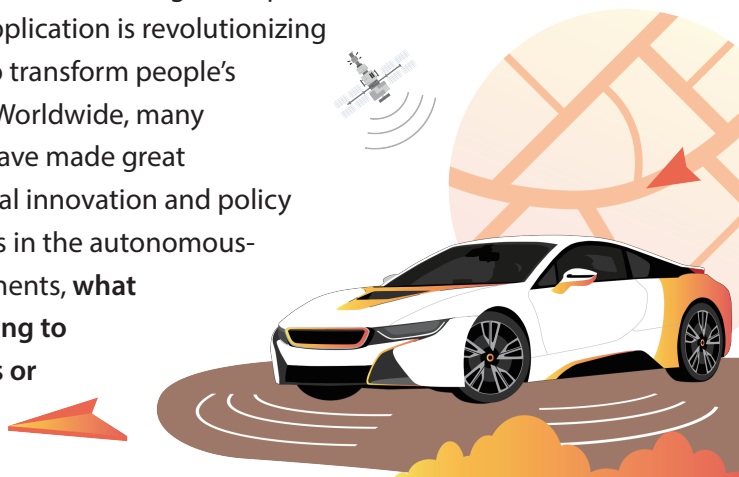
Leading in

Work in pairs and brainstorm the features of autonomous vehicles.

Connectivity

Navigation

Features of autonomous vehicles

Blind spot monitoring
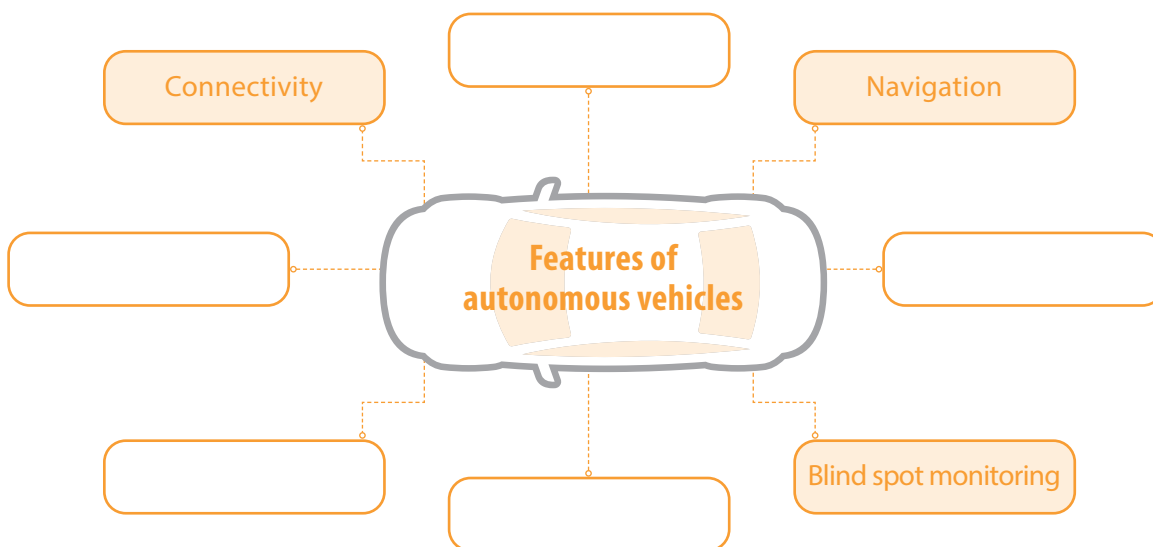
Exploring
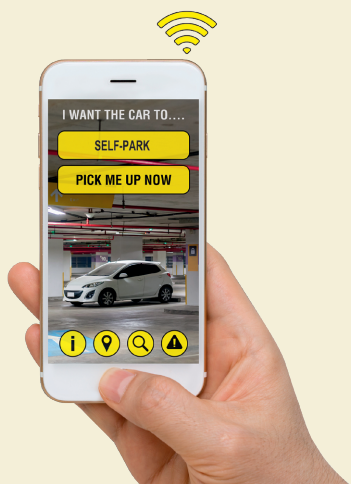
Word bank

blind spot *n.* [C] 视线盲区

black ice *n.* [U] 薄冰

dispatch /dɪˈspætʃ/ *vt.* (*fml.*) 派遣

first responder *n.* [C] 第一急救者

congestion /kənˈdʒestʃən/ *n.* [U] （交通）拥塞

Pre-viewing

Connected vehicle technology refers to equipment, applications, or systems that use vehicle-to-everything (V2X) communications to address safety, system efficiency, or mobility on roadways. This technology is viewed as a crucial factor in the development of autonomous vehicles. Work in pairs and discuss the questions.

1   What can vehicles be connected to?

2   What functions can these connections achieve?

Analytical viewing

Scan the code. Watch the video and complete the following exercises. You can do more comprehension exercises on Ucampus.

Viewing and understanding

Check (√) the features of a connected vehicle that are mentioned in the video. You can refer to the Academic listening skill on the next page.

☐ 1   It can communicate with similarly equipped vehicles within one kilometer.

☐ 2   It enhances pedestrians' safety by sounding warnings.

☐ 3   It enables drivers to respond quickly to avoid potential dangers through various warning applications.

☐ 4   It can help with weather-related traffic and safety issues.

☐ 5   It can provide real-time information to help manage transportation system performance.

☐ 6   It can help reduce our carbon emissions and build a greener future.

☐ 7   It can improve drivers' awareness of unexpected roadside incidents.

☐ 8   It can enhance the driving experience by offering personalized entertainment services.

While connected vehicles bring about many benefits, they also raise some challenges, including concerns about information privacy. Some people are concerned that their vehicles may collect information without their consent. Work in groups and discuss how to tackle this problem.

Academic listening skill 🎧

Listening for the main points of an academic talk

Attending academic conferences and lectures can be challenging, especially if the topic is complex and unfamiliar. Therefore, it is important to listen actively and focus on the main points of an academic talk.

Here are some strategies for identifying the main points:

Identify key words
Key words are often repeated or emphasized by the speaker. By identifying the key words, you can quickly gain an understanding of the main points of the talk. For instance, in the video, the term *connected vehicle* is repeated multiple times, along with words like *warn(ing)* and *(un)safe*. Therefore, you may be able to work out that the main point of the video is related to connected vehicles and their safety issue.

Focus on the beginning and the ending
Often, at the beginning of a talk, the speaker tells the audience what the main points are and in what order they will come. And at the end, the speaker usually restates the main points to sum up their talk. We can listen for language signals that introduce main points, such as:
· *Today, I'll talk about …*
· *To start, I'll talk about / introduce …*
· *We are going to discuss …*
· *To sum up …*

Pay attention to the speaker's delivery
The speaker often changes their tone, volume, or speed of delivery to emphasize the main points or indicate a transition in thought. Paying attention to these changes can help you follow the main points being discussed.

Scan the code and learn more about the skill on Ucampus.

Language focus

Scan the code and complete the language exercises on Ucampus.

Pre-reading

Work in pairs. Look at the text title and discuss the questions.

1 What will be the main ideas of the text?
2 What may be the author's attitude toward autonomous vehicles? Why?

"SELF-DRIVING" CARS
begin to emerge from a cloud of hype

1 Several years ago, the hype about "self-driving" cars reached a peak. At that time, virtually every major motor vehicle manufacturer and high-tech company predicted widespread **deployment** of automated driving systems (ADS) by the 2020s, which would **purportedly** lead to the rapid **obsolescence** of **conventional** human driving.

2 With the benefit of **hindsight**, it has become obvious that the prevailing view during that period was false, with no more than a handful of advanced **prototype** vehicles having been driven on public roads without the need for **onboard** safety drivers. The term *self-driving* has lost its original intended meaning because the driving assistance feature on the cars that have been labeled "full self-driving" cannot **maneuver** without constant human supervision. Recently, the major companies that have invested most heavily in ADS have started to make public statements, tempering their earlier optimism by

500 km
TOTAL RANGE

Driver 001-4237-2437
ID:48572:874-9549583
direction: 494-57-12

control check message
online: 24-98-11-3400*
wer das least ist doof, aber mal saudoof inne futt hiein
control check message
online: 23-54-08-2100

pointing out that the **rollout** of automated driving would be **incremental**, beginning with operations under **constrained** conditions in tightly restricted locations. They have learned that the technical requirements to support the widespread use of the technology are far more complicated than they originally **envisioned**. The **inherent** complexity of the driving task makes it difficult for automated systems to accurately **perceive** the driving environment, **anticipate** the actions of other road users, and recognize and respond to traffic hazards.

3   Like children learning to control their own movements, ADS need to learn to crawl before they can walk and to walk before they can run. This is why they first have to be **implemented** and perfected in simple environments before tackling unpredictable road users or operating in **adverse** weather conditions. As a result, the automated movement of goods – automated driving of heavy trucks on **long-haul** interstate routes – has become an area where ADS are being deployed more frequently. Long-haul trucking operations on interstate highways face simpler traffic and roadway infrastructure conditions, particularly if the origin and destination points for the automated trips are directly connected to limited-access highways. In contrast, ride-hailing services share rides in dense urban areas. Those are the places that are the most technologically challenging for ADS.

⁴ To provide safe operations, ADS need to perceive the surrounding environment and establish where they are located using technology based on multiple basic physical principles. They need to deal with adverse conditions brought about by **electromagnetic** interference from electrical storms or nearby electrical equipment, low sun angles that can blind cameras, **precipitation** or smoke that **diffuses** light needed by imaging sensors, and cyberattacks that target any of the vehicle's sensors. Also needed is information about nearby infrastructure and the relative **velocity** of other moving objects in the **vicinity**. Data from all these sensors must be **fused** to accurately represent the area surrounding the vehicle and to isolate any faulty inputs.

⁵ The sensor requirements and the data processing and storage associated with this level of environment sensing will make ADS technology expensive for the foreseeable future. These expenses are unavoidable if the technology is to replace the full range of a driver's skills without compromising safety. Such expenses also drive the business case for initial ADS deployment on commercial vehicle fleets that can be used throughout the day to generate **revenue** rather than operating only one or two hours a day like most private vehicles.

⁶ Remote human support for automated driving is another important topic that has not received the level of public attention that it deserves. Virtually every developer of ADS without an onboard human driver expects to rely on humans at a fleet management center to help the system make **tactical** driving decisions when needed. The human assistant may **compensate** for hardware and software faults on the vehicles, but will primarily provide advice in challenging traffic situations such as **navigating** around obstacles that temporarily block the intended route of the vehicle and recognizing

Destination

gestures of police officers directing traffic. Some developers are also considering remote driving capabilities, in which a human at a fleet management center would drive the vehicle for some portion of a trip that cannot be handled by the ADS. These remote support functions will be particularly important during the early years of ADS deployment as the technology is being **refined**.

7   ADS researchers and developers have worked on a variety of approaches to safety **assurance**, but are not close to reaching a **consensus** on the best option. The safety assurance challenges extend far beyond technological considerations but begin with the broader **societal** decision about how to determine "how safe is safe enough" for ADS to be put into public service. Relevant measures of safety need to be agreed upon for **regulatory** agencies and the general public to become comfortable with the public deployment of ADS. ADS developers also need to learn how to present their highly technical safety assessments in terms that can be understood clearly and accurately by regulators and public interest groups to earn trust and acceptance.

8   Although some observers may perceive that "the bloom is off the rose" for automated driving in the current post-hype environment, the current situation actually marks a sign of progress. More realistic views of the opportunities and challenges for automated driving will motivate better-focused investments of resources and **alignment** of public **perceptions** with reality. We could expect some limited implementations of ADS such as automated long-haul trucking on low-density rural highways during the current decade. Automated urban and suburban ride-hailing services could become available on a limited basis as well, but the location-specific challenges to their deployment are **sufficient** that this is unlikely to reach a national scale soon.

Analytical reading

What challenges have to be tackled for ADS to be put into public service? Skim the text and complete the diagram. You can refer to the Academic reading skill on the next page.

Challenge ❶

To provide safe operations, ADS need to sense the surrounding environment and determine their location based on 1) _____.
- They need to deal with adverse conditions brought about by electromagnetic interference, low sun angles, etc.
- They need information about 2) _____ and the relative speed of other moving objects.

Challenge ❷

In the near future, ADS technology will be expensive because of the sensor requirements and 3) _____ associated with the required level of environment sensing.

Challenge ❸

4) _____ for automated driving has not received deserved attention.
- Human assistants may compensate for 5) _____ on the vehicles in challenging traffic situations.
- Remote driving capabilities would enable a human at a fleet management center to drive the vehicle 6) _____ that ADS cannot handle.

Challenge ❹

Consensus is to be reached on the best option of safety assurance.
- 7) _____ need to be agreed upon for regulatory agencies and the public to accept the public deployment of ADS.
- ADS developers also need to present highly technical safety assessments in clear and accurate terms to 8) _____ from regulators and public interest groups.

Scan the code and complete more comprehension exercises on Ucampus.

Thinking beyond

In the text, major car manufacturers pointed out that the rollout of automated driving would be incremental. Apart from the applications mentioned in the text, what other possible applications of ADS can we anticipate in our daily lives?

Step 1 Search online to learn more about the potential applications of ADS in our daily lives.

Step 2 Work in groups. Discuss the key challenges that ADS may face in their application and propose possible solutions. Take notes while you discuss.

Challenge	Possible solution

Step 3 Share your ideas in class and invite more solutions to the challenges on your list.

Academic reading skill

Skimming an academic article

Skimming is a selective reading method in which you focus on the main ideas of a text. Instead of reading every word, you need to decide what to read and maintain your focus.

Skimming can save time and improve efficiency in reading and information processing. By quickly identifying the most important information, skimming allows the reader to focus on the core content and ignore specific details. This skill is particularly useful in today's fast-paced world, where people are constantly bombarded with information from various sources. Skimming can also help the reader develop critical thinking skills by encouraging them to evaluate the relevance of the information they encounter.

Here are some tips on skimming:
- Read the title and abstract (if there is any) of an academic article to get an overview of its content.
- Scan headings and subheadings.
- Read the first paragraph.
- Read the first sentence of each paragraph, as they are often the topic sentences.
- Pay attention to text that is bold, italicized, or underlined, as this may indicate key information.
- Take note of bullet points and lists.
- Read the last paragraph, which usually contains the conclusion of the article.
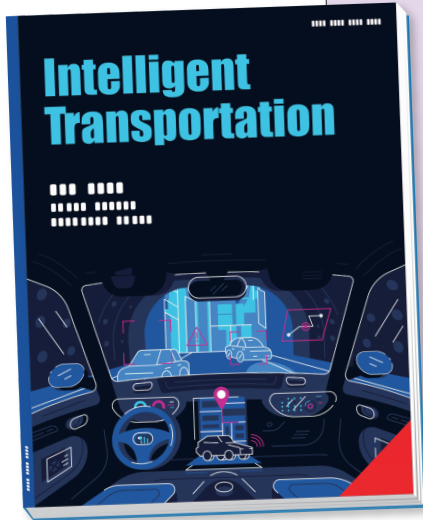
Scan the code and learn more about the skill on Ucampus.

Language focus

Scan the code and complete the language exercises on Ucampus.

Producing

Write an illustration essay: Benefits and challenges of autonomous vehicles

Intelligent Transportation

A magazine is inviting essays for a special edition focused on the development of autonomous vehicles. To participate, you are required to write an illustration essay of no less than 300 words. This essay should explore the benefits autonomous vehicles bring to our lives and examine the potential challenges they might encounter in their application, such as safety issues and ethical considerations.

Academic writing skill

Writing an illustration essay

An illustration essay is a form of writing that uses examples to explain, clarify, or justify a point. The purpose is to demonstrate an idea, situation, or concept using examples related to the topic.

An illustration essay usually adheres to the standard structure of most academic writings: It starts with an introduction that captivates the reader's interest, followed by a body which presents specific examples, and a conclusion summarizing the main arguments.

No matter how abstract your idea is, it becomes more comprehensible when you provide relevant and strong examples to illustrate your main point. The following are some tips to help you select and organize examples in your essay effectively:

Choose appropriate examples
Although it is better to collect ample evidence before writing, not all examples that you gather are supposed to be included in your essay. Make sure the examples you choose are relevant and support the thesis statement. Otherwise, you might lose your focus.

Employ different types of examples
Try to include various examples to make your main points more representative and persuasive. Some common types of examples are quotations, statistics or data, facts, and anecdotes.

Arrange examples in appropriate order
The order in which you present your examples plays a critical role in how the reader perceives and engages with your essay. Thoughtful organization of your examples can therefore enhance their effectiveness. Examples can be presented in chronological order, by importance, or by relevance – beginning with either the most compelling evidence or the least.

Scan the code and learn more about the skill on Ucampus.

Step 1 Brainstorm ideas

List the benefits of autonomous vehicles and the challenges they may face based on what you have learned in this unit. You can refer to Exploring as well as Reading more. Additionally, it is advisable to broaden your research by reviewing related articles and publications.

Benefit	Challenge
• Reducing accidents caused by human errors …	• Limitations of sensors …

Step 2 Collect and evaluate examples

Collect specific examples to illustrate the main points of your essay. You can use examples from Exploring, Reading more, or other sources. To make your essay persuasive, select and structure examples according to the Academic writing skill tips.

Benefit	Challenge

• Reducing accidents caused by human errors
   Example 1: _____
   Example 2: _____
 …
	• Limitations of sensors
	   Example 1: _____
	   Example 2: _____
	 …

Step 3 Write and review

Write your draft, incorporating the examples you have selected. After you finish, conduct a peer review and revise your essay based on the feedback.

Step 4 Proofread your essay

Carefully check your essay for spelling errors, grammatical accuracy, coherence, and logical flow. Make any necessary final adjustments to enhance its quality.

Did you complete the project efficiently? Scan the code and assess your performance by completing the project checklist on Ucampus.

From sci-fi to reality: Autonomous driving in China

¹ China's **automotive** industry has entered an age of **unprecedented** change powered by vehicle ACES (autonomy, connectivity, **electrification**, and shared **mobility**) standards and carbon peak and neutrality targets. The continuous progress in **regulation**, technology, and commercialization is paving a fast track for the development of autonomous driving, which will change people's usual mobility patterns and choices. It is believed that China's autonomous-driving industry will experience even more rapid growth over the next few years.

Regulatory frameworks are clear and local governments have been taking the wheel

² Technological breakthroughs have led to increasingly sophisticated autonomous-driving vehicles. Level 3 (L3) vehicles are conditionally automated, which means they can perform automated dynamic-driving tasks, although a human must be ready to take over within seconds. Level 4 (L4) vehicles, or highly automated vehicles, can drive completely autonomously in **designated** areas, such as highways, and bring themselves into a safe state in case of a system failure. A human driver is not required to take over the vehicle, but is still required to drive if the vehicle leaves its operational design **domain**.

³ Strategies to **integrate** these vehicles on the streets have already been set in motion. In 2020, China's National Development and Reform **Commission**, the Ministry of Industry and Information Technology (MIIT), and nine other ministries and commissions jointly issued a strategy for the **innovative** development of autonomous vehicles. According to the strategy, it is expected that by 2025 the large-scale production of L3 vehicles and the market

launch of L4 vehicles in selected **scenarios** will be realized, and China's standard intelligent vehicle system will be fully established and further improved between 2035 and 2050.

4   In July 2021, MIIT issued opinions on market access for intelligent and connected vehicles (ICVs) and products, laying the foundation for the mass production of L3 and L4 autonomous vehicles.

5   Local governments at all levels also strongly support autonomous driving. By the first half of 2023, there were 17 ICV test and demonstration zones all over the country, with more than 150,000 kilometers of roads for autonomous-car testing. Local governments have also created regulatory pilots that integrate market access, data security, accident handling, and design **specifications** in their tests.

6   More importantly, the regulatory system is getting more sophisticated. To develop autonomous-driving laws and regulations, the central government sets an agenda for local governments, which is implemented through pilots. **Subsequently**, the information gathered in these pilots is used to create policy. On this point, local governments can take a **pragmatic** approach when promoting and **optimizing** regulatory systems. For example, Shenzhen passed the first regulation in China regarding autonomous driving, permitting self-driving cars on the road in 2022, which is a **milestone** in the development of autonomous-driving technology.

Chinese consumers remain enthusiastic about autonomous driving

7   Consumer acceptance in China has continued to be shaped by the accelerated adoption of ICVs and the increasing **accessibility** of autonomous-driving fleets. A survey shows that Chinese consumers are more likely than Western consumers to embrace autonomous driving, more enthusiastic about autonomous **functionalities**, and more willing to pay, and all of this has **culminated** in a lot of interest in purchasing L4 pilot vehicles.

8   The fast expansion of China's electric vehicle (EV) market raises consumers' perceptions of autonomous driving to a new level. EVs have more potential to **accommodate** autonomous functionalities than **internal-combustion-engine** (ICE) vehicles. New **entrants** and local **premium** new-energy-vehicle (NEV) brands have enabled the mass production of L3 vehicles loaded with high-definition maps, AI chips, and light detection and ranging (LiDAR).

9   Since 2020, several ICV demonstration zones in Beijing and Shanghai have introduced trial operation of robo-taxis, **triggering** strong consumer enthusiasm. In the ICV demonstration area in Jiading, Shanghai, for example, 548 ICVs completed 563,000 intelligent manned trips on test roads in 2022 alone.

A complete, local autonomous-driving ecosystem is in place to support technology stack development

10 A lot of software and hardware technology stacks are needed across the autonomous-driving industry value chain, and each can be an opportunity for local vendors. Some businesses in areas such as core **algorithms**, LiDAR, and AI chips have become leading international players.

11 In the field of private autonomous vehicles and robo-taxis – as well as in commercial application scenarios for advanced driver-assistance systems such as **line-haul logistics**, ports, and mines – Chinese start-ups continue to emerge. Some start-ups may face difficulties commercializing their products in the short term, but they may grab more opportunities globally as application scenarios grow.

12 Original equipment manufacturers are at the center of this rapid change. They act quickly to identify their **strategic** position in the autonomous-driving landscape and design autonomous-driving solutions based on their own specialization and strengths. They are **fostering** the rapid development of the autonomous-driving industry.

Analytical reading

As introduced in the text, Chinese consumers are more likely than Western consumers to embrace autonomous driving. Work in groups and discuss the reasons.

Scan the code and complete the comprehension and language exercises on Ucampus.

READING 2

To ensure the success of self-driving cars, cities need to increase investment in infrastructure and prepare for their integration. Scan the code for more reading on Ucampus.

Evaluating

	Fair	Good	Excellent
I can illustrate the benefits autonomous vehicles bring to us and the possible challenges in their deployment.			
I can listen for the main points of an academic talk.			
I can skim an academic article to get its main ideas.			
I can write an illustration essay about the benefits and challenges of autonomous vehicles.			

Answer the following questions.
1 What do you need to improve?
2 How do you plan to improve it?

Vocabulary

Scan the code and learn the vocabulary on Ucampus.

Unit test

Scan the code and take the unit test on Ucampus.