1. A machine learning application scenario can be seen from four perspectives: (i) what is the technical problem to be solved, (ii) the data requirements, meaning can you get the data needed, (iii) security and privacy considerations, meaning what happens if data is leaked and (iv) the value proposition that machine learning brings to the table.

Choose one industry from the list below (or be creative and come up with your own) and give one example of how supervised machine learning can be applied. Your examples should follow the 4 perspectives outlined above.

Give a different example from those given in lecture. You may consult the Internet, but you must think things through yourself.

**Supervised Machine Learning:**

**Industry: Healthcare**

1. Supervised learning in the healthcare sector has plenty of applications, and one of the technical problems to be solved is to accurately identify malignant tumors from medical imaging datasets, which require high precision to minimize false positives in the datasets. The Data requirements often require large labeled medical datasets to be imported into the system, which can be challenging due to the need for extensive and diverse datasets from multiple sources. Security and privacy is also paramount in this application scenario, because medical patient information is confidential and contains sensitive information pertaining to the patient. Hence, a data breach can cause legal issues. Overall, this machine learning application scenario allows patients to diagnose earlier cancer conditions, leading to improved patient outcomes and reduction of healthcare costs for the patients.

**Unsupervised Learning:**

**Industry: Social Media**

1. Unsupervised learning in social media can be used to find patterns in user behaviours that are out of the ordinary without requiring labelled data, which is crucial for finding novel or changing risks. This may require platform-level access to obtain large amounts of user activity data, such as postings and conversations. But because this information is so sensitive, there are serious security and privacy concerns because a breach could lead to identity theft, harm to one's reputation, and legal problems. In this context, the main advantage or value proposition of unsupervised learning in this context is that it can automatically identify and react to new dangers, such as coordinated disinformation or bot activity, improving user trust and platform security without depending on predefined labels.

**Reinforcement Learning:**

**Industry: Banking**

1. The reinforcement learning (RL) application scenario for credit scoring and risk assessment is to develop adaptive models that, in contrast to static classical models, dynamically and in real-time assess a borrower's risk. This method necessitates combining extensive financial data, which may require complicated data integration but is typically available. This data must include payment behaviors and transaction histories. There are serious security and privacy concerns because financial data is sensitive and breaches could result in identity theft, financial loss, and legal problems. In this situation, RL's main benefit is its capacity to continuously learn from and improve credit ratings based on fresh information, leading to more precise risk assessments, fewer defaults, and more specialized credit offers.