Categories of AI: 1

Practice 2

To distinguish between different levels of intelligence, researchers often divide artificial intelligence (AI) into three categories: narrow intelligence, general intelligence and super intelligence.

For each of the following examples of artificial intelligence, pick the most appropriate AI category. Drag the category into the correct row of the table below to label the example described.

Example	Category
A machine with intelligence that surpasses that of humans across all possible domains.	
An autonomous pizza delivery vehicle that could make its way to your home from the pizza shop, without human intervention, to deliver your pizza.	
A machine with the ability to understand, learn, and apply knowledge across a wide range of tasks at human-level proficiency.	
A computer system that can consistently beat the world number one chess player and has never itself been beaten.	

Items:

Narrow intelligence | Super intelligence | General intelligence

Social and ethical: data bias

Practice 2

A comprehensive understanding of the social and ethical issues introduced by AI is essential to ensure the responsible development and deployment of these technologies.

An essential aspect to take into account involves examining potential **bias within the data** that is used for training machine learning models.

A university is developing an AI application that will predict the likelihood of a student graduating with a first class honours degree. Which of the following sets of training data would be **least likely** to produce a model that reveals bias?

- A set of data collected by the BBC that shows the outcomes for all of their journalists from various backgrounds who went to that university over the past 5 years.
- A set of data collected by the Girls' Day School Trust that shows the outcomes for all their students who went to that university over the past 20 years.
- A set of data collected by a national university and college admission service that shows the outcomes for a random selection of students who applied to that university over the past 5 years.
- A set of data collected by the School of Computer Science that shows the outcomes for all students who studied for a degree over the past 10 years.

Quiz:
STEM SMART Computer Science Week 30

Application of large language models

Practice 2

Large language models (LLM), such as that used by OpenAI's ChatGPT, are a specific type of AI that are designed to generate a text response to a prompt as realistically as if you were speaking to a human by predicting which words should come next in a sentence.

Which of the following tasks is **best suited** to a large language model?

- Producing a plan for a 2000-word essay on the American Civil War.
- Producing the answer to a logic problem.
- Producing a set of ten questions for a quiz on current affairs.
- Writing a letter to thank an aunt for a gift.

Quiz:
STEM SMART Computer Science Week 30

The Turing test

Practice 2

In 1950, Alan Turing redefined the essential question of artificial intelligence — "can machines think?". In doing so, he defined what is now known as **the Turing test**.

Which of the following options provides the best definition of the Turing test?

- The Turing test focuses on a machine's capacity to recognise and interpret visual patterns in a manner similar to human perception.
- The Turing test assesses a machine's ability to engage in natural language conversations in a manner indistinguishable from that of a human.
- The Turing test assesses a machine's computational speed and processing efficiency in comparison to human capabilities.
- The Turing test evaluates a machine's ability to mimic physical human actions, such as gestures and facial expressions.

Quiz:
STEM SMART Computer Science Week 30

Social and ethical issues with AI systems

Practice 2

LLM marked question

A company has recently started using an AI system to screen job applications. The AI system analyses applications and selects candidates based on specified criteria set by the company.

Identify two social or ethical impacts of using an AI system in the hiring process.

[2 marks]

Quiz:
STEM SMART Computer Science Week 30

ML types: 2

Practice 1

There are three main types of machine learning: supervised, unsupervised, and reinforcement.

For each of the definitions shown below, drag and drop the most appropriate type to the space alongside the definition.

Example	Level
A form of machine learning where the model is trained using trial and error. The model can be said to "learn" from mistakes and will constantly improve.	
A form of machine learning where the model is trained using labelled data. The model is trained to find the patterns, relationships, and features that map each piece of training data to its associated label.	
A form of machine learning where the model is trained on an unlabelled data set. The model must identify patterns, hidden relationships, or structures within the data.	

Items:

Reinforcement learning | Supervised learning | Unsupervised learning

Quiz:
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ML applications: 2

Practice 2

Many of us use online streaming services to listen to and organise our music.

Which of the following features of a music streaming service would benefit from using machine learning?

- Recommending a playlist based on the songs you commonly listen to.
- Adding a song to your favourites when you select the 'thumbs up' icon.
- Calculating how many minutes of music you listen to during the day.

Quiz:
STEM SMART Computer Science Week 30

ML models: lifecycle

Practice 2

A project lifecycle refers to the series of phases or stages that a project progresses through, from initiation to completion.

Place the stages of developing a machine learning model into a logical order.

Available items

- Explaining the model
- Preparing the data
- Training the model
- Defining the problem
- Testing the model
- Evaluating the model

Quiz:
STEM SMART Computer Science Week 30

ML models: testing and evaluating

Practice 2

A machine learning model has been developed to identify birds from their sound alone.

Part A

Whilst testing and evaluating the model, the developers found the following results. Which one of them is an indication of **bias** in the machine learning model?

- The average accuracy across all birds is 68%.
- The model is unable to identify human speech from sound.
- The app is 96% accurate for pigeons and 48% accurate for blackbirds.

Part B

Whilst testing and evaluating the model, it was found that it appeared to be biased against blackbirds. Which **two** of the following actions could the developers take to improve their model?

- [ ] Add audio samples of humans and other animals in a variety of environments.
- [ ] Add more audio samples of a wide variety of birds.
- [ ] Add audio samples of blackbirds in different conditions such as close up or far away.

ML engines: decision trees

Practice 2

Decision trees are engines that are a common component of many machine learning models.

A decision tree is made up of nodes that can be described as root, leaf, or decision nodes. Which **two** of the following types of node would contain a condition?

- [ ] Root node
- [ ] Decision node
- [ ] Leaf node