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A company employs a team of programmers to develop software to control a fleet of driverless cars, providing a taxi service for clients in a large city.

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Discuss a range of moral, ethical, legal and cultural issues that the programmers may need to consider whilst developing the service and that may arise during the use of the service by the public.

In your answer you will be assessed on your ability to follow a line of reasoning to produce a coherent, relevant and structured response.

[9 marks]

[illegible]

[illegible]

There have been some cases where law enforcement officers have requested a phone manufacturer to bypass access restrictions on a phone that they believe contains evidence of criminal activity. The manufacturers frequently refuse to do so.

In your answer you will be assessed on your ability to follow a line of reasoning to produce a coherent, relevant and structured response.

[illegible]

[illegible]

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The managers of a care home expect all of their residents to wear a Personal Emergency Response System (PERS) device. This is a device which residents wear around their neck and has a button that can be used to summon help should they feel unwell or require assistance.

A company has developed a life-blogging device. Like the PERS device it is worn around the neck. The life-blogging device monitors bodily signs such as blood pressure and heart rate as well as recording audio and video. The data collected are sent to a server and all of the data collected on the server can be accessed via a website.

The care home managers are considering using the life-blogging system instead of PERS so that the staff can monitor the residents' data. The life-blogging system will allow the care home to respond more quickly to an emergency situation and deal with situations where the resident is not capable of pushing a button. The managers are considering not telling the residents about the new device as they think it may confuse them.

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Discuss any moral, ethical, legal and cultural issues that the care home managers should consider before introducing the new life-blogging devices.

[9 marks]

[illegible]

An international technology company produces a smart speaker for use in homes. The smart speaker can be controlled by a user providing voice commands, which means the device must always be listening for audio input. The company stores audio recordings of each user to analyse when improving its voice recognition algorithms. The audio recordings are compressed using lossy compression and then sent over the Internet to be stored at the company's headquarters.

You will be assessed on your ability to follow a line of reasoning to produce a coherent, relevant and structured response.

[illegible]

[illegible]

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A clothing company has developed an application that allows a user to take a photograph of themselves on their mobile phone and upload it to their account on the company servers. The application will then use artificial intelligence to recommend new clothes that it computes will suit the user based on their preferences and the application's own interpretation of the way they look. It will then generate images of the user wearing the recommended clothes.

The user can preview the images and either buy the clothes from the company or use the generated images by linking to them from social media accounts.

Describe how a digital camera would work when capturing a photograph of the user for the application **and** discuss the moral, ethical, legal and cultural issues that developers of the application may have had to consider while developing it.

[9 marks]

[illegible]

A company provides a social media service through which members can share information about themselves and view information and news from their friends.

The service also displays current affairs news stories to its members. The service does not have journalists who write the stories but instead it uses algorithms to select news stories written by other organisations and individuals and shows these. Different news stories may be shown to different members.

Discuss:

- how algorithms might determine which current affairs news stories to display to an individual member
- the moral, ethical and legal considerations that the developers of the system and its operators should consider in relation to how the algorithms work and which news stories are displayed.

[6 marks]

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There are no margins, text, or other markings on the page.

[illegible]

Big Data is an important application area for modern computer science.

- Describe what Big Data is, using examples to illustrate your description.
- Explain some of the challenges that Big Data brings with it and the approaches that can be taken to overcome these, in relation to programming and hardware.
- Consider some of the ethical and legal issues that might arise in applications that store data, particularly data about people.

[12 marks]

[illegible]

[illegible]

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Supermarkets often gather information about their customers and the purchases that they make. This information can be analysed by the supermarket and other companies for a range of purposes.

Some of the information is collected at the checkout, where the identity of the person is read from a loyalty or payment card using RFID (radio-frequency identification) and a barcode reader is used to identify the products being purchased.

By analysing the purchases that a shopper has made, it might be possible to identify such things as whether the shopper has children, is pregnant, or lives in a house with a garden. Other types of analysis might include the amount of money a customer spends, the times that they choose to shop at and the differences in shopping habits of different groups of shoppers.

Describe the principles of operation of the hardware used to collect the information **and** discuss some of the ethical and legal issues that might arise as a result of the capture and processing of this data.

In your answer you will be assessed on your ability to follow a line of reasoning to produce a coherent, relevant and structured response.

[12 marks]

[illegible]

[illegible]