

**5** A bank allows customers to access their accounts using an application that they can download onto a device such as a smartphone.

**(a)** The system that allows customers to access their accounts using the application is a client-server model.

Describe the roles of the different devices in this model.

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**(b)** The bank wants to protect the integrity of its data while transferring the data to other banks. Parity check is one example of data verification.

Complete the description of parity check when Computer A is transmitting data to Computer B.

Computer A and Computer B agree on whether to use ..... parity. Computer A divides the data into groups of ..... The number of 1s in each group is counted. If the agreed parity is ..... and the group has an even number of 1s, a parity bit of 1 is appended, otherwise a parity bit of 0 is appended.

In a parity ..... check the bytes are grouped together, for example in a grid. The number of 1s in each column (bit position) is counted. A bit is assigned to each column to make the column match the parity. These parity bits are transmitted with the data as a parity .....

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**(c)** The bank also needs to keep its customers' data private and secure.

**(i)** The bank's network has a firewall.

Explain how a firewall can help protect the customers' data.

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**(ii)** Customers need to use biometric authentication to access their accounts. One biometric authentication method is facial recognition.

Facial recognition uses Artificial Intelligence (AI).

Describe how AI is used in facial recognition.

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