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Information technology in a global society
Standard level
Paper 1

Friday 4 November 2022 (afternoon)

1 hour 30 minutes

Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Answer two questions. Each question is worth **[20 marks]**.
- The maximum mark for this examination paper is **[40 marks]**.

Answer **two** questions. Each question is worth [20 marks].

1. Virtual learning environments

A new university is being developed to offer online degree courses through a virtual learning environment (VLE) (see **Figure 1**). This initiative will enable students from anywhere in the country to access higher education.

Each university lecturer records their lectures and transfers them to the cloud for remote access by the students.

Figure 1: A virtual learning environment



(a) (i) Identify **two** hardware devices that a university lecturer could use to record a lecture. [2]

(ii) Identify the steps that a university lecturer may use to upload course material to the virtual learning environment (VLE). [4]

(b) The university needs to choose between open-source software and proprietary software to develop the virtual learning environment (VLE).
Analyse these two options. [6]

(c) Students are in the process of selecting a university to complete their degree. They have two options:

- **Option 1:** A traditional university using face-to-face environments.
- **Option 2:** A university only offering online courses using a virtual learning environment (VLE) platform.

Evaluate these two options. [8]

2. The use of simulators to train military personnel

An army has developed a simulator to train its soldiers (see **Figure 2**). The simulator uses high-resolution images to represent the local environment. It allows a soldier to click on any region on a virtual globe and train in that environment.

To restrict access to the simulator, the army requires soldiers to use biometric authentication.

Each soldier is also provided with documentation that explains how to use the simulator.

Figure 2: Simulation-based training



- (a) (i) Identify **two** file formats that could be used to save an image in the simulator. [2]
- (ii) Define the term *image resolution*. [2]
- (iii) Identify **two** biometric authentication methods that could be used to access the simulator. [2]
- (b) (i) Distinguish between a model and a simulation. [2]
- (ii) Explain why the quality of user documentation is important for the success of the simulator. [4]
- (c) To what extent do the benefits of using simulators for training soldiers outweigh the concerns? [8]

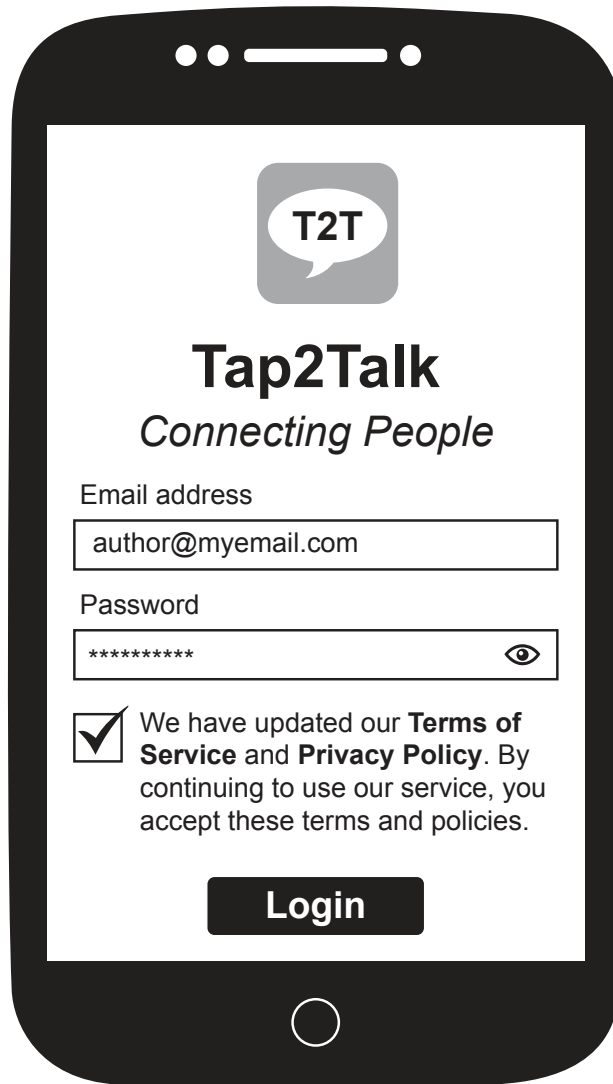
Turn over

3. Messaging apps*

Tap2Talk is a messaging app with over two billion users worldwide. The app lets users chat, text, make voice calls and video calls, share media and receive notifications. The data that is shared between users is encrypted.

Tap2Talk frequently reviews and updates its terms of service and privacy policy. To continue to use *Tap2Talk* services, users must agree to the changes (see **Figure 3**).

Figure 3: The *Tap2Talk* app



Users can choose whether to store their data, such as logs of their chats, audio files, video files, and documents, on their mobile device or on a *Tap2Talk* cloud-based server.

* apps: small specialized programs run on mobile devices, the internet, a computer or other electronic devices

(This question continues on the following page)

(Question 3 continued)

- (a) (i) Identify **two** disadvantages of a user’s data being stored on their mobile device. [2]
- (ii) Identify **two** characteristics of encrypted data. [2]
- (iii) Identify **one** advantage for *Tap2Talk* users of receiving notifications. [1]
- (iv) Identify **one** disadvantage for *Tap2Talk* users of receiving notifications. [1]

- (b) A number of *Tap2Talk* users are concerned about ticking a single check box to agree to the new terms of service and privacy policy (see **Figure 3**).

Explain why *Tap2Talk* users might be concerned about ticking a single check box to agree to the new terms of service and privacy policy. [6]

- (c) *Tap2Talk* has decided to share its users’ data with a third party, *GlobalConnect*. This will mean that all user data, such as text messages, locational information and media, will be held in *GlobalConnect*’s database.

Discuss the impacts of this decision for *Tap2Talk* users. [8]

4. Electronic health records in a hospital

A hospital in Philadelphia, USA, is increasingly using digital technologies, such as electronic health records (EHRs), wireless medical devices and other mobile technologies.

Patient data is shared between departments in the hospital using a local area network (LAN). To access the LAN, users are provided with a user identification (ID) and required to use two-factor authentication. The patients' data are stored in a relational database held on the hospital server.

- (a) (i) Identify **two** features of a local area network (LAN). [2]
 - (ii) Identify **two** technologies used in a local area network (LAN). [2]
 - (iii) Identify **two** disadvantages of using wireless connectivity in the hospital. [2]
 - (b) (i) Distinguish between the identification of a user and the authentication of that user on a network. [2]
 - (ii) Explain why a relational database would be used to store the patients' data. [4]
 - (c) The state health department has proposed a plan to centralize patient records and connect all hospitals to create a state-wide electronic health record (EHR) system.
Discuss whether this state-wide EHR system should be developed. [8]
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References:

Figure 2. Berner, A., 2013. *Virtual reality training*. [image online] Available at: https://commons.wikimedia.org/wiki/File:Virtual_reality_training_130417-A-BZ540-114.jpg [Accessed 8 July 2021].

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