Digital environments assessment – Answers

Q1. In the TCP/IP model, protocols are organised into layers. One of these layers is

the transport layer.

1. Name **one** protocol that operates in the transport layer.

Your answer may include one of these: **TCP, UDP**

1. Name **one other** layer in the TCP/IP model.

Your answer may include one of these: **Application, Internet, Link**

Q2. A Redundant Array of Independent Discs (RAID) is a virtualisation technology

used for data storage. Describe how RAID 10 stores data.

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| **RAID 10 is essentially two blocks of RAID 1 combined in RAID 0 (RAID 1 + 0).**  **RAID 10 requires a minimum of four disks.**  **Blocks are striped and mirrored resulting in excellent performance and redundancy.** |

Q3. A company is developing a new smart doorbell system.

The doorbell will connect wirelessly to the internet via the owner’s home network. The doorbell is automatically activated when it detects motion and the owner will get instant notifications on their smartphone.

The system will allow the owner to see, speak to, and hear visitors using the smartphone app.

The doorbell will contain input and output devices.

State **one** inputdevice that could be used in the doorbell.

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| **A microphone.**  **Other answers could include; camera, movement sensor, button for ringing the bell** |



Q4. Data is transmitted across a network in packets.

State **one** field that is typically contained in a packet header.

**Destination address, origin address, sequence/packet number, number of packets in file, checksum**

Q5. Describe **two** features of Integrated Development Environments (IDEs).

1. **Autocomplete: The IDE will predict the next word(s) or symbol(s) when the user is writing code. For example, it may provide a closing bracket when the user types in an opening bracket.**

2. **Keyword highlighting: The IDE will colour-code different elements in the program code such as variables and command words. This helps improve readability of the code.**

**Other answers could include: syntax checking, debugging tools, runtime environment, automatic line numbering, automatic formatting**

Q6. An airline operator uses a computerised system.

The system allows passengers to check whether a flight has available seats and

to reserve and book particular seats on a flight.

These systems run a real-time operating system.

Explain why a real-time operating system is suitable for this purpose.

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| **A real-time operating system responds to events or inputs within a guaranteed time frame. This is important in applications where the response time is critical.**  **The passenger will need to have real-time data about which seats are currently available and how much they are going to cost. If the system did not use a real-time operating system a passenger may book a seat that has just been booked by another passenger and this would result in the plane being overbooked and passengers being refused entry to the flight when they arrive at the airport.** |

Q7. Complete the table to correctly identify the type of main memory

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| **ROM (Read Only Memory)** | Stores the boot sequence set by the manufacturer. Is read only and non-volatile, meaning that stored data is not lost when the device is switched off. |
| **RAM (Random Access Memory)** | Stores data and instructions during processing. Is read and write, and is volatile, meaning that data is lost when the device is switched off. |

Q8. An architectural company designs buildings. Its employees work both in the office

and from home.

To accommodate this hybrid way of working, the company is planning to use a

cloud-based storage solution.

Explain **one** risk associated with cloud storage that the company should consider.

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| **By using a cloud storage system the architectural company is passing responsibility for the storage and security of their data on to the cloud service provider. If the cloud service providers hard drives fail, and there is not a complete backup of data, then the architects could lose their files. If data is permanently lost, this would have a disastrous effect on the business affecting work in progress for customers. Drawings would have to be done again resulting in delays for the customer and extra costs for the business.** |

Q9. A local council runs public libraries at several locations. As well as having a stock

of books, each library has several computers that can be used by the public. The

computers can be used to search the library book catalogue, as well as for

personal use and to access the internet.

The council is under constant pressure to limit its spending to keep the rate of council tax as low as possible.

Evaluate the suitability of a thin client networkfor use in the library.

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| **Thin client computers are typically lower cost because they are lower specification machines which would meet the council’s need to minimise costs. The purpose of these computers is for internet access and typical work-based tasks which do not require high performance machines.**  **Managing the software across a thin client network is easier, as all applications are installed on a central server. This means that software only needs to be updated in one place.**  **In a thin client model, more processing load is put on the server, which means the local council would have to spend money on a powerful server.**  **A thin client also needs a fast, robust network due to the increased network traffic required. It may be that the libraries do not have sufficient enough network connections for this.**  **In conclusion, a thin client model would be suitable for computers in the libraries. It would centralise and make updating computers across the county council quicker and more efficient, and would minimise costs.** |

Q10. A coffee shop chain has decided to install tablet devices at the point of exit from

their stores. The devices will be used to collect feedback from customers on the

customer service they have received during their visit.

The tablet devices will allow the customers to rate their experience by selecting an appropriate emoji and will also offer customers the opportunity to provide more detailed feedback by typing in text.

Evaluate the suitability of using tablet devices for this purpose.

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| **Tablet devices would be suitable for collecting feedback from customers because it has a touchscreen that could be quickly pressed by customers as they leave the coffee shop. Tablet devices are very simple to use, so even customers who are not used to using computing devices should be able to successfully leave feedback. Most tablet devices also have a reasonably sized screen, which would allow customers to easily see what they are being asked to do. The tablet device could be easily attached to a wall or stand near the exit of the coffee shop.**  **Tablet devices are fragile so could get damaged if they are not protected in a suitable case or housing. Tablet devices are also expensive, and it may be unnecessary for the coffee shop to invest in this hardware to just collect feedback. The coffee shop could still collect feedback by using alternative hardware.**  **In conclusion, the tablet devices would be suitable for collecting feedback from customers in the coffee shop. They would be easy to install and set up, and customers would find them easy to use. The coffee shop would have to protect the tablet from damage by putting it in a suitable case or housing.** |