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MARKSCHEME

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INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Standard Level

Paper 1

9 pages

1. (a) Distinguish between the terms *computer virus* and *computer worm*. *[2 marks]*

*Award **[1 mark]** for a definition of a virus and **[1 mark]** for a different definition of a worm.*

A virus
- malicious code
- designed to replicate itself
- attaches to other files

any point for ***[1 mark]***

A worm
- does not attach itself to a file
- can travel independently across a network

either point for ***[1 mark]***

Reward other acceptable answers only with the approval of the team leader.

(b) Outline *two* actions of employees that could increase the risk of a virus infecting their company's computers. *[2 marks]*

*Award **[1 mark]** for each action outlined.*

Actions could include:
- opening email / attachments containing executable code from people they don't know.
- not reporting any irregularities in the functioning of their computer to the company's technician.
- using pirated / unauthenticated software (as this could contain viruses).
- using discs (accept other storage devices) brought from home etc.
- not using / switching off virus checker software

Reward other acceptable answers only with the approval of the team leader.

(c) Explain *one* type of damage caused by a *computer virus*. *[2 marks]*

*Award **[1 mark]** for identifying one type of damage, and a further **[1 mark]** if it is fully explained.*

- sending email to the addresses in the recipient's address book ***[1 mark]*** *additional explanation* e.g. thereby clogging up mail servers ***[1 mark].***
- deleting files on the recipient's hard disk ***[1 mark]*** *additional explanation* e.g. example of how this can cause a problem ***[1 mark]***.
- causing instability of the computer system ***[1 mark]*** *additional explanation* e.g. example of how this can cause a problem ***[1 mark]***.
- giving out information from the recipient's hard disk ***[1 mark]*** *additional explanation* e.g. example of how this can cause a problem ***[1 mark]***.
- causing the memory to fill up ***[1 mark]*** *additional explanation* e.g. example of how this can cause a problem ***[1 mark]***.

Reward other acceptable answers only with the approval of the team leader.

(d) Describe *two* procedures that a company can implement to reduce the chance of losing valuable data due to a virus attack. ***[4 marks]***

*Award **[1 mark]** for identifying a relevant procedure, and a further **[1 mark]** for additional description.*

- virus checking software is installed on all network computers ***[1 mark]*** *additional description* e.g. example of how it is done or how this can help to reduce chances of losing data ***[1 mark]***.
- virus definitions are regularly updated ***[1 mark]*** *additional description* e.g. example of how it is done or how this can help to reduce chances of losing data ***[1 mark]***.
- virus scanning software is installed on the email server ***[1 mark]*** *additional description* e.g. example of how it is done or how this can help to reduce chances of losing data ***[1 mark]***.
- all company data is regularly backed up ***[1 mark]*** *additional description* e.g. example of how it is done or how this can help to reduce chances of losing data ***[1 mark]***.
- a network use policy is provided for all employees ***[1 mark]*** *additional description* e.g. example of how it is done or how this can help to reduce chances of losing data ***[1 mark]***.
- monitor employees working on computers for any action that would possibly allow a virus to enter the system ***[1 mark]*** *additional description e.g.* example of how it is done or how this can help to reduce chances of losing data ***[1 mark]***.

Reward other acceptable answers only with the approval of the team leader.

2. (a) Define the term *spam*. ***[2 marks]***

*Award **[1 mark]** each to a maximum of **[2 marks]**.*

Spam is

- unsolicited email
- email sent to bulk recipients
- is often advertising
- email sent by automated process
- illegal email

(b) A commercial organization has over 200 staff working online in its main office. Describe *why* spam is a problem for this organization. ***[2 marks]***

*Award **[1 mark]** for each reason up to a maximum of **[2 marks]**.*
Or
*Award **[1 mark]** for a reason and a further **[1 mark]** for the description of that reason up to a maximum of **[2 marks]**.*

- staff will choose to read email messages they know are relevant, leaving large quantities of unread email stored ***[1 mark]***
- spam will affect the efficiency of the server ***[1 mark]***.
- wastes time removing / reading ***[1 mark]***
- reduced productivity ***[1 mark]***
- the introduction of viruses to the company's system ***[1 mark]***.
- spam can incur huge costs ***[1 mark]***.

(c) Discuss *one* step that an ISP can take and *one* step that a government can take to reduce *spam*. *[6 marks]*

*Award **[1 mark]** for identifying a step that can be taken by the ISP, and up to a further **[2 marks]** for a full discussion. Similarly award **[1 mark]** for identifying a step that the government can take, and up to **[2 marks]** for a full discussion. Total maximum **[6 marks]**.*

ISP step:

- ISP can use spam filtering software ***[1 mark]***. Such software identifies probable spam ***[1 mark]*** additional discussion e.g. quarantines the messages / allows identification of the source ***[1 mark]***.
- ISP can 'educate' its members on how to identify spam and how to deal with it ***[1 mark]***. ISP can encourage its members to use personal preferences to block further email from 'rogue' senders / report spam, ***[1 mark]*** additional discussion e.g. report spam to the ISP, so that it can take action against them ***[1 mark]***.

Government step:

- The government can introduce legislation controlling the use of bulk emails. ***[1 mark]***. The consequences could be a penalty such as a fine ***[1 mark]*** additional discussion e.g provisions would have to be made for some exceptions (similar to the exceptions for ordinary bulk mailing, e.g. the opportunity for consumers to register their preferences, as some people enjoy receiving unsolicited advertising 'mail-shots') ***[1 mark]***.

3. (a) Distinguish between *freeware* and *shareware*. ***[2 marks]***

*Award **[1 mark]** for a definition of freeware and **[1 mark]** for a definition of shareware.*

Freeware

- software that incurs no cost (reject simply the word "free" if software not specified)

[1 mark]

Shareware

- an implied cost
- trial period

either point for [1 mark]

Reward other acceptable answers only with the approval of the team leader.

(b) Describe *one* disadvantage of *freeware*. ***[2 marks]***

*Award **[1 mark]** for identifying a relevant disadvantage, and a further **[1 mark]** if it is fully described.*

- freeware is often 'pre-mature' software, which has not been fully tested ***[1 mark]***. So it may contain bugs that cause problems during use and/or loss of data ***[1 mark]***.
- freeware comes with no warranty / may be unknown origin ***[1 mark]*** can be insufficiently tested and / or deliberate errors / unexpected effects ***[1 mark]***.

Reward other acceptable answers only with the approval of the team leader.

(c) *Open source* software is becoming very popular. Discuss *two* impacts of this increased popularity. ***[6 marks]***

*Award **[1 mark]** for each impact identified. Award up to a further **[2 marks]** for a full discussion of each impact, to a maximum of **[6 marks]**.*

- o-s software can help reduce software piracy ***[1 mark]*** cost of the legitimate version is too high ***[1 mark]*** plus further discussion e.g. access to broadly equivalent software (e.g. Open Office vs MS Office) allows them to be able to transfer compatible files with users of the MS version without breaking the law ***[1 mark]***.
- o-s software is helping to bridge the gap between IT-rich and IT-poor countries ***[1 mark]*** excessive cost is no longer a barrier ***[1 mark]*** plus further discussion e.g. since open source software is available world wide via the Internet ***[1 mark]***.
- o-s software is encouraging more would-be programmers to become involved in development of software ***[1 mark]*** encourages collaboration / learning programming ***[1 mark]*** plus further discussion e.g. upgrades can be produced much faster for open source software as any programmer can work on the code ***[1 mark]***
- o-s software reduces costs / can provide greater security and provides viable alternatives to commercial software ***[1 mark]*** possible for end users to adapt software to fix known security holes ***[1 mark]*** plus further discussion e.g. this is not possible with proprietary products as source code is unavailable ***[1 mark]***

Reward other acceptable answers only with the approval of the team leader.

4. (a) State *one* type of software that could be used in Pearl and explain how it would help it to perform its duties. ***[2 marks]***

*Award **[1 mark]** for identifying a type of software and a further **[1 mark]** if it is fully explained.* ***[2 marks max]***

- Navigation software or description ***[1 mark]*** valid reference to how it helps the elderly user e.g. robot movement is independent of directions from elderly user ***[1 mark]***.
- Speech recognition software ***[1 mark]*** valid reference to how it helps the elderly user e.g. allows voice input / does not have to enter commands manually ***[1 mark]***.
  Tracking / monitoring software ***[1 mark]*** valid reference to how it helps the elderly user e.g. to monitor the user's movements / condition ***[1 mark]***.
- Communications software ***[1 mark]*** valid reference to how it helps the elderly user e.g. to communicate with a central care office ***[1 mark]***.
- Software to accept data from touch screen ***[1 mark]*** valid reference to how it helps the elderly user e.g. allows easy input of commands ***[1 mark]***.
- Any reference to software that controls robot's movement ***[1 mark]*** valid reference to how it helps the elderly user e.g. reference to any mechanical task ***[1 mark]***.

(b) Identify *one* possible input device and *one* possible output device that could be part of Pearl. ***[2 marks]***

*Award **[1 mark]** for an input device and **[1 mark]** for an output device identified.*

Input

- touch screen / key pad
- camera
- microphone
- any sensor

Output

- any mechanical part e.g. arm / claw / motor / actuator
- speaker
- screen

This should relate to specifically robot peripherals. Reject any answer that relates to standard PC - peripherals e.g. do not accept mouse, standard keyboard, printer.

(c) Discuss *one* use of Pearl to assist the elderly. ***[3 marks]***

*Award up to a maximum **[3 marks]** for a use fully discussed. **[1 mark]** should be awarded for identifying the use, **[1 mark]** for partially discussing the use, or **[2 marks]** for a full discussion.*

Do not allow answers which are repeats of (a).

reminding the elderly person when to take medicines ***[1 mark]*** plus additional description of how this can be done e.g. voice / beep ***[1 mark]*** plus further discussion e.g. reminder if not taken ***[1 mark]***

carrying objects ***[1 mark]*** plus additional description of how this can be done e.g. claws for gripping objects ***[1 mark]*** plus further discussion ***[1 mark]***

monitoring vital signs and recognise unusual readings ***[1 mark]*** plus additional description of how this can be done e.g. temperature sensor ***[1 mark]*** plus further discussion e.g. document details to a care centre ***[1 mark]***

detecting unusual circumstances e.g. in elderly person's position ***[1 mark]*** plus additional description of how this can be done e.g. person has fallen over ***[1 mark]*** plus further discussion e.g. alert care centre ***[1 mark]***

communicating with a central base enabling experts to interact with the elderly person ***[1 mark]*** plus additional description of how this can be done e.g. voice output ***[1 mark]*** plus further discussion e.g. reassurance / responds to needs / questions ***[1 mark]***

(d) Discuss *one* ethical consideration when introducing robots like Pearl for assisting elderly people. ***[3 marks]***

*Award up to a maximum of **[3 marks]** for an ethical consideration fully discussed. **[1 mark]** should be awarded for identifying the consideration, **[1 mark]** for a partial discussion or **[2 marks]** for a full discussion.*

Ethical consideration - Reliability
The robot is programmed and a software bug could result in incorrect readings ***[1 mark]***. This could result in wrong doses of medication, failure to notify of unusual circumstances ***[1 mark]***. Given the numbers of elderly people and the likelihood that some would otherwise be home alone the robot is a good idea. Reliability can be less of a concern if thorough testing is carried out. Human contact can also intervene and phone contact could be made at regular intervals. ***[1 mark]***.

Ethical consideration - Privacy
Privacy may be a concern as the elderly person's vital health information is relayed to the robot. ***[1 mark]***. Who has access? Is it secure? Is it encrypted during transfer to the central care office? ***[1 mark]***. Encryption is becoming harder to break so security measures can be put into place to overcome the ethical concerns ***[1 mark]***.

Ethical consideration – Equal Access
Such devices should be available to all ***[1 mark]*** cost issues ***[1 mark]*** usability issues ***[1 mark]***.