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INFORMATION AND COMMUNICATION TECHNOLOGY

0417/11

Paper 1 Theory

October/November 2023

1 hour 30 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use an HB pencil for any diagrams, graphs or rough working.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [].
- No marks will be awarded for using brand names of software packages or hardware.

This document has **16** pages. Any blank pages are indicated.

- 1 A newsagent has created a database with fields to store details of each newspaper and magazine he sells. Part of the database is shown.

Product_number	Name_of_publication	Selling_price	Frequency	Publisher
1001	Wireless Times	\$1.50	Daily	Trinity Press
1015	The Daily Press	\$1.50	Daily	H W Brown
1034	OME	\$2.00	Monthly	Trinity Press

- (a) Tick (✓) the field name that would be the most appropriate primary key for the database.

- A Product_number ☒
- B Name_of_publication ☐
- C Selling_price ☐
- D Frequency ☐
- E Publisher ☐

A Primary Key is a field that holds unique data and is the field used to identify that record.

[1]

- (b) The newsagent has added a field called Bar_code to store the bar code number of the product.

Explain why a presence check is not a suitable validation check for the Bar_code field.

Not every publication has a bar code.

[1]

- (c) The newsagent could use a relational database rather than a flat file database.

Describe the advantages of using a relational database rather than a flat file database.

A flat file database stores its data in one table, organised by rows and columns. A relational database stores data in more than one linked tables stored in a file.

- Advantages
- Data is not duplicated unnecessarily
 - Queries can be created using many tables / Complex queries can be created
 - Reports can be created using many tables
 - Only have to input the data once into a relational database thus saves time.
 - Use data integrity which means no discrepancies in the data.

[4]

(d) From the data shown in the part of the database, identify the most appropriate data type for the:

(i) Selling_price

Numeric - since it is a currency. [1]

(ii) Name_of_publication

Alphanumeric / String / Text [1]

2 State the most appropriate word or phrase to complete each sentence.

(a) The type of data output from a sensor is

Analogue [1]

(b) The type of data read by a microprocessor is

Digital [1]

(c) The item of hardware that converts data from a sensor so a microprocessor can read it is

Analogue to Digital Converter (ADC) [1]

(d) The type of sensor that is used in a refrigerator is

Temperature sensor [1]

- 3 A group of students are carrying out a study of the quality of river water for a project. They can either use a tablet computer or a smartphone to monitor and record their findings.

(a) Discuss the advantages and disadvantages of using a tablet computer rather than a smartphone for this project.

Advantages

- Larger screen to view/see the findings
- Larger on screen keyboard to enter the data
- Better software suited for the task
- Easier to connect devices onto a tablet

Disadvantages

- Smartphones are more portable and can be easily carried in a pocket
- Students are more likely to have smartphones compared to tablets
- If cameras are to be used, it is easier to use a camera with a smartphone

[6]

(b) Identify two devices that could be used by the students to enter data.

1 Touchscreen

2 Microphone

Camera

Keyboard

[2]

- 4 A headteacher is considering setting up a card system for students to buy food in the school canteen.

The headteacher is trying to decide whether to install a system that uses magnetic stripe card readers or one that uses chip and PIN card readers.

Compare the use of magnetic stripe card readers with the use of chip and PIN card readers. Your answer must include similarities and differences.

Magnetic stripe readers are used to read information on the magnetic stripe found on credit/debit cards. The stripe contains useful info such as account number. Chip and PIN card readers are similar to smart card readers but are used at EFTPOS terminals. Device has a slot into which the card is placed and chip read, PIN is entered using a keypad.

Similarities

- Both readers are in direct contact with the card.
- Both devices can cause wear and tear on the cards.
- Both are input devices.

Differences

- For the chip and PIN readers, the user needs to know the PIN.
- The chip and PIN reader is susceptible to shoulder surfing.
- Chip and PIN readers prompts the user to enter a PIN.
- Chip and PIN readers is more secure as a PIN is needed.
- A magnetic stripe card can be used by anyone as no PIN is needed.
- Transaction on a magnetic stripe card are faster.
- Less data entry ^{errors} using a magnetic stripe as no manual input. [6]

- 5 A bridge and a router are examples of networking devices.

(a) Explain the differences between a bridge and a router.

A bridge is a device that connects one LAN to another that use the same protocol. They connect different parts of a LAN to function as a single LAN. Routers are used to route data packets from one network to another network, based on IP addresses. [2]
A bridge connects two LANs that use the same protocol to create a single LAN from separate parts. A router allows data packets to be sent to LAN/WAN. A router connects a LAN to a WAN.

- (b) IP addresses are used in computer networks.

Explain what is meant by an IP address.

An internet protocol address is a unique identifier.
Devices on the same network have different IP addresses
and all are assigned a unique IP address.
An IP address is used to determine the electronic location of a device/
identify the location of a device in a network.
IPv4 addresses are based on 32 bits and written in four groups of decimal digits.
IPv6 addresses use 128 bits and written in eight groups of hex digits.

[4]

- (c) Explain the purpose of a routing table.

A routing table is used to determine where data packets will be directed. It stores route information and IP addresses.
It stores computer addresses in the router's immediate network and information about other routers.

[2]

- 6 A cricket club secretary saves a list of players as a PDF file.

- PDF = Portable Document Format is a document which has been converted into an image format.
- (a) Describe two disadvantages of saving the list of players as a PDF file.

More difficult to edit the PDF
PDFs sometimes render incorrectly.
Need PDF editors/editing software/viewers to edit/view.

[2]

The cricket club has a junior team for 6–8-year-old players. The secretary has produced an ePublication to attract new members to the junior team.

(b) State **two** features of an ePublication that could **not** appear on a paper poster.

- 1 Audio - Animation
- 2 Ability to change to different languages - Interactivity
Text to speech
Video
Accessibility

[2]

(c) Describe the features that could be used to make the ePublication attractive to a younger audience.

- Features
- Cartoons
- Sounds/ Sound effects
 - Videos
 - Animations
 - Bright colours
 - Include more pictures than text
 - Simple and clear wording / Use of short sentences
 - Larger text fonts than easier to read
 - Use of white spaces to break up the text and make it easier to read
 - Games/ Activities for content can be used

[6]

7 An employee in a company has used QWERTY123 as his login password for some time.

(a) Give **three** reasons why this is **not** advisable.

- 1 - This password is easy to guess
- This password is not strong
- 2 - Easy to shoulder surf
- Letters and numbers are in sequence on the keyboard
- 3 - Should be regularly changed to secure login

[3]

(b) Complete the sentences using the most appropriate data protection method from the list. Your answers must be different in each case.

Anti-spyware Biometrics A digital certificate A dongle
Encryption A firewall Two-factor authentication User ID

(i) A method which scrambles the data so that it cannot be understood is

Encryption - used to protect data in case it is hacked or easily accessed. [1]

(ii) A fingerprint is an example of

Biometrics - relies on certain unique characteristics of humans e.g. fingerprint, retina scan & signature recognition [1]

(iii) A method of guaranteeing a website is authentic is

Digital Certificate - is a pair of files stored on a users computer, used to ensure the security of data sent over the internet [1]

(iv) A hardware device that filters the information coming through the Internet connection into a LAN is

Firewall - hardware/software that sits between the users computer and an external network. Works by filtering incoming and outgoing traffic [1]

(c) An employee in the company uses his company password for other accounts.

Explain why this is **not** a good idea.

- If one finds the password for one of the systems, other accounts using the same password may be compromised. [1]

8 Microprocessor-controlled devices are used in the home.

Describe, with examples, how using these devices can affect the health and fitness of their users.

- Reduces the amount of time it takes to complete a task. Thus saves time for the user to do other things.
- The user does not need to be present when the device is working hence gives the user more/less exercise.
- Allows the user to use interactive game devices thus helps improve their fitness.
- When the device does not work, it makes the user lazy.
- Users do not do as much manual work thus less impact on their health.
- Using these devices eg gaming devices for long may cause RSI / repetitive strain injuries.

[6]

- 9 Rowena's laptop computer contains a small capacity Solid State Drive (SSD) of 32Gb and a large capacity Hard Disk Drive (HDD) of 1024Gb.

(a) State, giving a reason for your choice, a use for the SSD and a use for the HDD in the laptop computer. Your answers must be different in each case.

(i) SSD

Solid State Drive uses NAND technology to store data
Use: To store the operating system/games
Reason: Faster loading of the operating system/games

[2]

(ii) HDD

Hard Disk Drive uses magnetic technology to store data on moving platters.
Use: To store applications/software/data files
Reason: Can store more files/larger files

[2]

(b) The laptop computer also contains internal memory.

Give two examples of internal memory.

- 1 Random Access Memory (RAM) - internal chip that stores data files temporarily when running applications, is volatile
- 2 Read Only Memory (ROM) - nonvolatile memory used to store information that needs to be permanent

[2]

- 10 A teacher has set up a database for a class library. The data about the books in the class library will be entered by the teacher.

(a) The data can be verified by double data entry or visual verification.

Compare double data entry with visual verification. Your answer must include similarities and differences.

In double data entry, data is entered into a system twice, the sets of data are then compared by the computer, if there is a difference it is flagged as an error.

Visual verification also called visual check is checking for data entry errors by comparing the original paper documents with data entered into the computer.

Similarities:

- Both are used to check that data has been entered correctly.
- Both are used to check data against original data.
- Both ensure that the data has been transferred correctly.

Differences:

- In visual check, the user compares the data, computers do the comparison in DDE.
- Data is compared with the original data source for visual check whereas for DDE, data is compared for previously entered data.
- In double data entry, data is entered twice by the user(s) whereas in visual check, data is entered once.

[4]

- (b) When data is entered into a date field it is validated. An example of the data that could be entered is 01/04/2023

State two validation checks that could be used on this data.

- 1 Format check - checks if data input is in the correct format.
 - 2 Length check - checks if data input contains only the required no. of characters.
- Range check - checks if data input lies between an acceptable upper and lower values. [2]
- Type/character check - checks if data entered is of the correct type i.e. letter or number only.

- 11 Many Automatic Teller Machines (ATM) allow customers to print out mini statements of their bank accounts.

Describe the inputs and processing involved in printing out a mini statement.

Inputs

Insert card into ATM machine, the system reads the details on the magnetic stripes on the card. User enters the PIN and selects a language of choice. User accesses the menu and selects print mini statement option, selects the account and confirms.

Processing

- Checks if the card is correct/valid
 - Checks if account number is correct
 - Checks if the PIN is correct
 - If incorrect PIN is input three times, the card is retained
 - Checks if the correct account is selected
 - Sends a signal / communicates with the bank
 - Bank computer creates the statement
 - Details of the amount in the account are sent to the ATM
 - Details are sent to the printer
- [6]

12 A student has produced some work for a school project. A page of the work is shown.

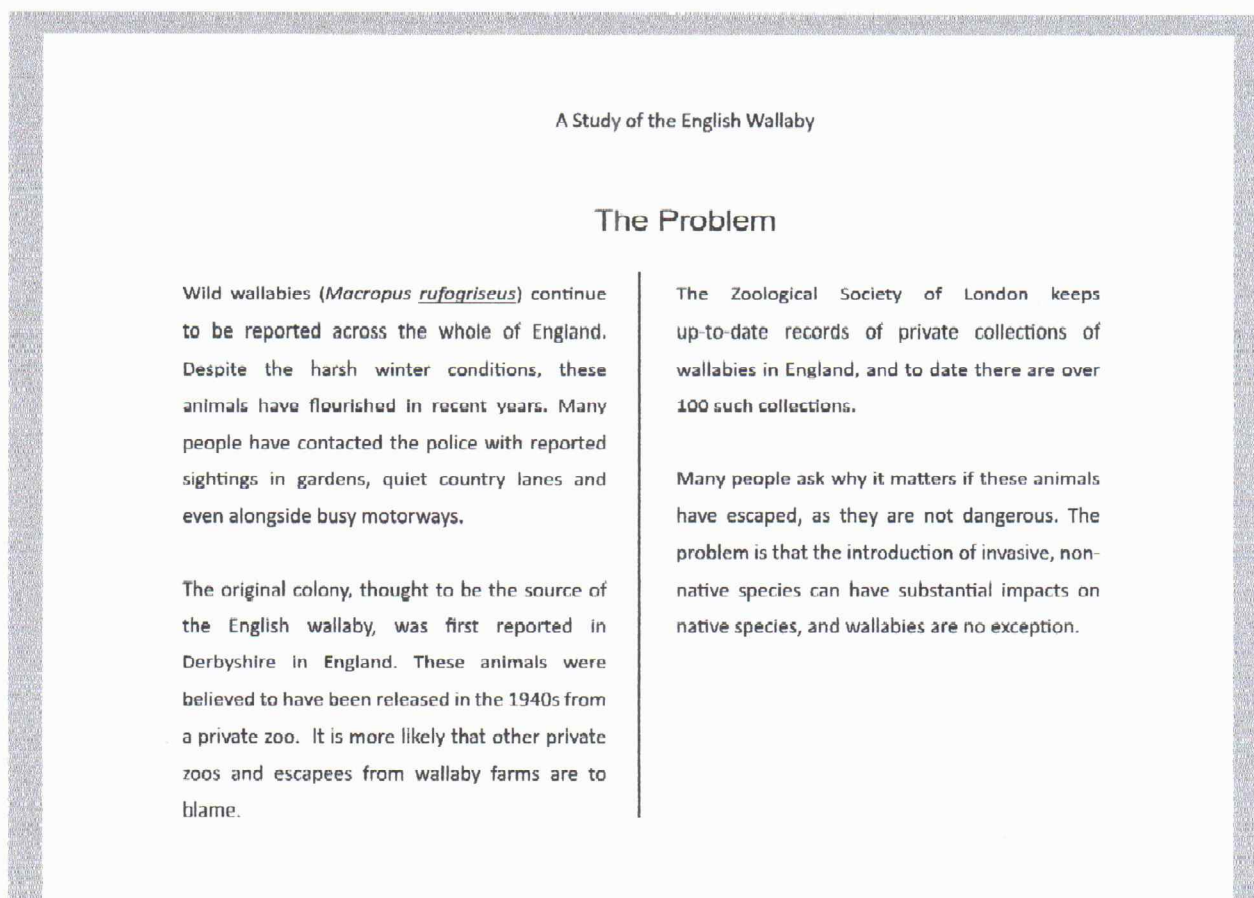


Fig. 12.1

(a) The student has placed a column break in his document.

Explain the purpose of setting a column break.

A column break is used to force the text into the top of the next available column, which may be on the same page or may be on the next page. The column break places a hard break in the location selected. This could help remove widows/orphans. [2]

- (b) After running a spell check and proofreading his document the student notices that one word is still showing an error.

Explain why this word has caused an error and how the student could ensure that the error does not reappear when this word is used in future.

The word does not appear in the dictionary.
The word is written in Latin and the dictionary is in English.
Add the word to the dictionary.
Set the dictionary to accept/allow scientific/Latin names [2]
Set the dictionary to ignore the word.