CPT 2 Revision Notes for June 2004 Examination Version 1.0

<u>Email</u>

Email is more conventional than regular postal service because

- Instantaneous delivery
- Cost
- Attachments
- 'Wont get lost in post'

Government agencies may routinely monitor email routed over the internet for the following reasons;

- to monitor criminal activity
- to monitor for viruses which could threaten economic well being

Individuals may make it difficult for such agencies by **encrypting data** – [Businesses may encrypt data to prevent fraud however]

Storage Mediums

	Storage Device
30kb file	Floppy Disk
2gb data	Hard Disk
Distribution of software	CD-ROM
package(s) 500mb	
Online database generated and	Hard Disk
used by police in the	
investigation of a major crime	
Electronic copy of an	CD-ROM
encyclopaedia	
companies information for 1	DVD-R
month (4GB)	

Suitable operating systems

Scenario	Operating system
Monthly payroll for a company	Batch
controlling guidance system of	Real Time
a cruise missile	
Computer used to control	Real Time
temperature inside an oven	
Computer system dedicated to	Batch
processing OMR forms at end of	
day	
controlling the anti-lock braking	Real-time
system of a racing car	
Monthly billing for a credit card	Batch
company	

A computer system consisting of several desktop PC's sharing	Network
each other's files	
dedicated to controlling the	Real time
flow of chemicals in a chemical	
processing plant	
dedicated to processing at the	Batch
end of each daya banks	
transactions on magnetic disk	
Reporters on a network can	Interactive
word-process articles	

Multi-Level directory system

Advantages

- ✓ Allows users there own directories
- ✓ Faster to locate files

File access rights

Examples

- Can set files to read only
- Can set files to 'hidden'

Data protection act 1984 / 1998

Why did the 'Data protection act' come about?

- Computers can store lots of private data
- Data is shared more easily due to networks
- Computer systems encourage information to be stored

2 other acts that relate to computer systems are;

- Data protection act 1998
- Computer misuse act

How does this relate to;

(a) Security Personal data must be kept secure(b) Integrity Personal data must be kept up-to-date

Copyright Act

- To copy material(s) of a website without authorisation/license
- Sell copies of software / distribute them
- Adapt copies of software

Computer Misuse Act 1990

Level 1 - Unauthorised access without criminal intent

Level 2 – Unauthorised access with criminal intent

Level 3 - Unauthorised modification with criminal intent

Security (prevention of misuse) – [Protection against loss or corruption of data]

- To further security companies could install CCTV cameras,
- use a fingerprint scanner
- use a retina scanner
- voice recognition

Integrity of data (database validation) – [Accuracy of data]

- Length check
- Range check
- Virus software

Optical mark recognition (process) [The device is an Optical Mark Reader]

- Used to read lottery tickets
- Used to read multiple choice questions in General studies examination

Magnetic swipe reader

• Reads credit/debit cards

What is a check digit? And why is it used?

- It is an extra digit calculated from the _____ code
- Used to detect if data has been corrupted

What is a primary key?

• Unique field of a record (unique attribute)

Why might storage space be wasted in databases?

- Repeating attributes
- Fixed length fields

Suitable file organisation

Scenario	File organisation
Locating a lottery ticket with all	Serial – all records have to be
6 winning numbers	examined
Each loan in a library	Serial
transaction file	Sequential

NB – To locate individual records quickly '*direct access*' should be used with an applied hashing algorithm which also minimises collisions

To generate a new file from a sequential file using a hashing algorithm, the following steps are taken;

Generate new file with sufficient empty records; Working from beginning of sequential file; Read next record; Hash <u>word field</u> to generate insertion position; Insert record at this position in new file;

Processing steps to checking whether a lottery ticket has a winning combination or not

- 1. Scan ticket
- 2. Check digit used to detect corruption
- 3. Numbers on ticket checked against draw results
- 4. Results displayed on till

Input devices

- Scanner
- Touch screen
- Barcode reader (Used to read barcode on an item in a supermarket)

Why use a network?

- Share printer
- Sharing of resources
- Communication between computers

Directory structures

The directory structure shown in the diagram contains a **root** directory (\) and three sub-directories, named **Work**, **Old** and **BackUp**.



The three sub-directories above would be stored in the **root directory** If a file with the same name were to be stored in;

- (a) root directory
- (b) sub directory, Backup

It would be eligible for certain file access rights, such as

- Read Only
- Hidden
- Execute only

Other types of resources managed by operating systems are;

- Processor
- RAM
- Hard drive

Information

Information collected	Purpose
Spending power of customer /	To price goods in a supermarket
Loyalty points total	accordingly
Purchasing habits of customer	Target customer with appropriate
-	special offers
Telephone No.	Direct marketing of goods

If this were a store card of some kind, certain rules would apply to it

- The customers permission to gather this data would have to be mandatory
- The information collection would have to be used for its intention
- Only information that is wholly relevant should be collected

Variable length record structure

Advantage	Disadvantage
Storage space is not wasted	Difficult to tell size of file

To search for a 'word' in a sequential file, the following steps are taken; Starts from beginning; Repeat

Read next record Test for a match Until end of list OR match made

Data inconsistency

This may arise in an application based on a separate file approach

• Two or more files share common data

A database approach *prevents* such data inconsistency arising via **controlling data access**

An independent file approach provides better security

Resources managed by operating systems

- Processor
- Hard disk
- Main memory

Definitions

"to provide a virtual machine" (role of an operating system) – OS hides complexities of hardware from the user

Archiving – Data is removed from online storage OR kept as reference

Batch operating system (Batch processing) – Processing from start to finish without user intervention

Direct access – Any record can be accessed independently of any other record **File** – Unit of storage, collection of records

File backing-up – A copy of the file is made which guards against loss of data or deliberate attempts of the same nature

Foreign Key – An attribute in one table but the primary key in another table **Index** – used to speed up searching

Interactive operating system – Direct communication with computer as program is running

Local disk drive – Physical disk drive connected to a desktop computer **Networked disk drive** – Remote disk drive

Non-text file – a file containing non-printable and non-readable characters **Real time processing** – Inputs are immediate and the system response is also immediate

Relational database - Collection of tables

Sequential file – Records/stores data in order, access starts at the beginning of the file and direct access is not possible

Serial file - Records and stores data in the order it was received

Smart Card – A card which is embedded with a memory chip and logic circuits **Text file** – A sequence of characters organised on a line-by-line basis which are printable and readable characters

Variable length record structure – Records in which the number of fields vary Virtual Machine – Hide complexities of data from user