UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Diploma

MARK SCHEME for the November 2004 question paper

CAMBRIDGE INTERNATIONAL DIPLOMA IN COMPUTING

Module 5216 Written Paper 1, maximum raw mark 90

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November 2004

CAMBRIDGE INTERNATIONAL DIPLOMA

MARK SCHEME

MAXIMUM MARK: 90

SYLLABUS/COMPONENT: 5216

Computer Systems, Communications and Software
Written Paper 1

UNIVERSITY of CAMBRIDGE
International Examinations

Question 1

(a)(i) Piece of hardware that allows data to be input to the processor. **[1]**

(ii) Piece of hardware that allows the processor to convey the results of its processing. **[1]**

(b) Input:
Bar code reader/laser scanner/light wand
Scans the barcode
recognises the thickness of bars
to allow interpretation of code number of item
Keyboard
to allow operator to input barcode/price/details
in case bar code reader cannot read barcode
to allow input of codes from items that have no printed barcode
Swipe card reader/chip reader
to read data from card (credit/debit/bank)
to send details of amount and customer to bank/computer
Scales
to measure weight of items
Customer keypad
to input PIN
Output:
Printer
to print till receipt
LCD
to show purchase details/cost of item
Buzzer
to confirm reading of code
(Any 2x2 input and 1x2 output, max 6) **[6]**

Question 2

(a) Large amounts of data
large number of customer statements to be produced
Data processing of similar type
simple calculations to work out balance
standard form of statement
Processor time available in quiet time
statements do not need immediate attention
uses large amount of resources
No human intervention
all details present on files so no outside interference
(Max 6) **[6]**

(b) Indexed sequential

file needs to be sequential for batch processing/match up with TF/ensure no records missed

file needs direct access for queries to be made on-line/access through layers of indexes or use of index followed by sequential search **[3]**

Question 3

Comments/annotation of code

the inclusion of comments within the code to describe what is happening/code not used or read by computer

Meaningful names

Names of variables/procedures/functions should be descriptive to make it easier to follow

Modularity

Easier to understand a number of small segments than a large one

Indentation

Highlights blocks of code in order to keep them together

(max 2 for each of 3 methods, max 6) **[6]**

Question 4

(a) Serial access is when records are stored in no particular order (chronological)
Note: Not "unstructured" without a good explanation.

Sequential access implies records held in a logical order/technique such as a binary cut can be used/alphabetic or numeric or key order. **[2]**

(b)(i) Key field is read

hashing algorithm is applied to (it/something)

to give (relative) address of data

Data is looked for at that address

Recognition of problem over clashes

(1 per point, max 3) **[3]**

(ii) 1. Subsequent locations are read

until empty location found

record inserted at empty location

2. Existing record is used as head of list

pointers pointing to subsequent records with same hash values

new value inserted in free location and pointer from end of original list

3. Area of memory (bucket) set aside for overflow

any clashing record inserted into bucket

in next location in serial form

(Any 2 methods, max 2 per method, max 4) **[4]**

Question 5

(a) A set of rules/instructions
to allow communication between devices **[2]**

(b) Types of data transmission
is the transmission serial/parallel?
Duplex/half duplex/simplex
Baud rate
Both devices must talk, listen at the same number of bits per second
Otherwise bits may be missed/counted twice
Error checking
Is parity odd or even?
Is echoing back used?
Acknowledge messages to confirm accepted transmission
(max 2 per type, max 2 types, max 4) **[4]**

Question 6

(a)(i) Expert knowledge covering a small area
is brought together in a computer system
comprises knowledge base
rule base
inference engine
HCI
(1 per point, max 4) **[4]**

(ii) Sensors/mechanic used to input details like car type and age and exhaust gasses
Inference engine compares input with data in knowledge base
e.g. engine temp with what it should be
According to the rules in the rule base
e.g. is temp too high-what to do
Report to engineer on screen/automatic adjustment made
(1 per point, max 3) **[3]**

(b) Need to be trained
may not be able to learn new skills
new skills make worker more qualified
may earn more because skill level higher
Loss of skills (because of reliance on system)
(1 per point, max 2) **[2]**

Question 7

Questionnaires:

Adv: Large number of people can be asked quickly
All employees perceive that they have had a say
Dis: Restricted responses possible
Some may have difficulty completing them
Few replies

Interviews:

Adv: Comments can be at length
Can leave a prepared script
Dis: Lengthy
Limits the number of views that can be sought
Generalised answers

Group discussions:

Adv: Many people can air their views
Cuts down the number of repeat views obtained in interviews
Dis: Some people may hog the discussion
Some people's views may not be heard

Observation of methods/collection of data used, forms used

Adv: Shows present system not just views which may be clouded
Dis: People tend not to act in the way they normally do
Data and forms tend to be seen in isolation

Collection of data used

Adv: A clear indication of the data used and the collection methods
Dis: Volume collected
Data and forms tend to be seen in isolation

(1 per method, 1 per adv, 1 per dis, max 3 methods, max 9) **[9]**

Question 8

(a) Custom A package specially written to solve a specific problem
contains all the features the business needs
including non standard ones
does not contain features that will not be used
OtS Pre written (generic) software
immediately available
shared development costs
ready pool of trained workers
will have been fully tested
compatible with other organisations
readily available help groups
(1 per point, max 4 points per type, max 5) **[5]**

(b)(i) Word processor
to produce reports/write letters
Spreadsheet
to produce itemised invoices for customers/to 'do the accounts'
Accounting package
to do the accounts (only allow once)
Database (MS)
to manipulate customer/stock files
CAD
to design new buildings/interiors
Graphical
to produce advertising material
Presentation
to produce presentations for marketing
Note: Reasons for graphical and presentation may be interchanged
Communication software
To use email/web/create intranet
(Any 4 types, 2 each, max 8) **[8]**

(ii) Files produced can be merged
e.g. spreadsheet can be placed in a report
Common screen design/common toolbars/common icons
makes it simpler for staff to learn
(1 per point, max 2) **[2]**

Question 9

(i) Enter data twice
Computer compares the two entries
Rejects the code if the two entries do not match
Visual verification on-screen

(ii) (Length check) all codes must contain exactly 6 digits
(Character check) all characters must be digits
(Range check) first 3 digits must be in range 000-100 or 300-600
(Existence check) code must match a key field on the file
(Check digit) one of the 6 digits is used to check the others for validity
(One per point, max 4 per dotty, max 6) **[6]**

Question 10

Input to the system is of a standard type
Form prompts the user to ask standard questions
in the correct order
Ensures that information is in the correct format
Validation checks are easier to set up
Clear indication of where and what information is to be entered
Can automatically determine different routes dependent on entry
Labelled boxes to make system easy to use
Important data cannot be missed out
(1 per point, max 4) **[4]**

Question 11

(a) Back up is an extra copy to protect data in case it is corrupted
Archive is a copy (of the files) at a certain point of time for long term storage **[2]**

(b) Customer file's hit rate reduced as number increases
many individual customers may only be 'one off', then record not used
Necessary to free up space
Stock file continually being changed
Necessary to store example states of file before lost forever
General point about possible need to retrieve data in the future
Replacing old files with new will lead to old files being archived
Taxation records
Management information
(1 per point, max 3) **[3]**

(c) Either:
At regular intervals (No more than) 7 days
File is copied to tape (or alternative, not floppy)
Stored away from system
Multiple copies
Use of a transaction file
Or:
Grandfather/Father/Son or Ancestral Filing System
All stored sequentially
When file updated from TF
Each generation moves up
G and F are back-ups
(1 per point, max 4) **[4]**

Total [90]