UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Diploma Advanced Level

MARK SCHEME for the October 2007 question paper

CAMBRIDGE INTERNATIONAL DIPLOMA IN COMPUTING

5216 Computer Systems, Communications and Software,
Maximum mark 90

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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1 (a) (i) Consists of
- Windows
- Icons
- Menus
- Pointer

(1 per -, max 2) [2]

(ii) - (Questions and) spaces for answers shown on screen/insertion boxes
- Input can be by radio buttons
- Pop up menus/drop down lists
- Insertion fields provided with validation checks
- Mirrors a hardcopy form

(1 per -, max 2) [2]

(b) (i) - School/children/inexperienced users/home computer (almost any application)
- Ease of use [2]

(ii) - Any example where **on screen** input is necessary
- Allows for instructions/ensures no data is missed/ease of set up of validation routines [2]

(c) - Touch screen
- Ease of use/restrict vandalism/can be weatherproof/acts as input and output
- Menu based
- Restricts choices/tree design of choices

(1 per -, max 4) [4]

2 (a) 01010011
(1 per nibble) [2]

(b) - Barcodes read as goods arrive/leave
- Number in stock is incremented if arriving
- Number in stock is decremented when leaving
- Software checks number in stock against reorder number…
- after every transaction
- When number in stock below reorder level then order created
- Note that order made is stored as Boolean 1 until order delivered
- Linked to supplier table for automatic ordering

(1 per -, max 5) [5]

3 (a) - Data on ROM cannot be changed/on RAM it can
- ROM is not volatile/RAM is

(1 per -, max 1) [1]

(b) - Operating system
- Those parts of application software in use
- User files

Note: All other suggestions should fit into one of the three acceptable answer groups. [3]

(c) (i) - Readily available when switched on/No need to ever alter software [1]

(ii) - Processor can only access data held in RAM
- Needs to be random access or access to data would be too slow [2]

4 **(a)** - Is solution technically possible?
- Is the solution economic to produce?
- Is the solution economic to run?
- What will be social implications of change?
- Is the skill level in the available workforce high enough?/training requirements
- What will be the effect on the customer?
- Will the introduction increase the profits?
- Time constraints

(1 per -, max 4) [4]

(b) - Information collection
  - Use of interview/questionnaire/document collection/observation/meetings
- Analysis of information collected
  - Produces clear view of present system
  - Diagrams to show how present system works
- Requirements specification
  - "Wish list" of requirements from user
  - Subjective list of requirements
  - Hardware and software requirements
- Consideration of alternative solutions
  - Matching of alternative solutions to needs of requirements specification
  - Justify one solution against others.

(1 per -, max 3 areas plus one expansion per area, max 6) [6]

5 - Loss of data can disrupt services to members of public
- Loss of data can be serious problem for company/organisation
- Taking regular back-ups of data
- Unauthorised access…
- may lead to wrong people learning personal information/misuse of data
- Use passwords/firewalls/… (to protect data from unauthorised access)
- Access rights
- To give confidence to people that their data is safe
- List those people who have access to it
- Data must not be passed on without consent
- Data can be inspected on request

(1 per -, max 6) [6]

6
```
WHILE DOOR NOT SHUT
        SHUT DOOR
END WHILE
IF HOT WASH  THEN  T = 80
                ELSE  T = 40
END IF
HEATER ON
REPEAT
UNTIL WATER TEMP = T
HEATER OFF
TURN M ON
FOR TIME = 1 TO 20 STEP 5
    IF WATERTEMP  < T
        THEN SUSPEND TIMER, REPEAT
            TURN HEATER ON
        UNTIL WATERTEMP = T, HEATER OFF
        RESTART TIMER
    ENDIF
NEXT TIME
TURN OFF M
SOUND BUZZER
```

Mark points:
*- Condition door is shut with action to shut door/loop to shut door
*- Condition hot or cool to set parameter
- Turn on heater H
- Loop until temperature met
- Turn M on
*- For loop with correct count…
*- and correct step
- Check for temperature in loop and correct action
*- Sound buzzer
(1 per *-, and any 2 other -, max 7) [7]

7 **(a)** - Knowledge base
- all the information about the particular study/about different formations and what they mean
- Rule base
- a set of definitions/algorithms to apply to the knowledge base/rules about interpreting the collected data
- Inference engine
- does the searching of the knowledge base using rules from the rule base
- Human Computer Interface
- to allow data/enquiries to be input and results to be output

(1 per -, max 3 pairs, max 6) [6]

(b) Set up:
- The knowledge of a number of experts is collected…
- and collated/edited
- Knowledge is stored in system
- Algorithms developed/to use rules collected from experts
- HCI developed (to suit users)

Used:
- System matches patterns/data from survey with
- patterns/data in knowledge base
- Uses rules (in rule base) to interpret (meanings of) patterns/data found
- Produces probabilities of successful drilling

(1 per -, max 3 per section, max 5) [5]

8 **(a)** - Computer/Processor on site
- Some form of data logging/collect data on storage over period of time
- Modem and phone line/satellite transmitter/mobile phone
- Modem/satellite receiver/computer at head office

(1 per -, max 3) [3]

(b) **(i)** - Hard copy output
- Larger scale printout
- Graphical output
- High level of accuracy

(1 per -, max 2) [2]

(ii) - Sound/beeper/emergency or urgent information/to draw attention to new radar data…
- (Hard copy) tabular/numeric/to study the data in detail/to search for anomaly in geology…
- On screen/graphical/to show snapshot of situation/to show result of one radar sweep/comparison of data

(2 per pair of points, max 2 points, max 4) [4]

9 (a) (i) - A copy of data being stored on the system
- stored away from the original
- taken at regular intervals
- includes the structure of the data
(1 per -, max 2) [2]

(ii) - A copy of some data being stored on the system
- for long term storage
- taken when data is no longer active
- not necessary to store structure, only data
(1 per -, max 2) [2]

(b) (i) - Expensive to collect the data
- (Do not want to repeat either in the event of) data corruption or data loss because…
- time consuming to re-process the data
(1 per -, max 2) [2]

(ii) - To compare with new material taken at a later date
- To reuse if other company wants survey of same area
- To reuse if circumstances change e.g. price of oil goes up making difficult area economically viable
- Allows data storage media to be freed up increasing the speed of processing
(1 per -, max 2) [2]

10 (a) - Data is numerical
- Allows for predictions to be made
- Formulae to be applied to the data/ease of calculation
- Tabular/graphical representation of data/for ease of understanding
(1 per -, max 3) [3]

(b) - Animation to maintain interest
- Use of video to show sites
- Sound to explain decisions
- Ability to present to a large audience all at once.
(1 per -, max 2) [2]

11 (a) (i) 10111100/the second one [1]

(ii) - This has an odd number of ones
- The others all have an even number of ones
- Even parity is being used
(1 per -, max 2) [2]

(iii) - There may be two (or an even number of) errors in one byte [1]

(b) - data bytes are added together

- MOD 256
- Result (Check Sum) is sent with data
- Calculation redone at receiving end
- Results compared
(1 per -,1st +conditional 3, max 4) [4]