MARK SCHEME for the May/June 2009 question paper

for the guidance of teachers

7010 COMPUTER STUDIES

7010/01   Paper 1, maximum raw mark 100

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes must be read in conjunction with the question papers and the report on the examination.

1 Generally, one mark per valid point.
Two different types of example can gain two marks.

   (a) batch processing
       data collected together
       during time period
       processed all at once/in one go
       ref to JCL
       no need for human intervention
       done at night/off peak
       e.g. cheques, utility billing   [2]

   (b) data logging
       automatic capture/sampling/gathering ….
       … and storing/recording of data/readings
       data from sensors
       <u>devices</u> contain ROM and RAM type memories
       e.g. weather conditions, temperature readings in an experiment   [2]

   (c) video conferencing
       form of electronic comms using the Internet/WAN/ISDN link
       requires webcam/microphone/speakers
       image taken by webcam appears on window in participant's monitor
       uses video compression software
       use of codec (analogue-digital translation)
       e.g. meetings that include delegates at different locations   [2]

   (d) virtual reality
       computer simulation
       in a 3D world
       uses special interactive devices such as goggles, data gloves, suits,…
       makes user "feel as if they were actually there"
       operates in real time
       e.g. viewing houses, inside chemical plants, flight simulators, games   [2]

   (e) virus
       program/software
       which copies itself/replicates
       created to corrupt/do damage to files/system/boot sector/data
       spread through email attachments/floppy disks/CDs/USB drives   [2]

2   Any **three** types of device from:
    bar code reader/scanner
    document scanner
    magnetic stripe reader
    smart card reader
    finger print reader
    retina scanner
    microphone
    digital (video) camera
    OCR
    OMR
    MICR
    RFID reader (radio frequency identification – used in electronic tagging)   [3]

3   **(a)** Any **three** features from:
        file management/delete/copy/save/load files
        memory management
        I/O control
        error messages/handling
        interrupt handling
        user interface
        security issues
        logging on/off
        accounting/user account management
        time slicing
        multi access
        multi-tasking
        JCL/job control
        network management   [3]

    (b) **(i)**   any typical device such as a microwave oven   [1]

         (ii) any **one** reason from:
                has only one set of tasks to perform
                simple input expected (e.g. keypad on front of device)
                simple, never-changing hardware
                would increase development and manufacturing costs   [1]

4   **(a)** signal that temporarily stops execution of a program   [1]

    (b) any **one** from e.g.:
        by a key stroke (e.g. BREAK key)
        by a printer (e.g. out of paper error)
        fault in program when running (e.g. try to divide by zero)
        end of an operation (e.g. end of time slice)   [1]

    (c) handshaking   [1]

5 (a) any **two** points from:
CAD is computer aided design
allows engineers and architects to design/model/test new products
uses special hardware such as hi res large screens, plotters, spaceballs
makes use of features such as 2D, 3D, wire frames, costing, zoom
references a library of spare parts
links into CAM   [2]

(b) any **two** examples from design of e.g. :
    aerospace
    architecture
    vehicles
    consumer goods
    circuits
    ergonomics
    fashion
    kitchens/bathrooms
    lighting at concerts
    (chemical) plant/factories   [2]

6 any **three** advantages and **one** disadvantage from e.g.:
immediate (almost instantaneous) arrival of email in recipient's inbox
can send attachments
easy to send out same message to several recipients
can leave message in recipient's mail box to be read later
can pick up emails anywhere in the world
can forward email without retyping it

hacking is now a possibility/possibility of viruses (…but encryption minimises risk)
lots of unnecessary messages (e.g. "I'm home!!!")
unsolicited mail
some "dodgy" email material
need computer equipment/Internet connection/email address
attachments may be too large
recipient may not be able to open an attachment
recipient cannot receive original documents

(NOT reference to costs or less paper used)   [4]

7 any **four** from:

hacking into his computer and change/read files
viruses could be sent
somebody "tapping into" his WiFi system
credit card details being stolen
bogus web sites
stealing his computer (with security information on hard drive, for example)
physical eavesdropping in a public place/shoulder surfing
driving round looking for wi fi access/ WarDriving   [4]

8 (a) any **two** from:
   need to re-train
   de-skilling
   possible loss of jobs/redeployment
   loss of social interaction   [2]

   (b) any **one** from:
   reduced costs to the company because of e.g. fewer staff/less office space
   can offer 24/7 customer services
   can advertise/offer new services and products automatically
   can recruit staff from anywhere
   standard responses to common queries   [1]

   (c) any **two** from:
   24/7 query system
   can see circuit diagrams etc. on screen
   can printout answers to take away/save and view again
   much faster response time (phone often busy, ….)
   less expensive (overseas phone calls to the company could be costly)
   don't get conflicting advice/get correct response   [2]

9 (a) any **three** from:
   can animate human movements to give more realism
   e.g. computer can "move" mouth properly to mimic speech
   use of avatars
   faster to produce the required number of frames
   ....takes **many** artists a long time to do the drawings
   tweening speeds up the process
   editing/adjusting animations is easier/faster
   rendering to give more realism
   no need for any film/can store straight to CD/DVD   [3]

   (b) There are various ways of completing this calculation, the following is one example:
   number of images needed = 30 x 25 x 60 = 45,000

   memory needed = 45,000 x 400 x 1000 bytes =   18,000,000,000 bytes
                                                    18,000,000 Kbytes
                                                    18,000 Mbytes
                                                    18 Gbytes

   (1 mark for showing a **correct** method of working out plus 1 mark for **correct** answer
   including units)   [2]

10 any **four** point from:

get information from experts
input data into knowledge base
populate rules base
create inference engine
create human-machine interface/question-answer sessions
test system with "known" problems and solutions
create output screens/format
create/design validation routines   [4]

11 **(a)** (D2) = C2 – B2
      (D2) = (C2 – B2)   [1]

    (b) (D10) = AVERAGE(D2:D9)
      (D10) = SUM(D2:D9)/8
      (D10) = (D2+D3+D4+D5+D6+D7+D8+D9)/8   [1]

    (c) (F10) = MAX(F2:F9)   [1]

    (d) select D2 and + appears
      drag down to D9

      OR

      select D2 and select copy
      select D3 – D9 and select paste

      OR

      select/highlight D2 down to D9
      select Auto/fill down   [2]

    (e) (D1/D2 to D7/D8/D9)
      AND
      (E1/E2 to E7/E8/E9)

      Note: (D1/D2:E7/E8/E9) is worth 2 marks   [2]

    (f) any **two** from:
      continuous (24/7) monitoring
      no need for human operators
      can run more experiments
      less chance of mistakes
      results/graphs will be produced without delay
      won't miss any "unusual" data   [2]

12 (a) any **two** from e.g.:   AND   any **two** matching points from:

assembling cars etc.   }   consistency of build/repeatability
paint spraying   }   faster in operation than humans
                                        }   can work without breaks/24-7
                                        }   health & safety

bomb disposal   }   no danger to human life
going into dangerous environments   }   equipped with sensors (can pick up data
                                        }   automatically)

vacuum cleaners/mowers   }   more leisure time for people   [4]

(b) any **two** from:
any task requiring creativity (writing original prose, music, etc.)
any task where logic/rules of programming can't be applied
one off task e.g. complex glass blowing   [2]

13 (a) any **two** from:
shopping basket
checkout facility/form for customer details
secure buying when using credit card
"when customers booked X, they also booked Y" facility
search facilities for artist
drop down boxes to choose type of concert/ticket/prices
calendar for dates
(interactive) seating plan
(interactive) map/directions
help facilities
currency conversions
data/sales confirmation by email
saved customer details/customised pages
ability to listen to video clips of previous concerts
recognise customer as soon as they log onto the site
hyperlinks to other sites/navigation buttons
bookmarking   [2]

(b) email + (attachment)
text message
printable page from web site   [1]

(c) (i)   each barcode/reference number for the concert is different   [1]

    (ii) any **one** from:
    link bar code/reference number to customer's credit card
    send PIN/id with email to uniquely identify customer
    ask customer for proof of identity   [1]

14 (a) 120
1

(b) for X = 1 to N + 1   OR   repeat   OR   while X <> N + 1 do
    (T = T * X)   (T = T * X)   (T = T * X)
                                     X = X + 1   X = X + 1
    next X   until X = N + 1   endwhile

(1 mark for correct first line of loop construct)
(1 mark for correct loop control and last line of loop construct)   [2]

15 (a) use of sensors
use of ADC (if necessary)   [2]

(b) any **two** from:
doesn't get tired/works 24-7
less likely to make mistakes
can respond to situations more quickly
less chance of mis-understanding or mis-interpreting data   [2]

(c) any **two** from:
in case computer program goes wrong/computer malfunction
passenger confidence
any "unusual" manoeuvres still best done in manual mode
in case of emergencies   [2]

(d) any **one** from:
faster processors
greater component reliability
considerable component (e.g. microchips) price reductions
increased complexity of aeroplanes
reduction in size of components
reduction in power consumption   [1]

(e) any **two** from:
flight plan keyed in
satellite/global position read by computer (frequently)
computer checks expected position based on time
changes course if necessary…..
…. by sending signals to the ailerons
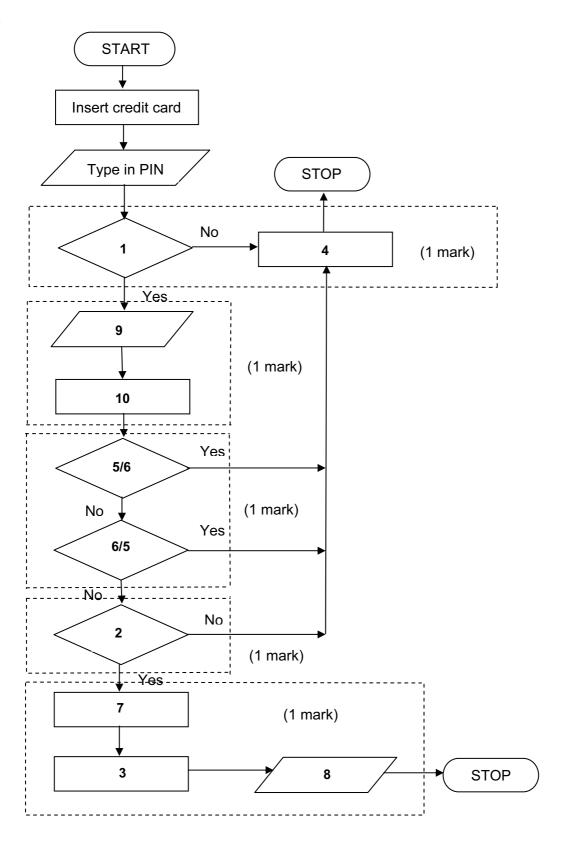…. electric motors change aileron angles etc.
operates in real time   [2]

(f) (i) any **one** from:
passenger name/passenger ID
destination(s)/point of departure
flight id   [1]

(ii) any **one** from:
tracking/uniquely identifies baggage/ensures baggage gets to right place
increased security
links to passenger/ensures luggage cannot travel without passenger

16

START

Insert credit card

Type in PIN

STOP

1 — No → 4 — (1 mark)

Yes

9

10

(1 mark)

5/6 — Yes →

No

6/5 — Yes →

No

2 — No →

(1 mark)

Yes

7

(1 mark)

3 → 8 → STOP

[5]

17 (a) 5

   (b) (i)   Customer Reference

        (ii) Specification   [2]

   (c) any **two** from:
        reduces typing errors
        uses less memory
        faster to type in
        quicker to sort
        store in one field
        easier to validate   [2]

   (d) Car Description/Car Ordered   VW Golf   }
        Delivery Date   Dec 2008   } New Car Sales
        Specification   21215168   }

        Customer Name   D Khan   }
        Customer Address   19 Main Street   } Customer Details
        Trade In   Yes   }

        (**1 mark** 1 field name **and** contents from New Car Sales table **plus** 1 field name **and**
        contents from Customer Details table)

        List of Extras   B D E F J L }
        Cost Price ($)   21 000   } Car Manufacturer

        (**1 mark** 1 field name **and** contents from Car Manufacturer table)   [2]

   (e) any **one** advantage from:
        later use if customer wants to trade in again in 2 or 3 years' time
        can send out new product information
        if safety/recall issues from car manufacturers
        service/safety check reminders   [1]

18 marking points (1 mark per item up to the maximum of 5):
    initialise fa, sj and ka to zero
    correct loop
    inputs (in correct place)
    addition of number of flights per airline
    any validation checks carried out
    calculate percentages
    outputs (in correct place and ONLY if some evidence of any attempt at processing)

sample program/algorithm

```
fa = 0; sj = 0; ka =0;                                  } 1 mark

for x = 1 to 400                                        } 1 mark

    input lettercode                                    }
                                                        } 1 mark
    input numbercode                                    }

        if lettercode = "FA" then fa = fa + 1           }
                                                        }
        if lettercode = "SJ" then sj = sj + 1           } 1 mark
                                                        }
        if lettercode = "KA" then ka = ka + 1           }

        else print "error"                             } 1 mark

next x

fapercent = fa/4                                        }
                                                        }
sjpercent = sj/4                                        } 1 mark
                                                        }
kapercent = ka/4                                        }

print fapercent, sjpercent, kapercent                  } 1 mark          [5]
```

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Sample flowchart:

START

fa = sj = ka = 0 x = 1

Input lettercode

Input numcode

Is lettercode = FA — Yes → fa = fa+1

No

Is lettercode = SJ — Yes → sj = sj+1

No

Is lettercode = KA — Yes → ka = ka+1

No

Output "error"

x = x + 1

Is x<=400 — Yes (loop back) — No →

fapercent = fa/4
sjpercent = sj/4
kapercent = ka/4

→ Ouput fapercent, sjpercent, kapercent → Stop