

**MARK SCHEME for the October/November 2010 question paper
for the guidance of teachers**

0420 COMPUTER STUDIES

0420/12

Paper 1, maximum raw mark 100

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1 (a) check digit

- validation check
- single digit appended to a number
- calculated from digits and their position
- re-calculated after data transfer

- e.g. bar codes, ISBN, credit/debit cards [2]

(b) RAM

- random access memory
- memory lost on switching off/volatile/temporary
- stores user programs/data (etc.)
- usually on a chip
- can be read/changed by user

- e.g. SRAM, DRAM etc. [2]

(c) macro

- macro instruction
- new command created by combining number of existing ones
- can combine effects of pressing several individual keys on k/board
- can be programmed by user to customise software
- e.g. single key stroke to insert a logo into a document [2]

(d) USB flash memory

- (memory data) storage device
- removable/portable
- uses universal serial bus connector
- re-writable device
- contains printed circuit board
- allows transfer of data/files between computers
- draws power from the computer port
- contains EEPROM (electrically erasable programmable ROM)/ non-volatile memory
- e.g. pen drive/memory stick/thumb drive [2]

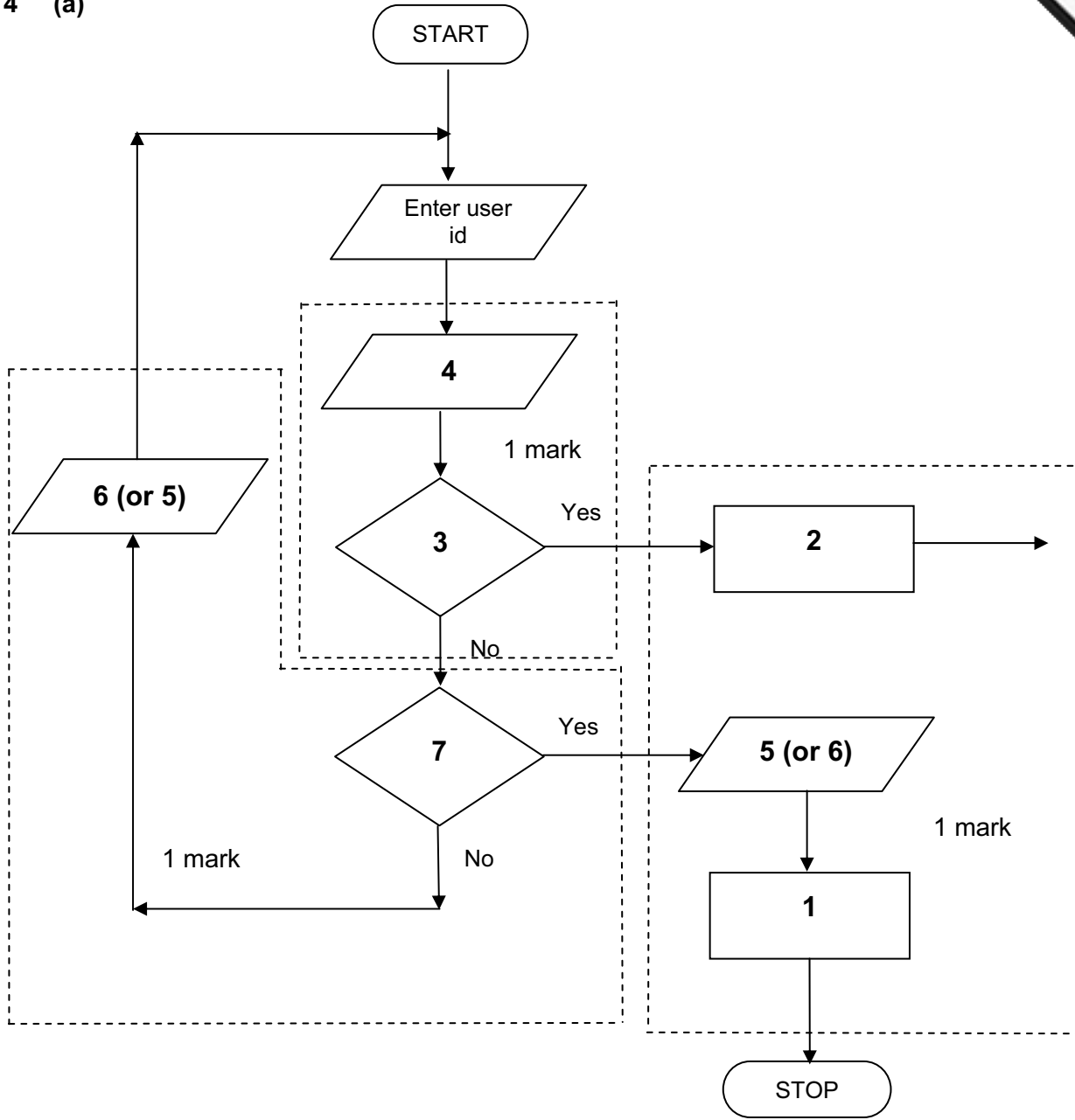
(e) printer buffer

- temporary storage/memory
- compensates for the difference in speed of printer and CPU
- e.g. holds data whilst computer completes a job, recovering from error (e.g. paper jam) [2]

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- 2 (a) Any **three** from:
- "glitches in the software" e.g. divide by zero
 - software conflicts
 - virus
 - operating system software loss/corruption
 - hardware malfunction (e.g. overheating of circuit board, processor fans failing etc.)
 - hardware incompatibility
 - power supply interruption/"spikes"
 - incorrect power down after use
 - hard disk crash/failure
- [3]
- (b) Any **one** from:
- Grandfather-Father-Son (GFS)/file generation system
 - backups
 - parallel systems
 - type/scan and OCR in new data again from the hard copies
- [1]
- (c) Any **one** from:
- encryption
 - encrypt files
- [1]
- 3 (a) STAR, BUS
- [2]
- (b) Any **one** from:
- can use any station to access files, etc.
 - can share files etc.
 - can share resources (e.g. printer)
 - allows easier communication between users
- [1]
- (c) Any **one** from:
- more easily/more rapid transfer of viruses from computer to computer
 - file (etc.) security is more difficult
 - extra infrastructure costs e.g. cabling
- [1]

4 (a)



- 1 Access not allowed
- 2 Allow access
- 3 Do user id and password match
- 4 Enter password
- 5 Error message
- 6 Error message
- 7 Three attempts

[3]

(b) verification

[1]

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5 (a) 2 marks (max) for RTTP points; 2 marks (max) for RTPC points

real time transactions

- individual transaction processed as it occurs
- files/fields/records updated immediately
- e.g. online booking of seats

real time processing

- physical quantities continuously monitored
- inputs compared with pre-set values
- processed fast enough to affect input
- uses sensors, ADC, DAC, etc.
- e.g. temperature control in air con

[4]

(b) Any **two** points from:

- file management
- input/output control
- spooling
- memory management
- multiprogramming
- multitasking/JCL/batch processing
- handling interrupts
- error reporting/handling
- security (e.g. virus checking)
- user interface (e.g. WIMP)
- processor management
- loads/runs programs
- user accounts
- utilities

[2]

6 (a) Any **one** from:

- reduced costs (no/less printing, no/less distribution of directories)
- faster/easier updating procedure
- raising profile of company

[1]

(b) Any **two** from:

- faster/easier to find information
- more accurate/up-to-date
- more information/data available
- could easily extend to international directories

[2]

(c) Any **one** from:

- more likely to get calls from call centres/sales companies
- unsolicited calls
- mis-use of details

[1]

(d) Any **one** from:

- number changed and not registered
- errors in the information

[1]

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- 7 (a) (i) Any **one** from:
- interview customers
 - hand out questionnaires to customers
- (ii) 1 mark for method and 1 mark for reason:
- DIRECT
 - must have only one way of conveying/updating the information
 - PILOT
 - could adopt new system at one terminal only to trial new system
 - PARALLEL
 - Check new system is working correctly/back up in case of system failure [2]
- (b) Any **one** from:
- current time
 - terminal number/name
 - date
 - baggage reclaim/carousel number
 - name of airline
 - transfers/connections [1]
- (c) Any **one** from:
- touch screens/touch pad/mouse/tracker ball [1]
- (d) Any **two** from:
- fewer errors
 - could be linked to website for live updates
 - faster/more accurate updating of information
 - no language problems for customers
 - no need to wait in a queue at manned help desks [2]
- 8 (a) 1 mark for hardware and 1 mark for software:
- hardware
- webcam
 - microphone
 - large TV/monitor/screen
 - router/broadband modem
 - communications cables
 - speakers
- software
- compression software/CODEC
 - communications software [2]

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- (b) Any **two** from:
- language differences
 - time differences
 - controlling a 3-way conversation
 - possible poor communications/loss of connection/slow connection
 - delay in transmission
- [2]

- (c) Any **two** from:
- less time lost in travelling
 - can hold meetings with little notice
 - safer (**must be qualified** e.g. terrorism risk, less travelling, etc.)
 - can involve more people company-wide
- [2]

9 1 mark for each error and 1 mark for reason why it is an error

- line 1/negative=1 and/or line 2/positive=1
 - negative and/or positive should be set to zero
 - line 7/count=count+1
 - don't need a count within a **for to next** loop
 - replace loop with a **repeat...until** loop
 - line 8/**print** negative, positive or line 9/**next** count
 - outputs should come after the **next count** statement
- [6]

10 (a) 6 (fields) [1]

(b) 3002, 2002, 3003, 3004 [2]

(c) (Length (m) > 74) OR (Max Speed (kph) < 900)

← - (1 mark) - → ← - - - - - (1 mark) - - - - - →

OR

(Max Speed (kph) < 900) OR (Length (m) > 74)

← - - - - (1 mark) - - - - → ← - - - - (1 mark) - - - - →

[2]

11 (a) Any **three** points from:

- (count) number of vehicles ...
 - ... at various times of day/at different positions/in different directions
 - put data into computer ...
 - ... and try out different scenarios
 - look at effect of accidents/break downs
 - look at effect of heavy traffic
 - determine optimum timings of lights
 - effect of emergency vehicles/public transport
- [3]

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(b) Any **two** from:

- less expensive (**must be qualified**)
 - much safer prevents accidents/traffic problems through incorrect lighting times
 - can try out many scenarios first (to give optimum settings)
 - much faster than doing actual "experiments" on real lights
- [2]

(c) Any **two** from:

- sensors detect cars at each junction
 - sends signals/data to computer
 - computer software counts number of cars
 - if analogue data, need an ADC
 - compares sensor data with stored data/simulation results
 - changes light timings/sequences as required
 - (uses DAC) to send signals back to lights (control)
 - continuously monitors
- [2]

12 (a) = SUM(B2:M2)/12 OR
= AVERAGE(B2:M2) OR
= (B2+C2+D2+E2+F2+G2+H2+I2+J2+K2+L2+M2)/12
[rounded] [1]

(b) = (L5 – L4) * L3 (must use cell references) [1]

(c) (i) graph "B" since rainfall usually measured as a height/bars
graph "B" since the information is clearer [1]

(ii) - draw a line at value 8
- include a row with all values 8 and add this data [1]

(d) Any **two** from e.g.
- weather forecast for 7/14 days
- attractions/facilities in the area
- online booking e.g. hotels
- maps/how to get there
- buttons linking to other web pages/site
- videos/multimedia presentations
- search facility
- images of resort/virtual tours [2]

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13 Any **four** from:

- collect information from expert(s)
- put information into the/create knowledge base
- develop YES/NO dialogue/user interface
- output screens designed
- fully tested with known expected outputs
- produce user manuals
- fully train users of the system
- reference to inference engine being created
- reference to rules base being created

[4]

14 (a) **delete**

- customer leaves the bank/close account
- customer dies

amend

- change of address
- change of telephone number
- change account details
- change name after marriage
- transactions on account e.g. deposits, withdrawals

insert

- new customer joins bank/opens new account

[3]

(b) (i) Any **one** from:

- saves memory/less space required on the file
- faster/easier to type in
- faster to search for information
- fewer errors

[1]

(ii) 1 mark for name, 1 mark for reason and 1 mark for improvement

- AGE
- always changing
- need to keep updating each year
- date of birth

[3]

15 EACH RESPONSE **MUST** BE DIFFERENT

(a) (i) Any **one** from:

- character/type check
- length check
- Boolean check
- presence check

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- (ii) Any **one** from:
 - format check
 - character/type check
 - length check
 - presence check

 - (iii) Any **one** from:
 - range check
 - character/type check
 - presence check
- [3]

- (b) Any **one** from:
 - drop down lists showing M or F only, possible dates, etc.
 - use of touch screens with only certain data options
 - use of restricted lists
 - radio buttons
- [1]

- (c) (i) Any **one** from:
 - lock computer
 - log off the system
 - if in an office, lock the door
 - put into sleep/hibernate mode with password
- [1]

- (ii) Any **one** from:
 - to prevent RSI
 - to prevent neck/back problems possible
 - to prevent eye sight problems/headaches
- [1]

- 16 (a) Any **three** from:
- satellites transmit signals to computer/sat nav in car
 - sat nav system in car receives these signals
 - depends on **very** accurate time references/atomic clocks
 - **each** satellite transmits data indicating location and time
 - sat nav system car calculates position based on at least 3 satellites
 - at least 24 satellites in operation world wide
 - sat nav system combines satellite information with mapping info
- [3]

- (b) Any **two** from:
 - no need to read/own maps
 - driver doesn't need to memorise route
 - can give useful information such as location of garages/speed cameras/points of interest/traffic congestion
 - allows driver to concentrate on driving (therefore safer)
 - can find shortest/fastest route
 - easier to re-route in case of road closures, etc.
 - updateable
- [2]

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- (c) Any **one** from:
- stored maps out of date (instructions go to incorrect roads)
 - inaccurate positioning
 - loss of signal
 - errors in original data/setting up
 - sends vehicles down inappropriate routes
 - over reliance by driver on the sat nav
- [1]
- (d) Any **one** from:
- ships
 - aeroplanes
- [1]

17 Marking Points

- initialisation of running totals (1 mark)
 - correct loop control (1 mark)
 - error trap for height input (1 mark)
 - error trap for weight input (1 mark)
 - sum total1 and average1 (i.e. height) calculation (1 mark)
 - sum total2 and average2 (i.e. weight) calculation (1 mark)
 - correct output (only if some processing attempted, must be outside loop) (1 mark)
- [max: 5]

Sample pseudocode

```
total1 = 0: total2 = 0 (1 mark)
for x = 1 to 1000 (1 mark)
    input height, weight
        if height > 2 or height < 0 then print "error": input height (1 mark)
        if weight > 130 or weight < 0 then print "error": input weight (1 mark)
        else total1 = total1 + height: total2 = total2 + weight
    next x
average1 = total1/1000 (1 mark)
average2 = total2/1000 (1 mark)
print average1, average2 (1 mark) [5]
```