UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2010 question paper

for the guidance of teachers

7010 COMPUTER STUDIES

7010/11   Paper 1, maximum raw mark 100

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UNIVERSITY *of* CAMBRIDGE
International Examinations

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
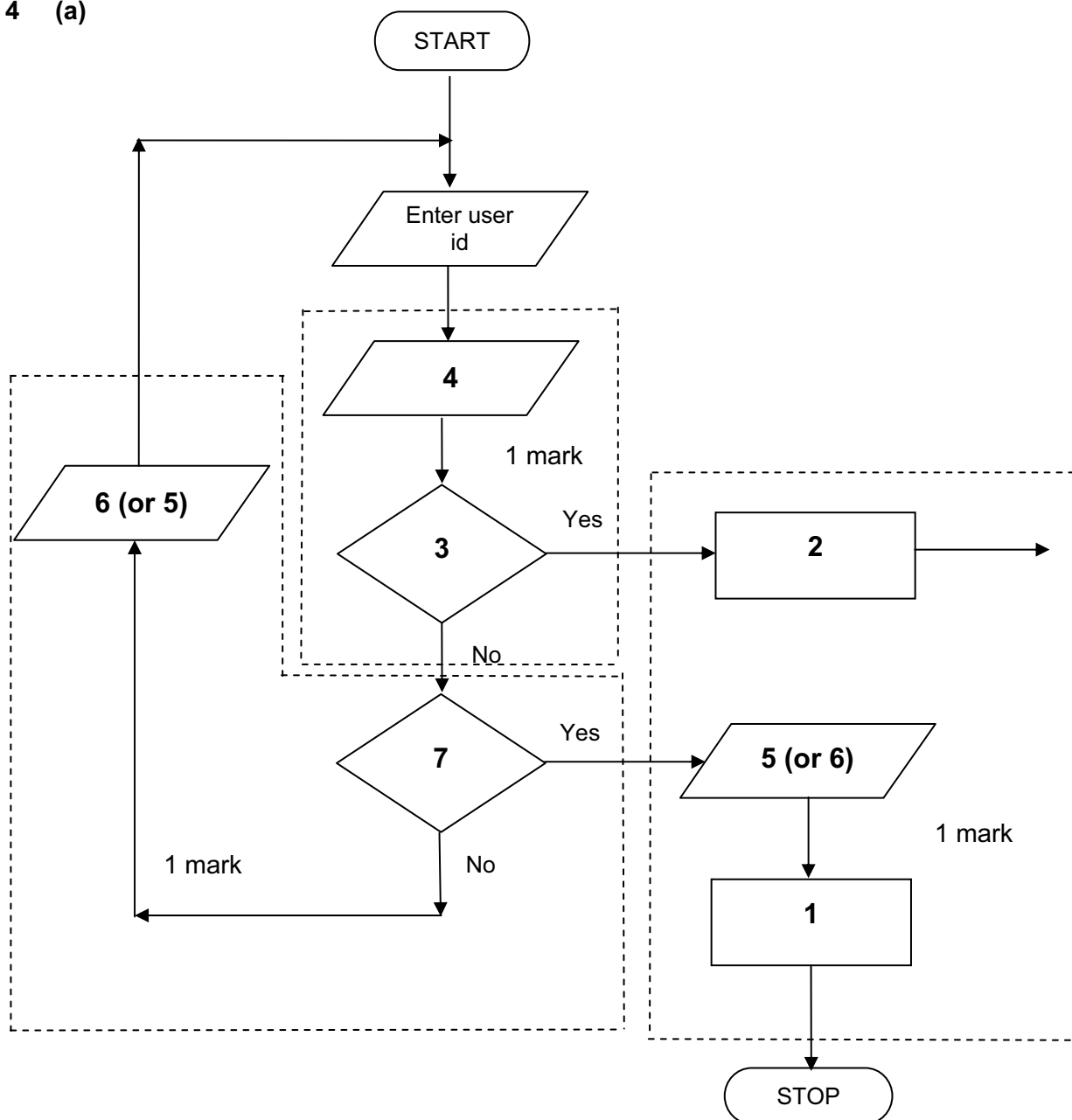
[2]

(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]

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)**

```
                    ┌─────────┐
                    │  START  │
                    └─────────┘
                         │
                         ▼
                   ╱ Enter user ╱
                   ╱    id     ╱
                         │
                         ▼
                       ╱ 4 ╱
                         │   1 mark
                         ▼
                  ◇  3  ◇ ── Yes ──▶ [ 2 ] ──▶
                         │ No
                         ▼
                  ◇  7  ◇ ── Yes ──▶ ╱ 5 (or 6) ╱
                         │ No              │   1 mark
                         ▼                 ▼
                                        [ 1 ]
                                          │
                                          ▼
                                    ┌─────────┐
                                    │  STOP   │
                                    └─────────┘

    ╱ 6 (or 5) ╱        1 mark
```

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]

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]

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

- interview customers
- hand out questionnaires to customers   [1]

(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]

(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]

(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]

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) <u>delete</u>

 – customer leaves the bank/close account
 – customer dies

 <u>amend</u>

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

 <u>insert</u>

 – 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 <u>MUST</u> BE DIFFERENT

 (a) (i) Any **one** from:
 – character/type check
 – length check
 – Boolean check
 – presence check

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

(iii) Any **one** from:
- range check
- character/type check
- presence check $\qquad$ [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 $\qquad$ [1]

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

(ii) Any **one** from:
- to prevent RSI
- to prevent neck/back problems possible
- to prevent eye sight problems/headaches $\qquad$ [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 $\qquad$ [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 $\qquad$ [2]

(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]