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

7010/13 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.

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1 (a) Interrupt

Any **two** points from:
- a signal/request generated by a device/program
- which causes a break in the execution of the program/stops the program
- examples: printer out of paper, <BREAK> key pressed, disk full [2]

(b) Optical media

Any **two** points from:
- type of non-magnetic memory
- uses light sensitive surface to store data
- media are very portable
- can be write once or write many times
- used to store large files
- can be ROM or RAM
- examples: CD, DVD [2]

(c) CAD

Any **two** points from:
- computer aided design
- uses special hardware such as hi-res screen, plotters, spaceball
- makes use of features such as 2D, 3D, wire frames, costings, zoom
- use a library of spare parts
- often used with CAM
- examples: architecture designing buildings, car design, lighting at concerts [2]

(d) verification

Any **two** points from:
- check on input for errors
- check before and after transfer (of signals)
- by double entry
- on screen checking
- comparing input/use of second operator
- e.g. typing in a password twice [2]

(e) GPS

Any **two** points from:
- Global positioning system
- navigational system
- uses satellites
- which transmit data …
- … to determine **exact** location and time
- satellites use atomic/very accurate clocks
- sat nav computer calculates position based on satellite data
- examples: used in vehicles to find routes from a to B [2]

2 **(a)** Any **one** point from:
- choose options by clicking on an arrow ▼
- which highlights possible options
- uses a pointing device (e.g. mouse) to select
- list of items to select/click on
- an inactive drop-down menu only has one value [1]

(b) Any **one** point from:
- when selecting an option from a finite list
- e.g. choosing an expiry date for a credit card
- navigating between web pages [1]

(c) Any **one** point from:
- limited options available
- difficult to find the required option, as only one option is visible [1]

3

RAM	– allows random access – stores work user is currently working on – stores files/data temporarily when s/ware running
ROM	– stores BIOS – stores files/data that should not be changed
Internal hard drive	– main memory of the computer – stores applications software
Internal modem	– allows computer to link to a network/internet – allows modulation/demodulation to enable info to be sent/received by analogue cables – controls the flow of data – error correction – compresses data transmitted – converts digital to analogue and vice versa [4]

4 **(a)** Any **two** points from:
Real time transaction:
- individual transactions processed as it occurs
- fields/files updated immediately

Batch processing:
- all data collected together before processing started
- processed in one go
- processing often done at night during "quiet periods"
- no need to up date files immediately [2]

(b) Any **one** use of **batch:**
- processing of utility bills (gas, electricity, water, …)
- processing of cheques
- payroll – producing wages/salary slips

Any **one** use of **RTT:**
- on line booking of seats in a cinema, flights, …
- *any application where double booking must be avoided* [2]

5 **(a)** Any **two** points from:
- consume very little power …
- … hence prolonging internal battery life
- run cool …
- … thus minimising problem of heat dissipation
- no processor fans needed …
- … therefore prolonging internal battery life
- light weight for easier portability [2]

(b) Any **two** advantages from:
(1 mark for advantage + 1 mark for expansion)
- very fast transfer/conncetion rate …
- … thus can download/upload files much faster
- always "on" (no need to dial up) …
- … thus don't have to wait/have instant access to the Internet
- not metered …
- … thus it is possible to download large files without additional cost
- telephone lines not tied up whilst computer in use …
- … this is because broadband uses a wide bandwidth
- because of the high data transfer rate …
- … it is possible to do video conferencing or use VOIP systems [4]

6 **One** mark for **each** method:

Data collection method
magnetic stripe reader OR chip and PIN reader
touch screen
OMR

[3]

7 1 mark for named method, 1 mark for advantage and 1 mark for each disadvantage (these MUST match up with named method)

Direct:
Advantages:
- less likely to malfunction since fully tested
- immediate benefits/less time wasted
- reduced costs (only one system so no need to duplicate staff)

Disadvantages:
- disastrous if the new systems does fail

Parallel:
Advantages:
- if new system goes down, there is a backup system in place
- possible to gradually train staff/staff have time to get used to the new system

Phased:
Advantages:
– only a small part of the operation affected if new system fails
– no need to pay for two sets of wages

Disadvantages:
– time consuming (each part needs testing fully before expanding system)

Pilot:
Advantages:
– if new system fails, only that part will be affected
– possible to gradually train staff on pilot before whole system changes over

Disadvantages:
– time consuming (waiting to see how pilot works before rolling out to rest of the organisation) [6]

8 Any **three** points from:
– animation effects produced by animator using ***key frames*** (which define start point and end point of a movement e.g. open the mouth)
– use of ***tweening/morphing*** (differences in appearance between key frames are calculated using ***tweening/morphing***)
– use of ***avars*** (animation variables)
– successive sets of ***avars*** control movement of animated character
– adding of surfaces to ***avars*** using ***rendering*** (realistic image)
– generation of ***avars*** using ***markers*** on real moving objects …
– … or using joystick to manually produce ***stick models***
– software prevents need to produce hundreds of hand drawn sketches [3]

9 **(a)** 1 mark for each advantage and 1 mark for each disadvantage:
Advantages:
– reaches a larger audience
– people can read information on paper copies at their leisure
– permanent copy which can be referred back to later

Disadvantages:
– need a high quality colour printer
– cost of ink, paper, etc.
– no sound, video, animation or special effects
– need to distribute by hand (time and cost issues) [4]

(b) 1 mark for each advantage and 1 mark for each disadvantage:
Advantages:
– can be interactive with the presenter
– can have sound, video, animation or special effects
– easier to update (don't have to re-print or re-distribute)

Disadvantages:
– not a permanent record
– people may not go to the presentation
– need expensive equipment (e.g. projector)
– needs to be set up each time it is used [4]

10 (a) Any **two** points from:
- a program/software/code
- which can replicate itself automatically
- attach themselves to e.g. files
- cause damage to computer **system** (e.g. delete/change/corrupt data) [2]

(b) Any **two** points from:
- data which is jumbled up …
- … to prevent unauthorised people from understanding data
- a key is needed to encrypt data (encryption key)
- a key must be known to decrypt data (decryption key)
- even if data is accessed it can't be read without necessary key [2]

(c) (i) Any **one** point from:
- viruses could be attached to the data and backup copies may still be "infected"
- when copying backup data onto computer may transfer virus again [1]

(ii) Any **one** point from:
- encryption only makes data, already accessed, unreadable
- encryption doesn't stop access to files [1]

11 (a) (i) range check

(ii) consistency check / crossfield check

(iii) presence check [3]

(b) 1 mark for name and 1 mark for example. Example must match name

	Name	**Example**
–	type/character check	only letters typed into ***name*** field
–	format check	ensure ***date*** typed in correct format
–	length check	ensure ***year*** field has four digits
–	check digit	on ***barcodes*** to ensure they have been read correctly [2]

12 (a) Any **two** points from:
- use a search engine …
- … and enter KEY words (e.g. CLOUD + COMPUTER) [2]

(b) Any **two** advantages from:
- more likely to be up-to-date
- can contain multimedia files
- **more** information is available
- can find information anywhere (e.g. away from home)
- usually **faster than** looking through paper-based information (must be a comparison)
- easier to incorporate information into own work, projects, etc. [2]

(c) Any **two** disadvantages from:
- not regulated/checked, therefore may be inaccurate/incorrect
- easy to get irrelevant information/sites/overabundance of info
- can download viruses, spyware, etc.
- risk of finding porn sites
- need to invest in computer system + broadband
- sometimes information is withdrawn and is lost from the Internet [2]

13 (a) = (C2 * 0.02) + (D2 * 0.15)

← 1 mark → ← 1 mark → [2]

(b) = MAX (E2:E6) [1]

(c) Any **two** points from:
- new column F added
- new formula e.g. F2 = 65 + (800 – D2) * 0.15
- modify formula in, e.g. E2, to include (800 – D2) * 0.15 [2]

14 (a) 8 [1]

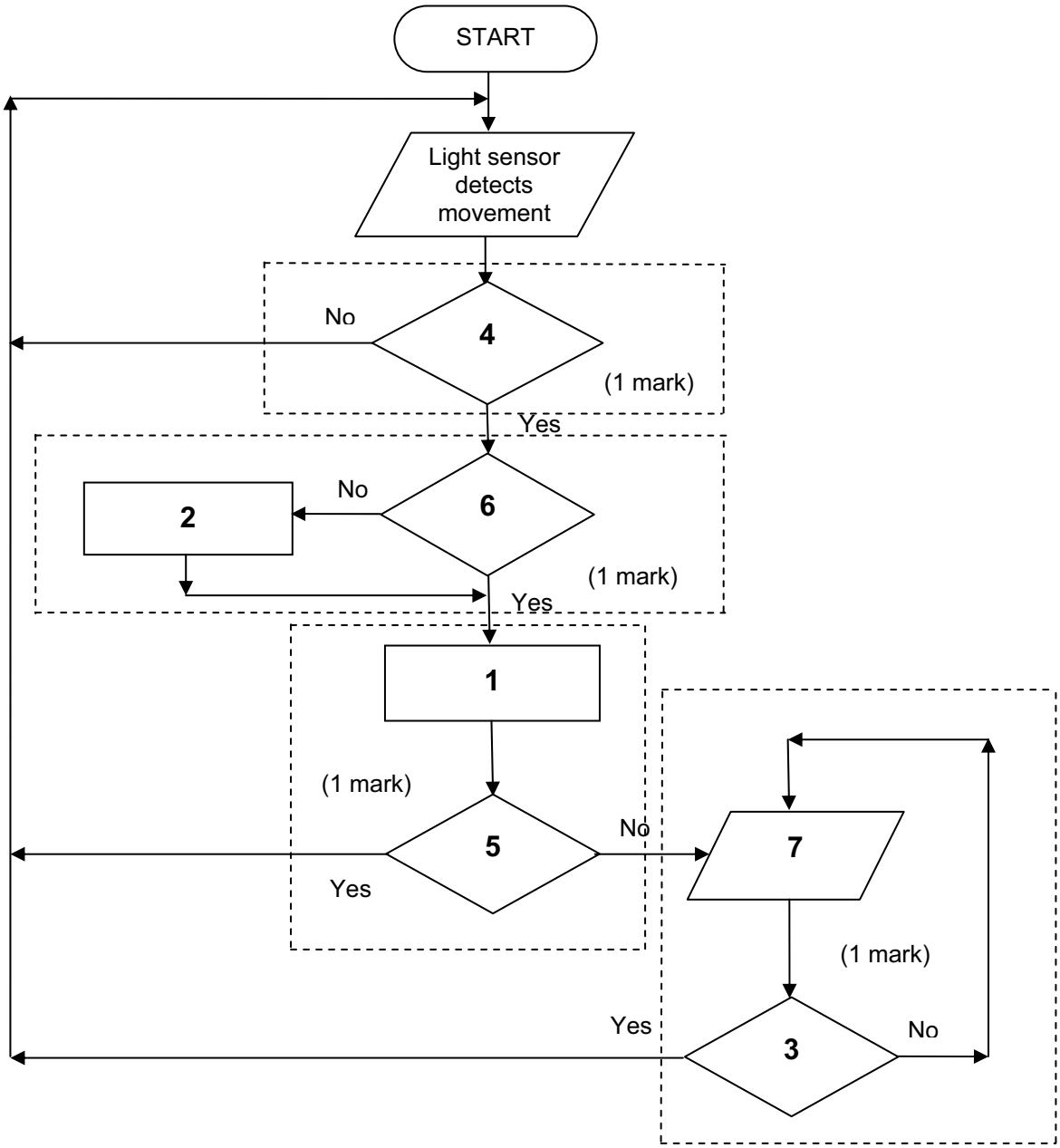
(b) **Hotel Ref** [1]

(c) H41, N15, L44, N21 (-1 for each error or omission) [2]

(d) (**Distance from airport (km)** < 10) AND (**Price per person($)** < 100)
←---------- 1 mark ----------→ ←---------- 1 mark ----------→
OR
(**Price per person($)** < 100) AND (**Distance from airport (km)** < 10)
←---------- 1 mark ----------→ ←---------- 1 mark ----------→ [2]

(e) N15, N21, L44, H41, H30, H21, K22, K14
↑
(last 2 in any order)
[2]

15 Award marks as shown below



1 = check sensor value with stored value
2 = convert signal to digital
3 = has alarm been re-set
4 = is a signal detected?
5 = is sensor value normal?
6 = is signal digital?
7 = sound an alarm [4]

(b) Any **two** points from:
- **sensor** information/signal usually analogue
- **computers** can only read/understand digital signals [2]

(c) 1 mark for name of sensor + 1 mark for application
Application must match the sensor
Can have the same application for different sensors

Sensor type	Possible applications	
temperature	(1) (2)	used in controlling central heating systems used to control/monitor temperatures in chemical processes
moisture	(1) (2)	monitoring of greenhouse environment any process where moisture is an issue (e.g. production of tablets in a pharmaceutical company)
oxygen	(1)	environment (e.g. measuring oxygen content in a river to check for pollution)
infra red	(1) (2)	detecting an intruder by breaking an infra-red beam counting (e.g. counting coins as each one breaks the beam)
pressure	(1) (2)	detecting intruders in a burglar alarm system some systems still use these to count vehicles on the road
acoustic	(1) (2)	picks up sound (e.g. burglar alarm system) detecting liquids moving in pipes (chemical processes)
motion	(1)	detecting speed (e.g. radar guns measuring vehicle speed)
pH	(1) (2) (3)	used to measure acidity in rivers (pollution monitoring) used in greenhouses to monitor soil acidity used to monitor/control chemical process where acidity levels are important
proximity/distance	(1)	these tend to be versions of the above (e.g. light or infra-red)

[2]

(d) Any **one** from:
– DAC (digital to analogue converter)
– actuators [1]

16 (a) (i)

1	5	1	1	8	5	1	2	3	4

[1]

(ii) more than one person can have same date of birth [1]

(iii) Any **one** from:
– give different 4-digit codes to people
– increase the number of digits in code (e.g. 10 instead of 4) [1]

(b) (i)

1st	3rd	4th	7th
P	U	L	6

[

(ii) to prevent illegal access to the website [1]

(c) Any **two** from:
- he last logged on on 16th March 2010 and system shows 14th April 2010
- there is evidence of illegal access [1]

17 (a)

```
highest = –100; total = 0: count = 0      (1 mark)   initialise values NB highest cannot be 0
input number                              (1 mark)   inputs in the correct place
while  number < > –1 do                   (1 mark)   loop until –1 is input
       total = total + number             (1 mark)   calculate number total
       count = count + 1                             and count numbers input
       if number > highest then highest = number (1 mark)  highest
       input number
endwhile
average = total/count                     (1 mark)   calculate average value
print average, highest                               and output average and highest value
```

[4]

(b)

```
d = 0                                     (1 mark)   initialise value
input number                              (1 mark)   input number and set variable
t = number                                           to this number
repeat                                    (1 mark)   correct loop
    t = t /10                             (1 mark)   **method to find number of digits
    d = d + 1                             (1 mark)   **counting number of digits
until t < 1
print number, d                           (1 mark)   correct output outside the loop
(** NOTE: there are other ways of finding number of digits e.g.
    if number > 0 then d = 1
       else if number > 9 then d = 2
       … … … … … … … … … … … …
                                  else if number > 999999 then d = 7 etc.)
```

If no loop then 0 for loop and 0 for output [4]