Cambridge International AS & A Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary and Advanced Level

COMPUTER SCIENCE **9608/01**

Paper 1 Theory Fundamentals **For Examination from 2015**

SPECIMEN MARK SCHEME

1 hour 30 minutes

MAXIMUM MARK: 75

This document consists of **7** printed pages and **1** blank page.

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[Turn over

1 (a) (i) The table/each student has a repeated group of attributes. // Each student has a number of subjects. [1]

(ii) StudentName, TutorGroup and Tutor would need to be repeated for each record. [1]

(b)

Table: Student

StudentName	TutorGroup	Tutor
Tom	6	SAN
Joe	7	MEB
Samir	6	SAN

Table: StudentSubjectChoices

Student Name	Subject	Level	Subject Teacher
Tom	Physics	A	SAN
Tom	Chemistry	A	MEB
Tom	General Studies	AS	DIL
Joe	Geography	AS	ROG
Joe	French	AS	HEN
Samir	Computer Science	A	VAR
Samir	Chemistry	A	MEB
Samir	Maths	A	COR
Samir	General Studies	A	DIL

Mark as follows:
complete Student table [1]
repetition of StudentName in StudentSubjectChoices table [1]
complete columns 2, 3, and 4 [1]

(c) (i) *primary key...*
- an attribute/combination of attributes
- chosen to ensure that the records in a table are unique // used to identify a record/tuple [2]

(ii) StudentName + Subject (This is the only correct answer.) [1]

(iii)
- There is a one-to-many relationship. // Student is the 'one side' table – StudentSubjectChoices is the 'many side' table.
- the primary key (attribute StudentName) in Student
- links to StudentName in the StudentSubjectChoices table
- (StudentName in the) StudentSubjectChoices table is the foreign key. // StudentName is the foreign key that links the two tables. [max 2]

(d)
- there are non-key attributes ...
- SubjectTeacher ...
- dependent only on part of the primary key (i.e. Subject) // partial dependency [max 2]

(e)
- there are dependent <u>non-key</u> attributes // there are <u>non-key</u> dependencies
- TutorGroup is dependent on Tutor // Tutor is dependent on TutorGroup [2]

[Total: 14]

2 **(a)**
- type of parity (odd or even) is agreed by both devices concerned with the communication
- transmitting device counts number of 1 bits in the byte
- one bit is reserved for parity bit
- this parity bit is set to 1 or 0 in order to make the number of 1s in the byte an odd or even number dependent on what type of parity is used
- receiving device on receipt of byte counts number of 1 s
- …odd number of 1s in even parity gives an error /even number of 1s in odd parity gives error

(1 mark per -, max 3) [3]

(b)
- odd parity is used
- byte number 5 has an even number of 1s therefore an error
- column 4 has an even number of 1s
- therefore the 0 in row 5, column 4 needs to be changed to 1

(1 mark per -, max 3) [3]

[Total: 6]

3 **(a)**

LDD 105

Accumulator

0001 0001

Main memory

100	0100 0000
101	0110 1011
102	1111 1110
103	1111 1010
104	0101 1101
105	0001 0001
106	1010 1000
107	1100 0001
200	1001 1111

Mark as follows:
- sensible annotation which makes clear 105 is the address used
- final value in Accumulator [2]

(b)

LDX 101

Accumulator

0101 1101

Index Register

0000 0011

Main memory

100	0100 0000
101	0110 1011
102	1111 1110
103	1111 1010
104	0101 1101
105	0001 0001
106	1010 1000
107	1100 0001
200	1001 1111

Mark as follows:
- IR contents converted to 3
- computed address of 101 + 3 = 104
  // explanation: add contents of IR to address part of instruction
- then, 'direct addressing' to 104
- final value in Accumulator [max 4]

(c)

Accumulator
22
23
170
171

Memory Address			
507	508	509	510
22	170	0	0
		23	
			171

Mark as follows:
- 22 to Accumulator
- incremented to 23
- 23 copied to address 509
- 170 copied to Accumulator and incremented to 171
- 171 in address 510 [5]

[Total: 11]

4 **(a)** lines 10 – 35 [1]

(b) **(i)** myWeight – myHeight – myBMI
case must be correct – any 2 of 3 [2]

(ii) Line Number 21 – 33 [1]

(c) **(i)** prompts the user for input [1]
assigns the input to the given variable [1]

(ii) displays the text shown [1]
in a dialogue box with the alert symbol [1]

(d) router [1]

(e) F – G – B – A – C [5]

(f) The browser will have an interpreter to execute the JavaScript code. [1]

(g) The browser loads the page from the local hard drive. [1]

[Total: 16]

5 **(a)** **(i)** 1001 0110 [1]

(ii) 9C [1]

(b) height: 205 pixels [1]
width: 156 pixels [1]

(c) **(i)** 1 bit [1]

(ii) Each colour is represented by a number. [1]
1 byte makes possible 256 different numbers/colours. [1]

(iii) the header [1]
the resolution [1]

(iv) A bitmap may contain the same sequence of pixels (i.e. a pattern) repeated many times / may contain the same pixel in a long sequence. [1]

A lossless technique is designed to lose none of the original detail. / Lossless allows the original file to be re-created exactly. / Lossy may result in a loss of detail. [1]

One lossless technique is 'run-length encoding/store the colour and the number of consecutive pixels of that colour'. JPEG and GIF file formats use RLE (i.e. a lossless technique). [1]

Lossless techniques are founded on some form of replacement. [1]

Lossy techniques make a decision about what parts of the image are important and then discard certain information. [1]

[max 4]

[Total: 13]

6 **(a)** product – 3
management – 1
self – 2

3 correct = 2 marks
1 correct – 1 mark [2]

(b) **(i)** Management at fault need to keep whole project staff fully informed – i.e. a MANAGEMENT issue

This could impact on the whole project – i.e. a PRODUCT issue.

JUDGEMENT of the project leader is poor. [3]

(ii) A SELF issue – staff should be expected to keep their skills up to date.
It could be the EMPLOYER is not able to move quickly into new areas of work. [2]

(iii) This is a PUBLIC interest issue.
The employee has used good JUDGEMENT in bringing the issue into open discussion. [2]

[Total: 9]

7 (a)

A	B	C	S
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0

(1 mark for C column and 4 marks for S column) [5]

(b) It adds together two single bits/a half adder. [1]

[Total: 6]

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