
COMPUTER SCIENCE

9608/13

Paper 1 Written Paper

May/June 2016

MARK SCHEME

Maximum Mark: 75

Published

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- 1 **Four** from: [4]
- Compiler creates an executable//an interpreter does not create an executable.
 - The compiled program can be independently distributed.
 - Compiler reports all errors at the end of compilation//an interpreter stops when it reaches an error.
 - Interpreter executes each statement immediately after decoding/checking it//a compiler checks the whole program for errors.
 - The interpreter software/source code must be present in main memory every time the program is executed//the compiled program does not require compiler/source code to be present.
 - Cross-compilation is possible/compile on one hardware platform to run on another.
- 2 (a) 77 [1]
- (b) 1000 0010 [1]
- (c) -53 [2]
- One** mark for '53' and **one** mark for '-'
- (d) C6 [2]
- One** mark for the answer, one mark for the method
- Working e.g. $198 / 16 = 12$, $198 - (12 \times 16) = 6$
- 3 (a) **Two** from: [2]
- The source code comes with the software.
 - The user can edit the source code.
 - Once edited, the software is re-distributed with the changes.
- (b) **Two** from: [2]
- The software is purchased.
 - With a **licence** which restricts the number of users / possible time period for use.
 - The program code for the software cannot be edited.
- (c) **Four** from: [4]
- Support / training is readily available so help can be accessed if needed.
 - More robust software / fewer bugs as it has been tested more thoroughly/by more users.
 - Forums / user groups will exist for popular software.
 - Software upgrade path likely to be available (at minimal cost).
 - Manufacturer develops patches that can be automatically downloaded.
 - Compatibility is inbuilt for other commercial software.

4 (a) 11001110

[1]

(b)

[7]

Instruction	Working space	ACC	Memory address				IX	OUTPUT
			90	91	92	93		
			2	90	55	34	2	
20		55						
21		54						
22			54					
23							3	
24		34						
25		33						
26								
27								
28								
31		67						
32						67		
33								'C'
34								

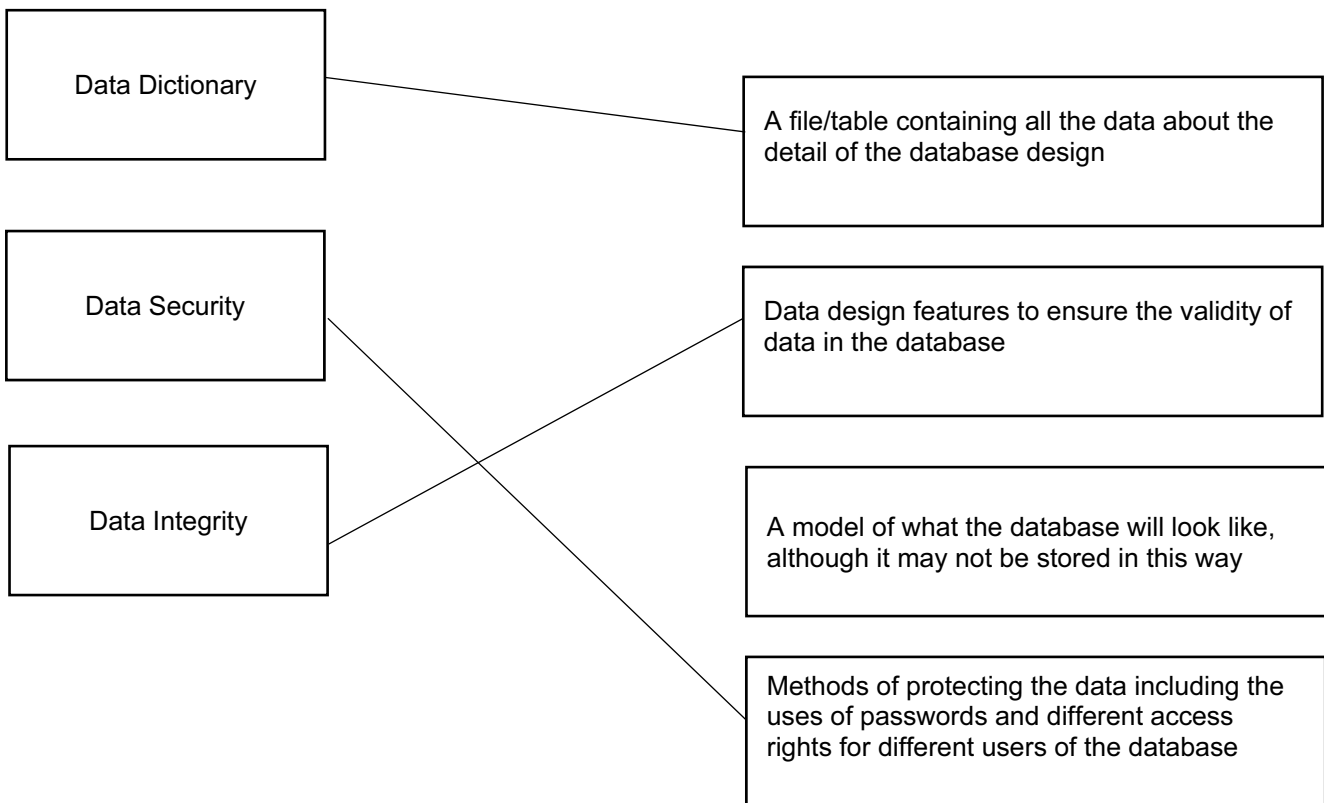
One mark each for:

- Instruction 20
- Instructions 21 and 22
- Instruction 23
- Instructions 24 and 25
- Not executing instructions 29 and 30
- Instructions 31 and 32
- Correct output

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5 (a) One mark for each correct line.

[3]



(b) One mark for procedure point, one mark for justification.

[6]

Maximum **three** procedures.

- How often should the data be backed up? e.g. at the end of each day
- Justification e.g. student's progress may be edited each day and should not be lost

- What medium should the data be backed up to? e.g. external hard disk drive
- Justification e.g. it has large enough capacity

- Where should the backups be stored? e.g. off-site
- Justification e.g. so if the building is damaged only the original data are lost

- What is backed up? e.g. only updated files ...
- Justification e.g. There are a large number of files and they are not all updated each day

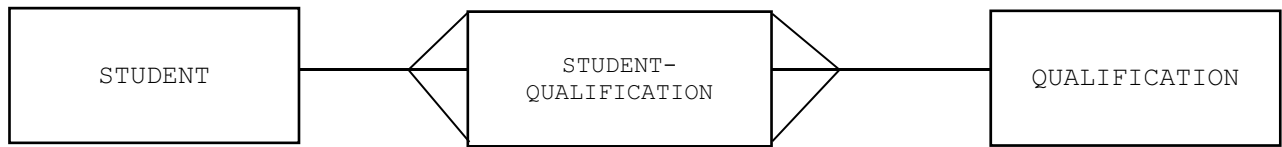
- When should the backup take place? e.g. overnight
- Justification e.g. the system is not likely to be used then

- Who is responsible for performing the backup?
- Justification e.g. otherwise it may not be done

- Make sure the procedure is written down and understood by staff
- Justification e.g. otherwise some data may not be backed up

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(c) (i) One mark for each correct relationship. [2]



(ii) One-to-many [1]

(iii) Two points from: [2]

- The primary key in the QUALIFICATION table is QualCode.
- The foreign key in the STUDENT-QUALIFICATION table is QualCode.
- The primary key of QUALIFICATION is also included in QualCode.

(d) (i) One mark per statement. Several statements may be on one line. [2]

```
ALTER TABLE STUDENT
ADD DateOfBirth DATE;
```

(ii) One mark per statement. Several statements may be on one line. [3]

```
SELECT StudentID, Grade, DateOfAward
FROM STUDENT-QUALIFICATION
WHERE QualCode = 'SC12';
```

(iii) One mark per statement. Several statements may be on one line. [4]

```
SELECT STUDENT.FirstName, STUDENT.LastName, STUDENT-
QUALIFICATION.QualCode
FROM STUDENT, STUDENT-QUALIFICATION
WHERE STUDENT-QUALIFICATION.Grade = 'A'
AND STUDENT.StudentID = STUDENT-QUALIFICATION.StudentID;
```

Alternative answer:

```
SELECT FirstName, LastName, STUDENT-QUALIFICATION.QualCode
FROM STUDENT, INNER JOIN STUDENT-QUALIFICATION
ON STUDENT.StudentID = STUDENT-QUALIFICATION.StudentID
WHERE Grade = 'A';
```

6 (a) Two from: [2]

- WWW is a collection of interlinked, hypertext documents/webpages/multimedia resources (accessed via the Internet) //WWW is content from web servers organised as web pages
- Internet is the global connection of interconnected computer networks
- The Internet uses TCP/IP protocol / WWW uses http protocols to transmit data

(b) [5]

Description	Fibre-Optic cables	Copper cables	Radio waves
'Wireless' media			✓
Twisted-pair is an example		✓	
Uses light waves	✓		
WiFi			✓
Fastest transmission media	✓		

(c) One pair from: [2]

- Real-time - a live stream of an event that is currently taking place
- On-demand - streaming of an event/programme that has taken place in the past
- Real time – the event is captured live with a video camera connected to a computer
- On-demand – Existing media are encoded to bit streaming format and uploaded to a server
- Real-time – cannot be paused / rewind etc
- On-demand – can be paused / re-wound / fast forwarded etc

(d) Two marks for description, one mark for correct example. [3]

- Four numbers separated with '.'
- Each number is between 0 and 255 / 00 and FF in Hex / stored in one byte.
- 32 bits long
- Correct example

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(e) Four from: [4]

- URL is a reference address to a resource on the Internet.
- The URL is passed to the nearest Domain Name Server (by browser software).
- DNS server stores a database / list of URLs and matching IP addresses.
- DNS (Name Resolver) looks for the URL in its database.
- Finds the matching IP address and returns it to the originator.
- Or if it cannot find it, it forwards to another Domain Name Server at a higher level.
- (Original) DNS server adds the returned IP address to its cache.
- (Original) DNS server returns the IP address to the browser.

7 (a) Four from: [4]

- Security is keeping the data safe.
- Integrity is making sure that the data is correct / valid.
- Security is the prevention of data loss.
- Integrity ensures that the data received is the same as the data sent / data copied is the same as the original.
- Example of ensuring security, e.g. usernames and passwords, firewalls etc...
- Example of ensuring integrity, e.g. parity checks, double entry etc...

(b) Three pairs from: [6]

- Installing a firewall and ensuring it is switched on.
- To stop unauthorised access / hackers gaining access to the bank's computer network.
- Use authentication methods such as passwords and usernames.
- Passwords should be strong / biometrics.
- Encrypt the data.
- So that if data is accessed it will be meaningless / only accessed by those with decryption key.
- Set up access rights...
- To stop users reading/editing data they are not permitted to access.
- Installing and running an up to date anti-malware program (anti-virus/anti-spyware etc.).
- To detect / remove / quarantine viruses / key-loggers etc.
- Make regular backups of the data.
- To separate device or off site to enable recovery if necessary.
- Employ measures for physical security.
- Example of a measure for physical security.