

QUESTION 10.

CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International Advanced Subsidiary and Advanced Level



MARK SCHEME for the October/November 2015 series

9608 COMPUTER SCIENCE

9608/11

Paper 1 (Written Paper), maximum raw mark 75

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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Page 2	Mark Scheme
	Cambridge International AS/A Level – October/November 2015



1 (a) any **two** from:

- sequence of digital signals / bits
- over a communication path / Internet
- transfer of data at high speed
- requires fast broadband connection
- requires some form of buffering
- bits arrive in the same order as sent

[2]

(b) (i) any **two** from:

- no need to wait for a whole file to be downloaded
- no need to store large files on user's computer
- allows on demand playback
- no specialist software is required for playback in browser

[2]

(ii) any **two** from:

- video stops / hangs if very slow Internet / broadband speed low
- video stops / hangs if inadequate buffering capacity
- loss of Internet means can't access films / files
- may require specific software to run the files / films
- viruses can be downloaded from the websites

[2]

(c) 2 marks for on-demand and 2 marks for real-time

on-demand

- digital video tape, analogue video tape, or digital files are converted to bit streaming – format for broadcasting on the net; this is known as encoding, these encoded streaming video files are then uploaded to a dedicated server
- a link for the encoded video is placed on a web site
- a user clicks on the link to download the encoded streaming video; the streamed video is then broadcast to the user as and when they require it
- can be paused / can go back and re-watch / fast-forward, etc.

real-time

- an event is captured live with a video camera
- the video camera is connected to a computer
- the video signal is converted to streaming media files (encoded) on the computer
- the encoded feed is then uploaded from the computer to a dedicated streaming server via cable, DSL, or a high-speed internet connection
- the server then sends the live images it to all users requesting it as real-time video streaming
- cannot be paused etc.

[4]



2 (a) A = control bus

B = address bus

C = data bus

(b) Program Counter – stores the address of next instruction to be executed

Memory Data Register – stores the data in transit between memory and other registers // holds the instruction before it is passed to the CIR

Current Instruction Register – stores the current instruction being executed

Memory Address Register – stores the address of the memory location which is about to be accessed [4]

3 (a)

Statement	True (✓)
The IP address consists of any number of digits separated by single dots (.)	
Each number in an IP address can range from 0 to 255	✓
IP addresses are used to ensure that messages and data reach their correct destinations	✓
Public IP addresses are considered to be more secure than private IP addresses	

accept words TRUE or FALSE in right hand column

1 mark per tick, –1 mark for each wrong tick if more than 2

[2]

(b) (i) http – enables browser to know what protocol is being used to access information in the domain

cie.org.uk – cie.org.uk is the domain name

computerscience.html – actual web page / file being viewed

[3]

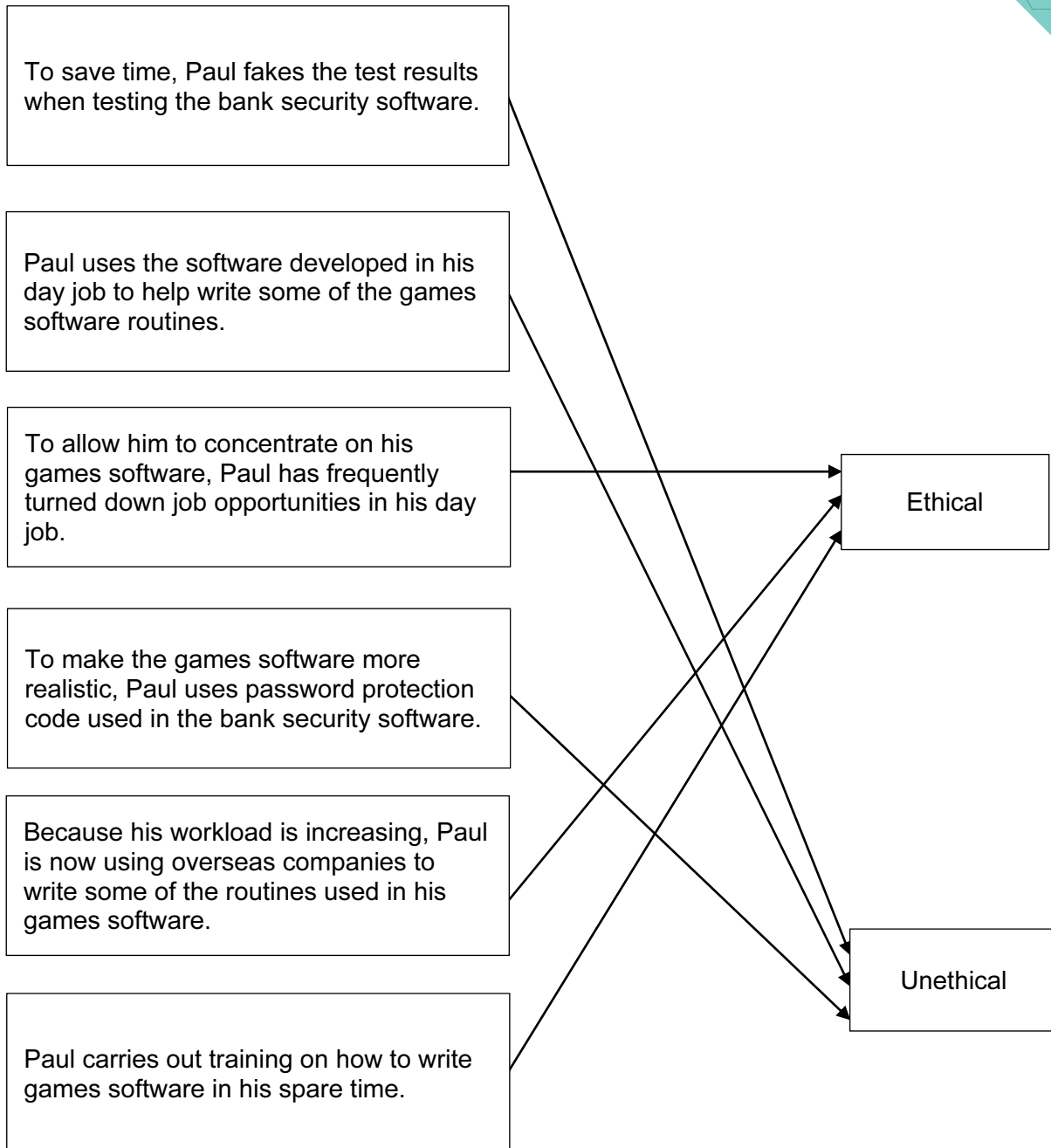
(ii) %20 – because <space> not allowed in a URL, %20 is the coding for a space (32 in denary)

? – separates the URL from all parameters or variables

[2]



4



1 mark for each correct line, two lines from one box is incorrect

[6]

Page 5	Mark Scheme
	Cambridge International AS/A Level – October/November 2015



- 5 (i) any **four** from:
- sensors send signals / data to a computer
 - data / signal converted to digital (using an ADC)
 - computer calculates the activity value based on sensor signal strength / data
 - if calculated value > 3,
 - determine location of sensor
 - build up a map of seismic activity
 - location and magnitude sent to printer
 - ... via USB port / wireless link
 - monitoring is continuous [4]
- (ii) – output / hard copy not picked up in good time [1]
- (iii) 1 mark for name + 1 mark for reason for choice
- speaker / buzzer / alarm bell
 - gives control room operators an audible warning
 - flashing lights
 - gives control room operators an visual warning
 - monitor
 - use of red / flashing colours on monitor gets the attention of operators [2]
- 6 any **four** points from (maximum 3 marks per type of cable):
- fibre optic cables have greater bandwidth
 - fibre optic cables need less signal boosting // can transmit over longer distances
 - fibre optic cables have greater security (more difficult to “tap” into)
 - fibre optic cables are immune to electromagnetic and other effects
 - fibre optic cabling is lighter in weight (easier to install)
 - fibre optic cables consume less power
 - copper cabling is less expensive to install
 - copper cable is easier to install because it is more flexible
 - it is easier to make terminations using copper cabling
 - the expertise in use of copper cabling is more extensive
 - has been around for years ... so very little is “unknown” about installations using this type of cabling [4]



- 7 (a) (i) – at least one computer used to “serve” ...
 – ... other computers are referred to as “clients”
 – server provides services / applications etc. ...
 – ... which may be requested by clients
- (ii) any **two** from:
- files and resources are centralised
 - creation of security / manage security
 - user needs user name and password to access network
 - centralised back-up
 - intranet capability
 - Internet monitoring
 - clients can be less powerful machines, therefore less expensive to buy
 - saving resources on server reduces the burden on the client
- [2]

(b) router [1]

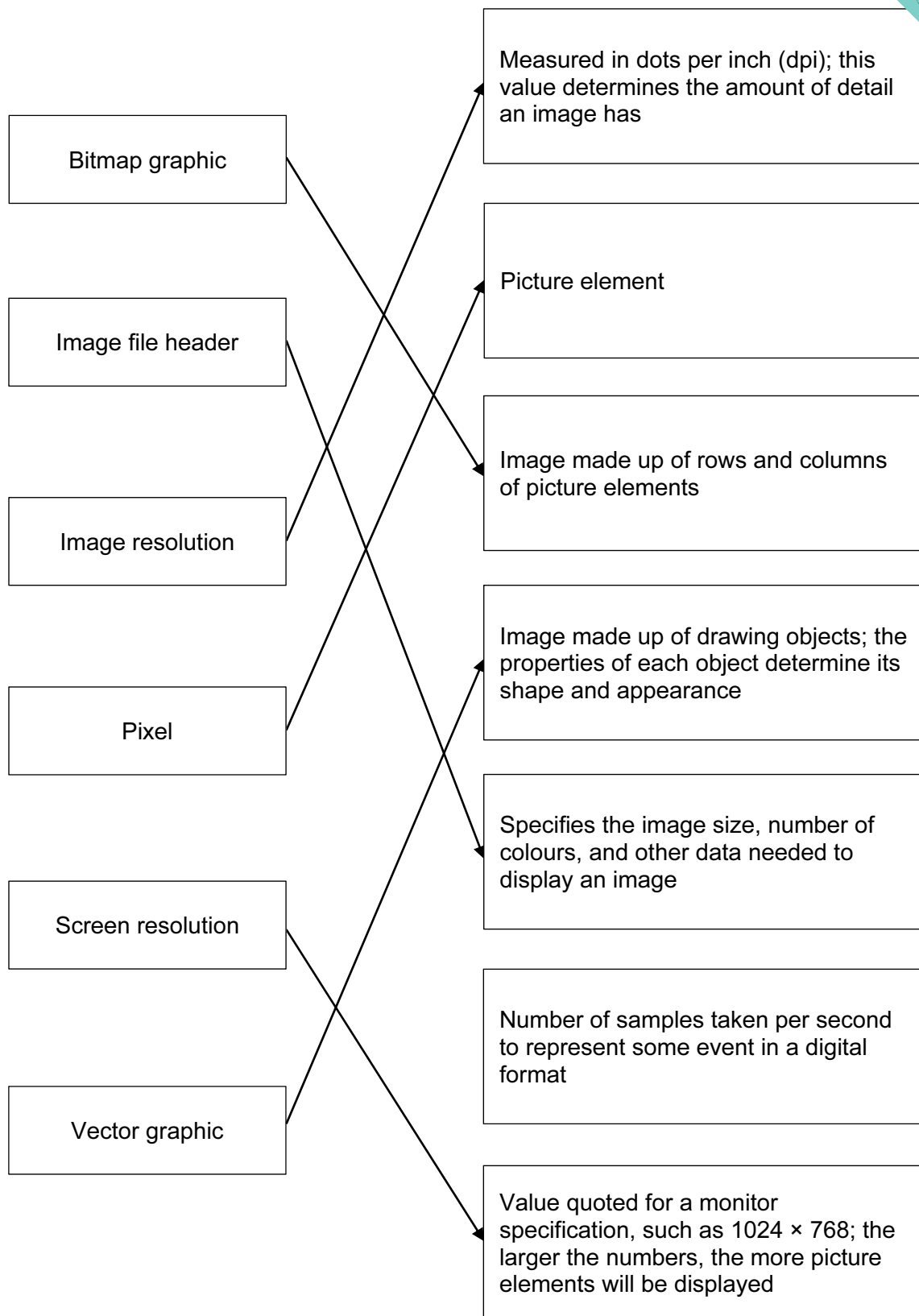
(c)

Statement	Sequence number
The requested web page is displayed on the client computer	5
The user clicks on the hyperlink and the web page is requested from the web server	1
The requested web page content is transmitted to the client computer	3
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The web server locates the requested web page	2

[5]



8 (a)



1 mark for each correct line, two lines from one box is incorrect

[6]



(b) (i) $\frac{512 \times 256}{8 \times 1024} = 16 \text{ KB}$

1 mark for numerator + 1 mark for denominator

- (ii) so it is possible to estimate how many images can be stored / to decide if it can be sent as an email attachment [1]

9 (a) One mark for validation, one mark for verification.

validation

- check whether data is reasonable / meets given criteria

verification

- method to ensure data which is copied / transferred is the same as the original
- entering data twice and computer checks both sets of data
- check entered data against original document / source

[2]

(b) any **four** from:

- parity can be even or odd
- parity check uses the number of 1s in a binary pattern
- if there is an even / odd number of 1s, then the parity is even / odd
- following transmission ...
- parity of each byte checked
- a parity bit is used to make sure binary pattern has correct parity
- example: 1 0 0 1 0 1 1 1 has parity bit set to 1 in MSB since system uses odd parity (original data: 0 0 1 0 1 1 1 which has four 1 bits)

[4]

10 (a) any **two** from:

- malicious code / software / program
- that replicates / copies itself
- can cause loss of data / corruption of data on the computer
- can cause computer to “crash” / run slowly
- can fill up hard disk with data

[2]

(b) any **two** from:

- checks for boot sector viruses when machine is first turned on
- when an external storage device is connected
- checks a file / web page when it is accessed / downloaded

[2]



11

Statement	Interpreter	Correct
This translator creates an executable file		✓
When this translator encounters a syntax error, game execution will halt	✓	
The translator analyses and checks each line just before executing it	✓	
This translator will produce faster execution of the game program		✓
Use of this translator makes it more difficult for the user to modify the code of the game supplied to the user		✓

1 mark for each correct row

[5]

QUESTION 11.

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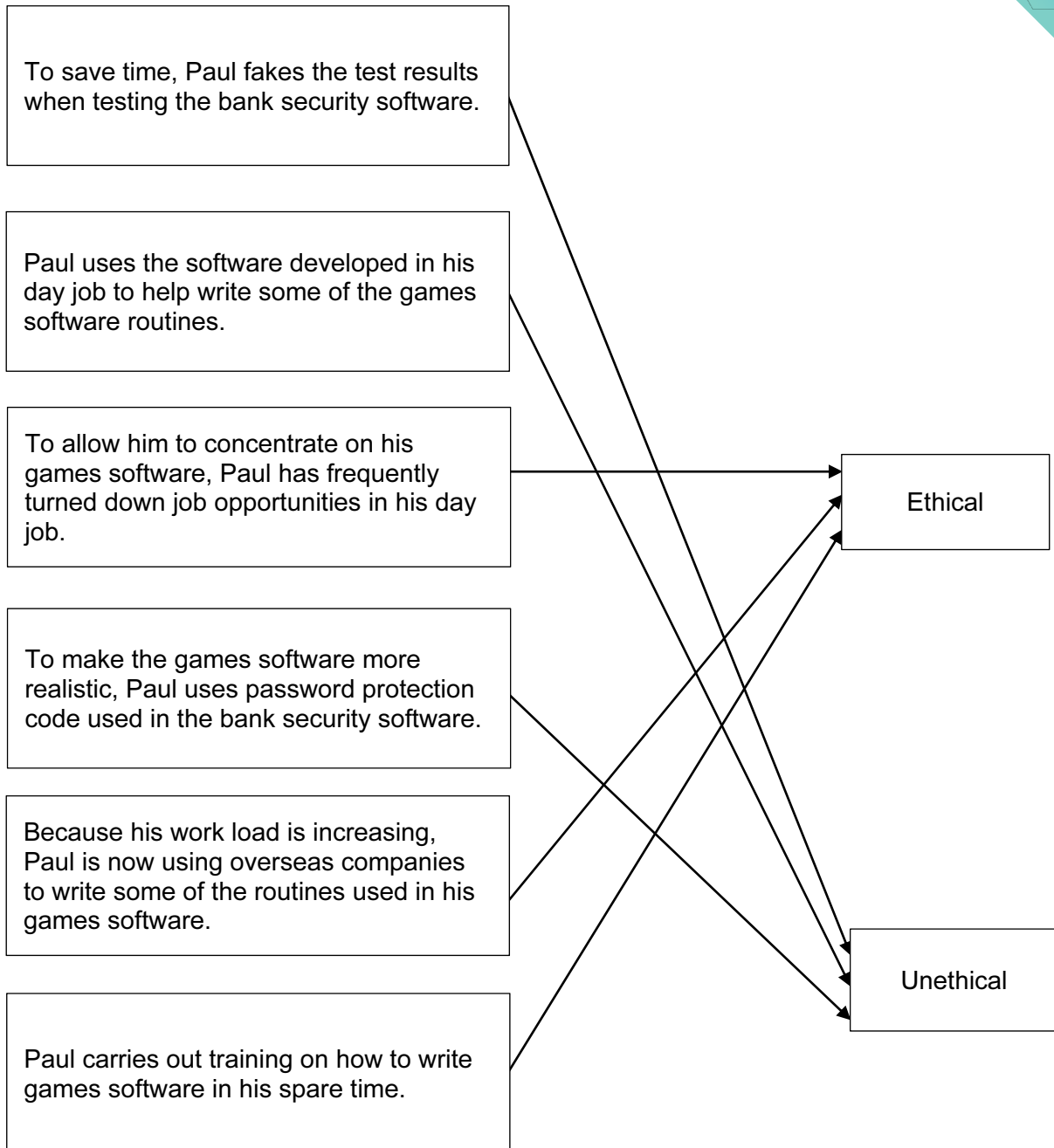
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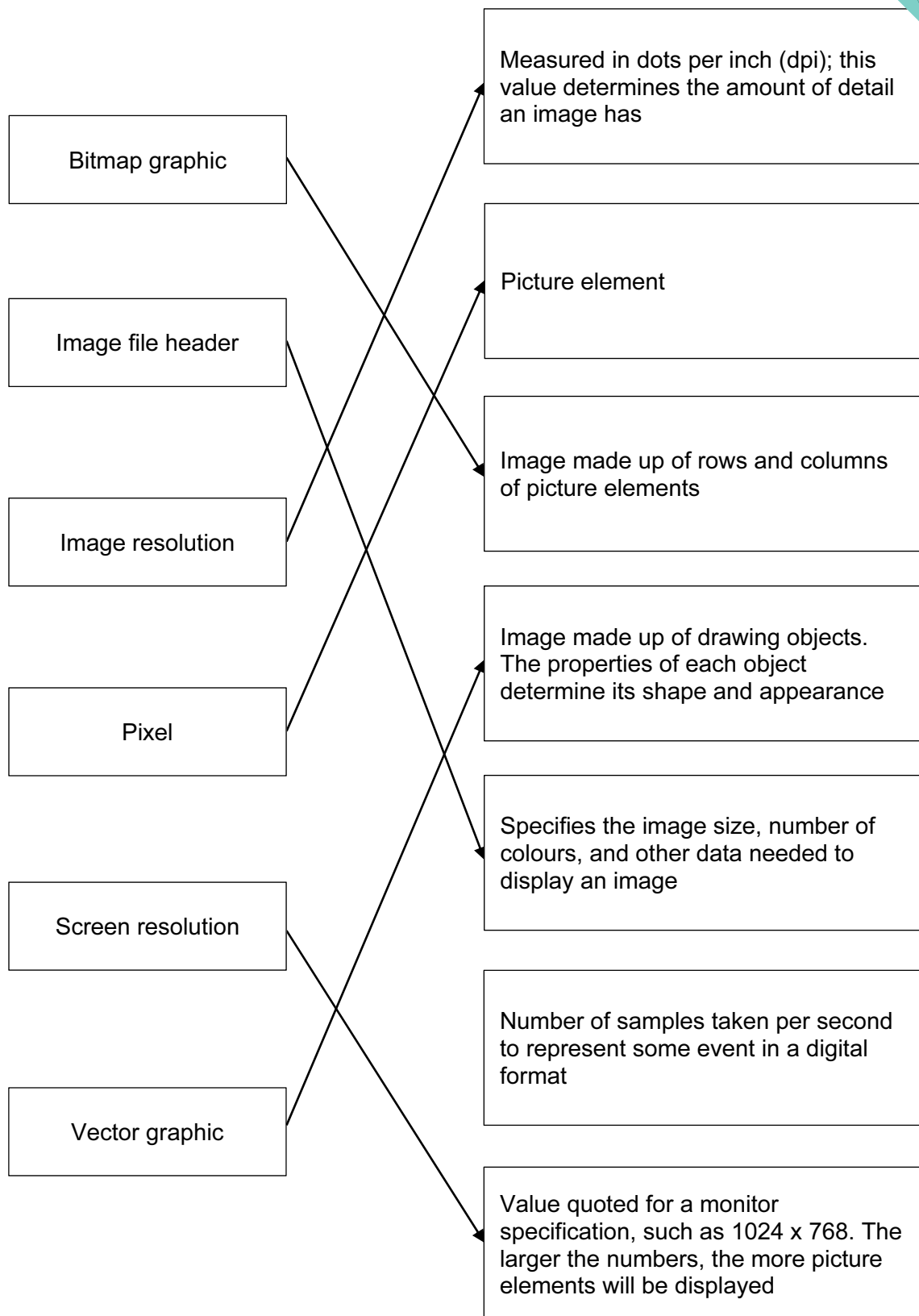
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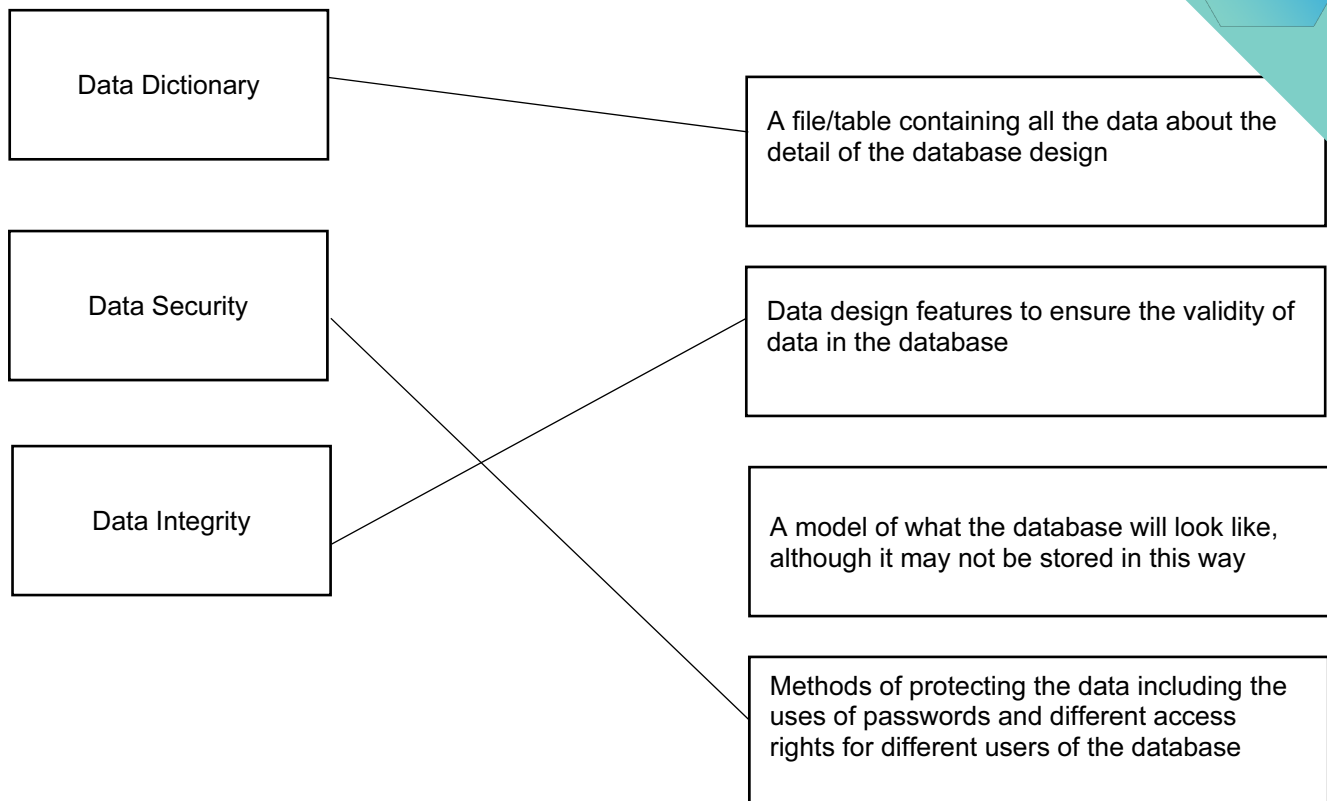
1 mark for each correct row

[5]

QUESTION 12.



5 (a) One mark for each correct line.



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

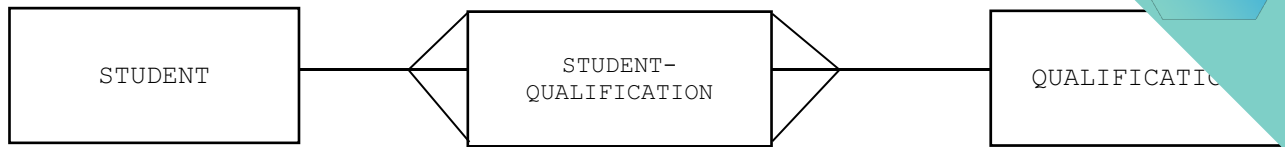
[6]

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



(c) (i) One mark for each correct relationship.



(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';
```

QUESTION 13.



Question	Answer	Marks
4(a)	1 mark for naming a principle, 1 mark for description to max 3 × 2 • Product • Software engineers shall ensure that their products and related modifications meet the highest professional standards possible. • Judgement • Software engineers shall maintain integrity and independence in their professional judgement. • Management • Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance. • Profession • Software engineers shall advance the integrity and reputation of the profession consistent with the public interest. • Colleagues • Software engineers shall be fair to and supportive of their colleagues. • Self • Software engineers shall participate in life-long learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.	6
4(b)	1 mark per bullet point to max 2 × 2 Data backup • A copy of data will have been made and stored elsewhere. • If the original is lost, the backup can be used to restore the data. Disk-mirroring • The data is stored on two disks simultaneously. • If the first disk drive fails, the data is accessed from the second disk.	4

QUESTION 14.



Question	Answer												
1(a)	1 mark for each correct entry <table><tr><th>Management task</th><th>Description</th></tr><tr><td>Memory management</td><td>Handles the allocation of memory to processes // Ensures two programs do not attempt to use the same memory locations // Keeps track of allocated and free memory locations</td></tr><tr><td>Security management</td><td>Provides user accounts and passwords</td></tr><tr><td>Interrupt processing</td><td>Handles the signals sent when the attention of the processor is required elsewhere</td></tr><tr><td>Provision of a software platform</td><td>Provides an environment within which programs can be run</td></tr></table>		Management task	Description	Memory management	Handles the allocation of memory to processes // Ensures two programs do not attempt to use the same memory locations // Keeps track of allocated and free memory locations	Security management	Provides user accounts and passwords	Interrupt processing	Handles the signals sent when the attention of the processor is required elsewhere	Provision of a software platform	Provides an environment within which programs can be run	
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Interrupt processing	Handles the signals sent when the attention of the processor is required elsewhere												
Provision of a software platform	Provides an environment within which programs can be run												
1(b)(i)	1 mark per bullet point to max 2 for formatter, max 2 for defragmenter hard disk formatter - Makes existing data inaccessible - Partitions the disk into logical drives - Sets up the (specified) file system - Prepares the disk for initial use - May check for errors on the disk hard disk defragmenter - Re-organises the disk contents - Moves split files so they are contiguous - Creates a larger area of (contiguous) free space	4											
1(b)(ii)	1 mark per bullet point For example: - Backup software - File compression - Virus checker - Disk contents analysis / repair	3											

QUESTION 15.



Question	Answer	
2(a)(i)	1 mark per device to max 2 e.g. • Trackpad/touchpad • microphone • touchscreen • scanner	
2(a)(ii)	1 mark per device to max 2 e.g. • printer • speakers • touchscreen	2
2(a)(iii)	Magnetic hard disk drive // solid state drive	1
2(a)(iv)	1 mark per bullet point to max 3 • The ball touches horizontal and vertical rollers • When the ball rotates / moves • ... one or both of the rollers rotate as well • Each roller connects to a shaft which spins a disk with holes • Infrared beams shine through the holes in the disks • As the ball moves the roller the beam is broken by the space between the holes • ... creating pulses of light • The distance and/or speed of the mouse is determined from the rate of the pulses • ... by an on-board processor chip // by driver software in the computer	3
2(b)	1 mark per bullet point to max 4 for each management task, max 6 in total Process management: • Manages the scheduling of processes • ... allows multi-tasking / multi-processing • ... ensures fair access • ... handles priorities • Manages the resources the processes need • Enables processes to share information • Prevents interference between processes// resolution of conflicts Provision of a user interface: • Allows a user to communicate with the hardware // vice-versa • ... by making navigation around the system easier • Provides facility for user inputting data • Provides facility for outputting to the user • By example e.g. command line / GUI / menu-driven	6



Question	Answer	
2(c)	1 mark per bullet point to max 3 for each utility program, max 4 in total Virus checker: • Scans files stored on a computer system for malicious code • Scans files when they enter the system / memory stick inserted / download etc. • Sets up a schedule for virus-checking • Isolates / quarantines / deletes viruses • Regularly updates the virus definitions Backup software: • Creates a copy of the contents of a disk / partition. Can be set up to automatically backup // schedules backups • Allows the user to decide what is backed up, e.g. all data // all files that have changed since the last backup • Allows the user to set up an off-site backup • May encrypt the backup files • Restores the data if necessary	
2(d)	1 mark per bullet point to max 2 • The code is translated one line at a time • ... and executed immediately • The interpreter stops as soon as it finds an error	2