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Mark

EP09/H/01

Computing Science

Date — Not applicable

Duration — 2 hours



* EP09H01 *

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Number of seat

Date of birth

Day

Month

Year

Scottish candidate number

Total marks — 90

SECTION 1 — 20 marks

Attempt ALL questions.

SECTION 2 — 70 marks

Attempt ALL questions.

Show all workings.

Write your answers clearly in the spaces provided in this booklet. Additional space for answers is provided at the end of this booklet. If you use this space you must clearly identify the question number you are attempting.

Use blue or black ink.

Before leaving the examination room you must give this booklet to the Invigilator; if you do not, you may lose all the marks for this paper.



* EP09H0101 *

SECTION 1 — 20 marks

Attempt ALL questions

MARKS

DO NOT
WRITE IN
THIS
MARGIN

1. The following section of code represents some information about flights:

```
direct(glasgow, london).  
direct(london, paris).  
direct(paris, rome).  
direct(paris, seville).  
direct(rome, berlin).  
  
fly_direct(P,Q):-direct(P,Q).  
one_stop(X,Y):-fly_direct(X,Z),fly_direct(Z,Y).
```

- (a) State which type of language is shown.

1

- (b) Describe two features of this type of language. You may refer to the code in your answer.

2

2. Before a customer can register with the website, they must complete an optical character recogniser code to verify that the user is human.



- (a) Validation of this code entered requires a script. Explain why this script would require server-side processing, rather than client-side processing.

2

- (b) Explain one feature of the code interface that ensures it can be used by as many people as possible.

2



* E P 0 9 H 0 1 0 2 *

3. State the decimal value of the largest whole number that can be stored using 10-bits.

1

4. Describe two differences between main memory and cache memory.

2

5. The Scottish Tennis Association stores details about players and clubs in a single table. Below is a record from this table:

Name	Paul Notman
Rating	6.2
Tennis club	Strathmore
Club secretary	Marta Barowska
Club address	67 Greenfield Street, Falkirk
Club telephone	01789 786532

- (a) A new club secretary has been appointed for the Strathmore tennis club. Explain why changing the name in this record would be problematic.

2

- (b) Explain how this problem could be solved.

2



6. Ali has created a poster using bitmapped graphic software. Describe how a colour bitmapped graphic is stored.

2

7. BestPals is a social networking website. Members can post comments and images on their own pages and on their friends' pages. Members of BestPals can also send private messages to their friends.



- (a) Describe one possible social implication of using private messaging in this context.

1

- (b) Describe one possible legal implication of using private messaging in this context.

1

8. A list of eight scores for a game is stored in a 1-D array as shown below:

Index	0	1	2	3	4	5	6	7
Scores	16	12	19	20	17	8	13	19

An algorithm will ask for a target score and then find all the scores in the array and reduce them by 10. For example, if the target score entered is 19, then the array becomes:

Index	0	1	2	3	4	5	6	7
Scores	16	12	9	20	17	8	13	9

Part of the algorithm is shown:

```

1  SET scores TO [16,12,19,20,17,8,13,19]
2  RECEIVE target FROM (INTEGER)KEYBOARD
3  FOR counter FROM 0 TO 7 DO
4  IF .....
5  .....
6  END IF
7  END FOR
    
```

Using pseudocode, or a language with which you are familiar, complete the missing lines of code at lines 4 and 5.

2

SECTION 2 — 70 marks

Attempt ALL questions

9. A social networking website stores information about its members. The table below shows a sample of the information stored:

Surname	Forename	Username	Password
Walker	Andrew	andyandy	5654
Anderson	Eilish	ellie34	1457
Khan	Ganesh	ganeshk	1457
Anderson	Kevin	kev67	4789
Gallagher	Paul	pg88	2564
Anderson	Shona	shaza	7312
Khan	Zahra	zahrak	1958

- (a) A record data structure is used for the members' details.

```
Record Members IS {STRING surname,
                   STRING forename,
                   STRING username,
                   INTEGER password}
```

Describe how the website could store the information for five million members, using the record data structure above.

2



9. (continued)

(b) When someone logs on, a search is performed using the **Username** that they entered.

- (i) Using pseudocode, or a language with which you are familiar, write an algorithm that asks for a **Username** and then finds the position of that **Username**.

5

- (ii) When implementing code, a programmer can limit the scope of a variable. Explain what is meant by scope and how it can be limited.

2

- (iii) A test plan is to be constructed for the search algorithm. `kev67` is an example of normal test data that will be used to test the search algorithm.

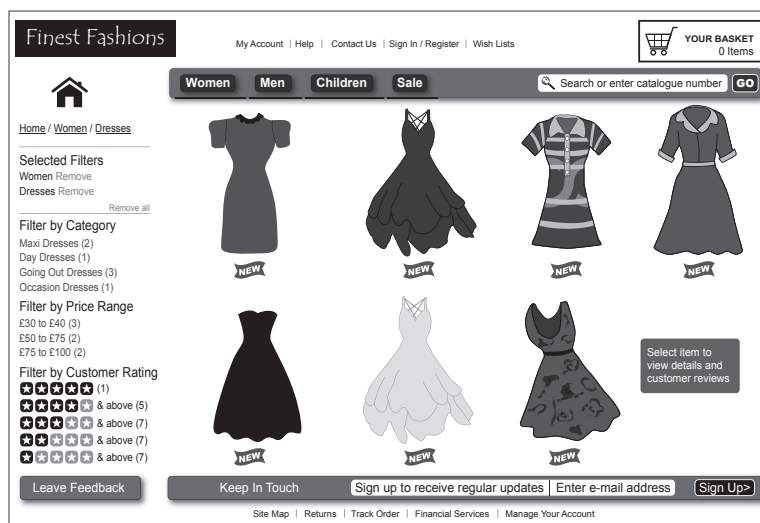
Describe two examples of other types of test data that should be used in this test plan.

2



10. Finest Fashions is an online fashion store. Customers can browse the company website, search for items of clothing and make online purchases.

The screen shot below shows one page from the Finest Fashions website:



- (a) All images on the website have been stored as bitmaps of integers, corresponding to the colour of each pixel. Part of an algorithm used to compress the images is shown below:

```

1   SET pixelPrev TO " "
2   SET runLength TO 0
3   SET counter to 0
4   REPEAT
5     RECEIVE pixelColour[counter] FROM
      (INTEGER) file1
6     IF pixelPrev ≠ pixelColour[counter] THEN
7       SEND pixelColour[counter] TO file2
8       SEND runLength TO file2
9       SET pixelPrev TO pixelColour[counter]
10    SET runLength TO 0
11    END IF
12    SET counter TO counter + 1
13    SET runLength TO runLength + 1
14    END IF
15  UNTIL end of file1

```

Explain whether this compression algorithm is lossy or lossless, by making reference to the line numbers shown above.

2



10. (continued)

- (b) The website allows customers to leave ratings of 1 to 5 stars for any items purchased. As each rating is received, a server-side script is used to recalculate the average rating for the item and then update the average rating displayed on the website.



The web server stores the total number of ratings received for each item, along with the overall average rating for each item.

Using pseudocode or a language with which you are familiar, write an algorithm for this script.

4

- (c) When a customer using the site proceeds to the checkout, the following warning message is displayed:



10. (c) (continued)

(i) Should the customer proceed? Explain your answer.

2

(ii) The website is hosted using public web server provision. Explain why moving the website to private web server provision can improve the security of the site.

2

(d) Finest Fashions decides to make its website available on mobile devices such as smartphones. As a result of this decision, maintenance must be carried out.

Explain **one** modification to the interface that will be necessary, due to the technical limitations of smartphone devices.

2



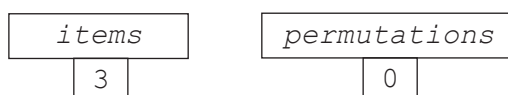
11. A function used to perform an arithmetical operation is shown below:

```
FUNCTION combinations (INTEGER number) RETURNS INTEGER
  SET factor TO 1
  FOR counter FROM 1 TO number DO
    SET factor TO counter * factor
  END FOR
  RETURN factor
END FUNCTION
```

(a) State the formal parameter in the function.

1

(b) A program has two variables called *items* and *permutations* which contain the values 3 and 0 respectively, as shown below:



(i) Explain what is meant by an actual parameter, by referring to the following line of code used to call the function above:

```
SET permutations TO combinations(items)
```

2

(ii) State the values contained in *items* and *permutations* after execution of the line of code in part (i).

2



11. (b) (continued)

(iii) Explain your answer to part (ii).

3

(c) Initial testing of the function showed that it contained a logic error. This logic error was corrected.

(i) Use an example to explain how a logic error could occur by changing one line of code.

2

(ii) Describe one other type of error that may occur when coding.

2



12. Carter’s Carriage is a transport company which operates a fleet of vans carrying goods between 25 depots throughout the country. Every trip follows one of a number of set routes between an origin depot and a destination depot.

Refuelling, if necessary on longer routes, is only permitted at a particular town on the route.

A relational database has been created to help the company. The structure of the data model is as follows:

Driver	Trip	Van	Route
<u>Driver number</u>	<u>Driver number*</u>	<u>Registration number</u>	<u>Route number</u>
Driver name	<u>Registration number*</u>	Capacity	Origin
Mobile number	<u>Date</u>	Date purchased	Destination
	Route number*		Refuel town

(a) Draw an entity relationship diagram to represent this data model. 2

(b) Explain the term “compound key” using the above data to exemplify your answer. 2

12. (continued)

- (c) The data dictionary below represents the Trip entity.
State a suitable entry for each of the missing values A to D.

Attribute	Data type	Validation	Unique	Key
Driver number	Integer	Lookup from Driver table	N	PK/FK
Registration number	A	Lookup from Van table	N	PK/FK
Date	Date		C	PK
Route number	Integer	B	N	D

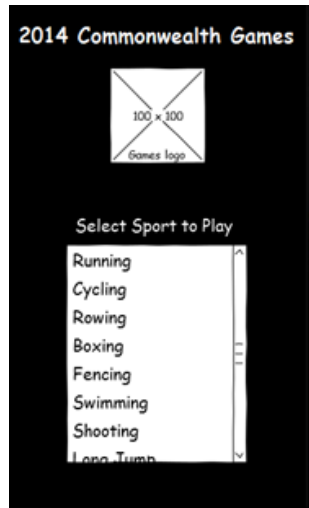
4

- (d) It was suggested that “Refuel town” could have been used instead of “Route number” as a primary key in the Route table. Explain why this would have caused problems.

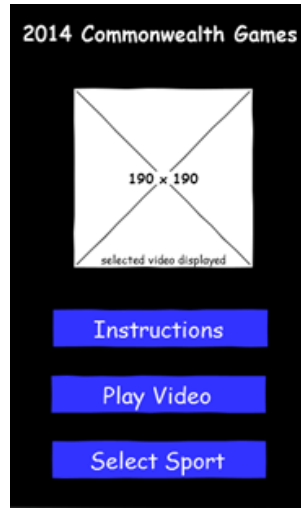
2

13. An app is being developed to view video clips of sporting events such as the 2014 Commonwealth Games and will run on a wide range of smartphones.

During the development process, the developers produce the wireframes shown below:



Sports Selection screen



Play Video screen

- (a) Describe how the wireframes are used during the software development process. 2

- (b) The interface of the app must take account of the needs of all users. Explain how the presence of novice and expert users will increase the complexity of the development task. 2

13. (continued)

(c) Once in use, the Sports Selection screen will send the selected sport to the web server and suitable video clips will then be returned to the smartphone. The developers of the app are considering the use of distributed storage for the video clips.

(i) State one benefit of distributed storage for the app developers.

1

(ii) State one benefit of distributed storage for the users of the app.

1

(d) Many smartphones use the Vortex processor. In February 2014 an updated version of the Vortex processor was released. Read the following information about the new processor.

The 32-bit Vortex-A17 will replace the aging Vortex-A9. The scalable design can support up to four cores, running at speeds of 2GHz and beyond. It will provide up to 60% greater performance than a Vortex-A9 chip, but use 20% less power. The Vortex-A17 processor offers configurable caches, with sizes between 32 KB and 64 KB for instruction, and 32 KB for data.

(i) Explain how the use of cache can improve the user's experience of the Commonwealth Games app.

2

(ii) It is expected that the next release of Vortex processors will introduce the 64-bit Vortex-A50.

Explain why the improvement from 32-bit cores to 64-bit cores will improve the performance of any smartphone, based on these ARM processors.

2



MARKS

DO NOT
WRITE IN
THIS
MARGIN

13. (d) (continued)

(iii) Explain how this trend towards increased processor performance impacts on the lifetime carbon footprint of a smartphone.

2

(iv) Many owners of a smartphone sign up to the online forum run by the manufacturer of the device.

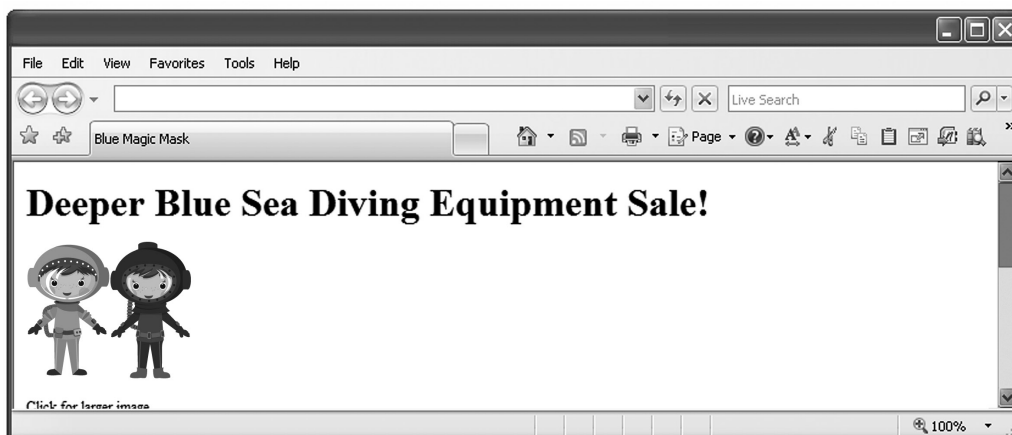
State **two** benefits to smartphone owners of using this type of online community.

2



* E P 0 9 H 0 1 1 7 *

14. Deeper Blue Sea is a company selling diving equipment. A section of a page from the company’s website is shown below:



Part of the HTML code used to produce this page is shown below:

```

1. <head>
2.     <title>Blue Magic Mask<  A  >
3.     <style>
4.         p.style1{font-size: 9pt;}
5.         h1{font-family:Verdana, Arial, Helvetica;}
6.     </style>
7. <  B  >
8. <  C  >
9.     <h1>Deeper Blue Sea Diving Equipment Sale!</h1>
10.    <p> <a href="My pictures/diver.jpg"> </a></p>
11.        <p class="style1">Click for larger image </p>
12.    <p>Our best selling mask just got better - and cheaper<a
    href="#BMMask" >...more... </a></p>
13.    <p>E-mail for information about <a
    href="mailto:discounts@deeperblue.com.uk">diving club
    discounts</a> </p>

```

- (a) State suitable entries for each of the missing values labelled A, B and C. 3

14. (continued)

(b) The internal style sheet code in lines 3–6 affects the page layout. Explain the effect of the style sheet on:

(i) Line 9

2

(ii) Line 11

1

(c) Describe **two** benefits of using an external style sheet instead of an internal style sheet, as used by Deeper Blue Sea.

2

(d) The website is published on the internet. However, Deeper Blue Sea realises that search engines are not finding the website. Describe how the HTML code could be modified to help a search engine find the website.

3

[END OF EXEMPLAR QUESTION PAPER]

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* E P O 9 H O 1 1 9 *

ADDITIONAL SPACE FOR ANSWERS

MARKS

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* E P 0 9 H 0 1 2 0 *



EP09/H/01

Computing Science

Marking Instructions

These Marking Instructions have been provided to show how SQA would mark this Exemplar Question Paper.

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General marking principles for Higher Computing Science

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the detailed Marking Instructions, which identify the key.

- (a) Marks for each candidate response must always be assigned in line with these general marking principles and the detailed Marking Instructions for this assessment.
- (b) Marking should always be positive. This means that, for each candidate response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding: they are not deducted from a maximum on the basis of errors or omissions.
- (c) Marks should be awarded regardless of spelling, as long as the meaning is unambiguous.
- (d) Candidates may answer programming questions in any appropriate programming language or pseudocode. Marks should be awarded, regardless of minor syntax errors, as long as the intention of the coding is clear.
- (e) Where a question asks the candidate to **describe**, the candidate must provide a statement or structure of characteristics and/or features. This should be more than an outline or a list. It may refer to, for instance, a concept, process, experiment, situation or facts in the context of, and appropriate to, the question. The candidates will normally be required to make the same number of factual/appropriate points as are awarded in the question.
- (f) Where a question asks the candidate to **explain**, marks should only be awarded where the candidate goes beyond a description, for example by giving a reason, or relating cause to effect, or providing a relationship between two aspects. These will be related to the context of the question or a specific area within a question.

Marking Instructions for each question

SECTION 1

Question		Expected response	Max mark	Additional guidance
1	a	Declarative	1	
1	b	<ul style="list-style-type: none"> • Uses facts to represent information, eg line 1 states that there is a direct flight from Glasgow to London. • Uses rules, eg line 5 or 6 reduces the need for repeated lines of code. • Uses queries to interrogate the knowledge base. • Has an in-built search algorithm to pattern match/resolve queries. <p>Any other valid response.</p>	2	
2	a	<p>The business would have no control over data validated and processed using client-side script.</p> <p>This reduces the potential of spamming the web server, as the server-side script receives optical recogniser code input and validates it against the correct response.</p>	2	NOTE: no marks for simply naming script without providing an explanation.
2	b	<ul style="list-style-type: none"> • It provides an audio option. • This option makes it possible for blind or visually impaired users to access the code. 	2	Award 1 mark for audio option. Award 1 mark for explanation of increased accessibility.
3		$1023 \text{ OR } 2^{10} - 1$	1	
4		<ul style="list-style-type: none"> • Cache memory is more expensive (per megabyte) than main memory. • Cache memory has faster access (“not just faster”) than main memory. • Cache memory is Static RAM (SRAM) instead of Dynamic RAM (DRAM) for main memory. • Cache memory is on (or immediately adjacent to) the processor. <p>Any two of the above for 1 mark each; max 2 marks.</p>	2	Note: NOT “closer to processor” without providing further detail.
5	a	Changing the name of club secretary would affect multiple records (1 mark). You might make an error which could impact on one or more of the other records (1 mark).	2	
5	b	Take all the fields about the tennis club into a new table (1 mark) and link it to that club secretary’s name (1 mark).	2	

Question		Expected response	Max mark	Additional guidance
6		<p>As a 2-D array/grid of pixels (1 mark).</p> <p>Each pixel will be represented by a binary value to indicate colour (notion of bit depth) (1 mark).</p>	2	
7	a	<ul style="list-style-type: none"> • makes the world a smaller place • good for keeping in touch with friends • users become more information rich • use can be addictive – affects family and personal life • arranging nights out, etc is much easier • the increasing problem of cyber bullying 	1	
7	b	<ul style="list-style-type: none"> • Regulation of Investigatory Powers Act – how it affects private messages. • Computer Misuse Act – it is illegal for others to hack your private messages. • Communications Act – it is a criminal offence to send malicious communications using social media. • Copyright Designs and Patents Act (plagiarism) – it is illegal to post content that is copyrighted by others, without their permission. 	1	
8		<ul style="list-style-type: none"> • IF target=scores[counter] THEN PLUS • SET Scores[counter] TO scores[counter]-10 OR • SET scores[counter] TO target-10 	2	

SECTION 2

Question		Expected response	Max mark	Additional guidance
9	a	Create variable people [5 000 000] of (data type) Members – allow indexing from 0 (or equivalent).	2	1 mark for appropriately indexed 1-D array and 1 mark for data type Members.
9	b	i <pre> SET found TO false SET counter TO -1 RECEIVE targetname from (string) KEYBOARD REPEAT SET counter TO +1 IF people[counter].username=targetname THEN SET found TO true SET position TO counter END IF UNTIL counter = 4 999 9999 or found=true </pre>	5	1 mark for initialisation 1 mark for loop 1 mark for IF 1 mark for assigning position 1 mark for terminating both conditions – end of list or found Any variation in syntax is acceptable.
9	b	ii <ul style="list-style-type: none"> • Scope – the area of code in which a variable is useable AND • Create a local variable by declaring inside procedure/module OR • Create a formal parameter which is useable within that procedure/module. 	2	
9	b	iii <p>Example of boundary, eg first username, last username.</p> <p>Example of extreme, eg name not present, wrong data type</p>	2	Simply stating “erroneous” is not acceptable.
10	a	Lossless – explanation must refer to specific lines in the algorithm. For example: <ul style="list-style-type: none"> • Lines 4, 5 and 6: every pixel in the original file is processed. • Line 13: counts the number of consecutive pixels that are the same colour. • Line 7: sends the pixel colour to the compressed file. • Line 8: sends the number of consecutive pixels of that colour to the compressed file. <p>Award 1 mark for each for any two of the above.</p>	2	No marks for simply naming technique stated without providing an explanation.

Question		Expected response	Max mark	Additional guidance
10	b	<ol style="list-style-type: none"> 1 RECEIVE customer rating FROM website 2 SET number of ratings for the item TO number of ratings + 1 3 SET total rating for item TO total rating + 1 4 SET average rating TO total rating / number of ratings 5 SEND average rating TO website 	4	<p>Award 1 mark for communication with the website (RECEIVE and SEND are both required).</p> <p>Award 1 mark for updating the number of ratings on the server.</p> <p>Award 1 mark for updating the total rating on the server.</p> <p>Award 1 mark for updating the average rating.</p>
10	c	<p>i Customer should not proceed.</p> <ul style="list-style-type: none"> • Warning message suggests that a spoof site has been set up. • This spoof site could use payment details provided to steal money from the customer's account. 	2	<p>No marks for simply stating "proceed" or "do not proceed".</p> <p>Award 1 mark each for any two valid reasons provided as justification for decision.</p>
10	c	<p>ii With public server provision, the website is hosted on the same server as many other sites and owners of these sites have no control over the hardware or software running on that server. This can present security issues since sensitive data, such as customer payment details, will be held on a server that can be accessed by many other users.</p> <p>With private web server provision, the business gets sole, dedicated use of a web server and full control of that server. This enables the business to design and implement their own security features, to ensure that sensitive data cannot be accessed by others.</p>	2	<p>Award 1 mark for potential security issue of public web server provision. Award 1 mark for explanation of security benefit of using private web server provision.</p>
10	d	<ul style="list-style-type: none"> • Number of graphics used will need to be reduced (1 mark), since the target device has a much smaller screen (1 mark). <p>Any other valid response.</p>	2	<p>Award 1 mark for appropriate modification.</p> <p>Award 1 mark for explanation (related to suggested modification) in terms of the underlying technical limitation of smartphones.</p>
11	a	Number (1 mark)	1	

Question			Expected response	Max mark	Additional guidance
11	b	i	<p>Items is the actual parameter (1 mark), which contains the value 3, which is passed to the formal parameter number (1 mark).</p> <p>OR</p> <p>Items is the actual parameter (1 mark) which contains the value/argument to be used in the function and is copied to number (1 mark).</p>	2	
11	b	ii	<p>items = 3 permutations = 6</p>	2	
11	b	iii	<p>Any of three of the following:</p> <ul style="list-style-type: none"> • Items is unchanged by the function (it is still 3) • Factor equals 1 x 2 x 3 • The loop executes three times • After third pass, counter = 3, and factor = 6 • Factor is returned to actual parameter 	3	
11	c	i	<p>Example answer:</p> <ul style="list-style-type: none"> • <code>SET factor TO counter * counter</code> • Code runs to completion but will result in a wrong answer. <p>Any other valid response.</p>	2	Example must not have an execution error.
11	c	ii	<p>Syntax error – error in a reserved word or variable name that causes the program not to translate.</p> <p>Execution error – error that causes a program to crash/stop responding.</p> <p>Any other valid response.</p>	2	
12	a		<pre> erDiagram Driver --} Trip Van --} Trip Trip --} Route </pre>	2	<ul style="list-style-type: none"> • 1 mark for all correct joins between the entities. • 1 mark if all joins show one-to-many.
12	b		<p>A “compound key” consists of more than one field, to uniquely identify an entity occurrence.</p> <p>In the above example, the trip entity has a compound primary key of Driver number, Registration number and Date.</p>	2	

Question		Expected response	Max mark	Additional guidance
12	c	A – Text (1 mark) B – Lookup from Route (Table) (1 mark) C – N (1 mark) D – FK (1 mark)	4	
12	d	“Refuel town” might not be necessary on a journey (1 mark), so it would not have a value (1 mark). OR “Refuel town” may not be unique (1 mark), as two routes may use this town (1 mark).	2	
13	a	<ul style="list-style-type: none"> Wireframes are used at the design stage, to show the layout of each screen of the app. Wireframes are used by the developers, to discuss the layout within the team. Wireframes are used to illustrate the app layout to a user focus group and get early feedback about the interface. Wireframes are used as a blueprint by the team implementing the interface of the app. <p>Any other valid response.</p>	2	Award 1 mark each for any two relevant uses.
13	b	<ul style="list-style-type: none"> Novice and expert users have different needs, which increase the complexity of the development. More time will be needed to develop the interface. Novice users will require a simple graphical interface to navigate from one screen to another and more help facilities. Expert users are likely to be more familiar with navigating different areas of the interface and will need quicker alternatives built in to the interface. <p>Any other valid response.</p>	2	Award 1 mark each for any two valid points that justify the increased complexity of the development.
13	c	i <ul style="list-style-type: none"> If any one of the web servers used to store the data is faulty, other replicas will still be available. <p>Any other valid response.</p>	1	Award 1 mark for valid benefit for app developers.
13		ii <ul style="list-style-type: none"> Data can be accessed from different locations, meaning that there is less likely to be a delay waiting for a server to process requests. <p>Any other valid response.</p>	1	Award 1 mark for valid benefit for app users.

Question			Expected response	Max mark	Additional guidance
13	d	i	<ul style="list-style-type: none"> Frequently used data and instructions will be held in cache rather than in the main memory. This will reduce fetch time whenever those details are needed, which will improve the user's experience of the app. 	2	Award 1 mark for use made of cache. Award 1 mark for improvement in user experience.
13	d	ii	<ul style="list-style-type: none"> 64-bit cores will fetch and process 64 bits of data at a time. This will halve the number of fetches needed by a 32-bit core. Reducing the number of fetches will result in an improved smartphone performance. 	2	Award 1 mark for implication of 64-bit cores. Award 1 mark for reduction in number of fetches needed.
13	d	iii	<p>Answers could refer to many issues including:</p> <ul style="list-style-type: none"> Costs and energy needed to develop new processors adds to lifetime carbon footprint. Processors are becoming more energy efficient, which reduces lifetime carbon footprint. Frequent upgrading of smartphones, without consideration given to careful disposal or recycling, leads to increased lifetime carbon footprint. <p>Any other valid response.</p>	2	Award 1 mark each for any two relevant points discussed.
13	d	iv	<ul style="list-style-type: none"> If users have problems with their smartphones, they have ready access to a community of users who can provide help and advice. Users can take part in discussions about smartphone developments and share experiences. Users have access to technical support from the community, which is available when telephone help desks are shut. <p>Any other valid response.</p>	2	Award 1 mark each for any two valid benefits.
14	a		<p>A = /title B = /head C = body</p>	3	1 mark for each correct answer.
14	b	i	<p>The CSS sets the font for the heading. (1 mark).</p> <p>If available in the browser, Verdana is used. If Verdana is not available, Arial is used. If Arial is not an option, Helvetica is used (1 mark).</p>	2	
14	b	ii	<p>The text "Click for larger image" will be shown in text size 9pt.</p>	1	

Question		Expected response	Max mark	Additional guidance
14	c	<ul style="list-style-type: none"> The style sheets can be shared across a number of documents. The style sheet can be changed without requiring modifications to the document. Many style sheets can be selected for the one document, depending on requirements. 	2	Award 1 mark each for any two valid answers.
14	d	<ul style="list-style-type: none"> Use Metatag to provide metadata about the HTML document (1 mark). The metadata can be used by search engines using keywords, eg diving (1 mark). This code will be placed in the header (1 mark). 	3	

[END OF EXEMPLAR MARKING INSTRUCTIONS]