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N5

National Qualifications 2014

Mark

X716/75/01 Computing Science

FRIDAY, 23 MAY

9:00 AM—10:30 AM

X7167501

Fill in these boxes and read what is printed below.

Full name of centre

Town

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Scottish candidate number

Total marks—90

SECTION 1—20 marks

Attempt ALL questions in this section.

SECTION 2—70 marks

Attempt ALL questions in this section.

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

Use **blue** or **black** ink.

Show all working.

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.

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X7167501

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MARKS | DO NOT WRITE IN THIS MARGIN

SECTION 1—20 marks

Attempt ALL questions

1. A web page can use internal and external hyperlinks.

Explain the difference between an internal hyperlink and external hyperlink. **2**

2. Gillian is viewing a website on her laptop. Name the software on Gillian's laptop that enables her to do this. **1**

3. Calculate the backing storage required for an 8 bit colour image 400 pixels by 600 pixels.

Express your answer in Kilobytes. **3**

4. Name the part of the processor that deals with comparisons. **1**

MARKS | DO NOT WRITE IN THIS MARGIN

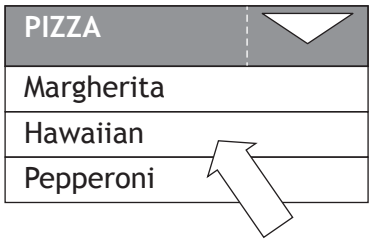
5. Convert the decimal value 47 into the equivalent 8-bit binary number. **1**

6. State **one** problem associated with storing data in a flat file database. **1**

7. A bank employee has lost a laptop storing customers' personal details.

Identify **one** *security precaution* the bank should have in place to prevent unauthorised access to this information. **1**

8. When ordering pizza online, users select their choice from the following drop down menu:



State **one** advantage of this type of user interface. **1**

[Turn over

MARKS | DO NOT WRITE IN THIS MARGIN

9. Before going live with a new website, the developer makes sure it matches the original design. Describe **one** other type of testing that the developer should carry out. **1**

10. Businesses and individuals are now making use of *cloud* services instead of local storage for storing their data.

State **one** benefit of using cloud based storage instead of local storage. **1**

11. Hussain is a technician for a new company and has been asked to prepare a presentation on networks. State **one** difference between peer-to-peer and client/server networks that he could include in his presentation. **2**

Client/Server	Peer-to-Peer

12. This pseudocode allows a user to enter the level they wish to start playing a game.

```
Line 1  RECEIVE level FROM (INTEGER) KEYBOARD
Line 2  WHILE level < 1 OR level > 10 DO
Line 3                  SEND "error : please re-enter level" TO DISPLAY
Line 4                  RECEIVE level FROM (INTEGER) KEYBOARD
Line 5  END WHILE
```

Explain what happens if a user enters 12. **2**

13. A programmer is developing a stock control program. If a user enters a stock code number from 1 to 900, it will display the number of items in stock.

Give **one** example of *exceptional test data* the programmer could use to test the program. **1**

[Turn over

MARKS DO NOT WRITE IN THIS MARGIN

14. Employees can only access their company network if they enter a correct username and password. A validation program is being developed and will run each time an employee logs on.

An extract of pseudocode from the program is shown below.

```
Line 1  RECEIVE userName FROM (STRING) KEYBOARD
Line 2  RECEIVE pinNumber FROM (STRING) KEYBOARD
Line 3  IF userName VALID OR pinNumber VALID THEN
Line 4          Allow access to network
Line 5  ELSE
Line 6          SEND "Access Denied" TO SCREEN
Line 7  END IF
```

An error is noticed when the program is tested.

(a) Identify the line containing a logic error. **1**

Line _____

(b) State how this error should be corrected. **1**

_____

_____

MARKS | DO NOT WRITE IN THIS MARGIN

[Turn over for Question 15 on *Page eight*

DO NOT WRITE ON THIS PAGE

SECTION 2—70 marks

Attempt ALL questions

15. Holibobs sells holidays to its online customers. A page from Holibobs website is shown below.

holibobs – IceWolf Web Browser

File Edit View History Bookmarks Tools Help

http://www.holibobs.co.uk/greece/crete234.html

Holibobs

Contact our UK call centre
0345 279 1000

Home | Late Deals | Browse All Details | City Breaks | Holiday Extras

Check out our latest deals for fantastic prices to locations all round the world

Holiday Search

Where would you like to go?
Greece

Resort?
select

Leaving from?
Any London

Nights
1 week

When are you going?
1 | May 2015

Find my Holiday

Modern luxury villa, Crete, Greece

This property is set in a quiet position close to Elouda. This modern villa offers a wonderful setting in which you can unwind at any time of the year. The simple and contemporary decor on the inside, and a spacious patio area and pool outside creates a perfect atmosphere for a villa holiday. Here you can enjoy breakfasts, lunches or evening meals al fresco. You can also enjoy views towards the sea.

Luxury Villa
Private Pool
Sleeps 6
7 Nights
Departs Luton
Car Essential

Download our complete brochure

Photo gallery | Download Video

Virtual Tour of property | Location Map

(a) State the URL of this web page. **1**

_____

15. (continued)

(b) The webpage is created using HTML and Javascript.

(i) State the feature of HTML code that allows the webpage to be formatted. **1**

(ii) Clicking on the "Location Map" button opens the PlanetEarth Maps website in a new window.

Explain why the HTML code for this link uses absolute addressing. **1**

(iii) The "weather widget" showing the current weather uses Javascript code.

Suggest **one** other use of Javascript that could be added to this webpage. **1**

(c) The Holibobs website includes a variety of media types which are stored using several standard file formats.

Complete the table below, indicating where the following file formats have been used on the website.

The first one has been done for you. **2**

File format	Example
pdf	brochure
mp4	
jpeg	

[Turn over

15. (continued)

(d) The photo gallery features a wide range of holiday images. A photograph is going to be added to the photo gallery.

Beach v1

Preview

Item Type: JPEG colour image
Date taken: 28/07/2010
Dimensions: 4000x3000
Bit depth: 24bits
File size: 4.5MB

The file called Beach v1 was altered using graphic editing software and saved as a Beach v2.

Beach v2

Preview

Item Type: JPEG colour image
Date taken: 28/07/2010
Dimensions: 4000x3000
Bit depth: 8bits
File size: 2.61MB

Explain why Beach v2 is being added to the photo gallery instead of Beach v1. **2**

15. (continued)

(e) A search is carried out for holidays in Greece leaving from "Any London" airport after 1st May 2015.

Here are some of the matching holidays.

From	Resort	Departs	Price per person
Gatwick	Kefalonia	19/05/2015	£350·00
Gatwick	Corfu	30/05/2015	£325·00
Gatwick	Santorini	07/06/2015	£295·00
Luton	Zante	04/06/2015	£295·00
Stansted	Corfu	04/06/2015	£289·00
Stansted	Kefalonia	21/05/2015	£289·00
Gatwick	Kos	19/05/2015	£289·00
Luton	Halkidiki	03/06/2015	£250·00
Luton	Corfu	17/05/2015	£225·00
Stansted	Zante	28/05/2015	£225·00
Gatwick	Kos	12/06/2015	£199·00

Describe how the list is sorted. **2**

Total marks 10

[Turn over

MARKS | DO NOT WRITE IN THIS MARGIN

16. Jack has been asked to design a program to calculate the potential profit in a soft drink business. The program will store the costs involved in producing and selling one litre of each drink.

The following calculations will be used to output the profit made for each litre of drink.

Manufacturing Cost = Water Cost + Flavouring Cost + Labour Cost

Profit = Selling Price − Manufacturing Cost

(a) State the number of variables Jack would require in his program. **1**

(b) Using pseudocode or a programming language of your choice, write a program to enter the required data, then calculate and display the profit for the soft drink business. **5**

Pseudocode ☐ OR Programming Language ☐

16. (continued)

(c) Jack adapts the program to ensure that **water cost** can only be entered as always greater than or equal to £0·10 and less than or equal to £0·50 per litre.

(i) State the standard algorithm that is used to ensure that data entered is acceptable. **1**

(ii) Complete the table below to show four different examples of test data for **water cost** and the type of each example. **3**

Test Data	Type of Test Data
0·05	
0·45	normal
0·10	
	extreme

Total marks 10

[Turn over

MARKS | DO NOT WRITE IN THIS MARGIN

17. A supermarket website is used successfully by customers using desktop computers to order groceries online.

(a) The company has received complaints from some customers that the website is difficult to use on their tablet or smartphone.

Identify **two** reasons why the webpage above would be unsuitable for such portable devices. **2**

Reason 1

Reason 2

(b) When buying items online, encryption is used. Explain why customers should be reassured by this feature. **1**

17. (continued)

(c) The supermarket is now developing a mobile application (app) for use on smartphones.

Explain why different types of smartphone would require different versions of the app. **1**

(d) The mobile app contains a search page so that customers can find the items they want to buy from the supermarket.

Identify **two** smartphone input devices that would allow users to make use of the search features of this app. **2**

[Turn over

17. (continued)

(e) As well as having the mobile app and website the company provides a DVD of recipes.

Complete the table below to show which type of storage (magnetic, optical or solid state) is most appropriate for each of the following uses and why. **3**

	Type of storage	Reason
Smartphone storing the app		
Web server storing the website		
Collection of video recipes stored on DVD		

(f) The minimum amount of RAM required to run the app is 1 Gigabyte.

State what RAM stands for. **1**

_____

_____

Total marks 10

[Turn over for Question 18 on *Page eighteen*

DO NOT WRITE ON THIS PAGE

18. An athlete is developing a mobile application (app).

The app will allow athletes to track weight in Kg.

Part of the pseudocode for this app is shown below.

```
.....
.....
Line 15   SEND "Enter your new weight" TO DISPLAY
Line 16   RECEIVE newWeight FROM (REAL) KEYBOARD
Line 17       IF newWeight > previousWeight [counter] THEN
Line 18               SEND ["You have gained weight"] TO DISPLAY
Line 19       END IF
Line 20   SET previousWeight [counter] TO newWeight
....
.....
```

(a) (i) Identify the line that includes a condition. **1**

Line _____

(ii) Identify the line that stores a value in an array. **1**

Line _____

(iii) Identify the line that accepts input values into the program. **1**

Line _____

(b) When the code for the program is written the programmer mis-types the word UNTIL, typing UNTOL instead.

State the type of programming error being described above. **1**

_____

18. (continued)

(c) The pseudocode is edited to ensure that the new weight being entered is acceptable.

```
....
Line 16    REPEAT
Line 17              RECEIVE newWeight FROM (REAL) KEYBOARD
Line 18    UNTIL newWeight > 20 AND newWeight < 70
.....
```

(i) State the **type** of loop shown above. **1**

(ii) State an input **the user** could enter to enable the program to continue from line 18. **1**

(d) State another design notation that could have been used to design the app. **1**

(e) While the program is being implemented, the programmer stops occasionally to run the program.

State the type of translator you would recommend the programmer uses in this situation.

Explain your answer. **2**

Translator

Explanation

(f) State the component required to convert the data from the mobile devices touchscreen into data that can be used by the app. **1**

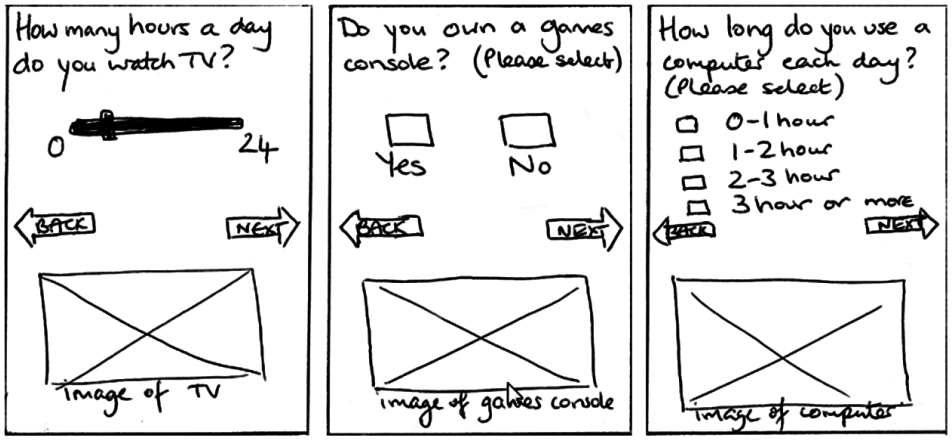
Total marks 10

19. Ally has designed a website that encourages children to learn about energy saving and conservation.

Ally plans to include 2 sections – a personal carbon footprint calculator and a game to play.

(a) The carbon footprint calculator takes the user through a list of questions about their current energy usage.

Here are Ally's designs for some of the questions.



Question 2 **Question 3** **Question 4**

(i) Referring to the designs above, draw a diagram to represent the navigation structure for the carbon footprint calculator. **2**

19. (a) (continued)

(ii) At the end of the questions, the user's carbon footprint is calculated.

Explain what is meant by a carbon footprint. **1**

(iii) When Ally is testing the website, she notices that the total carbon footprint worked out is not calculated correctly.

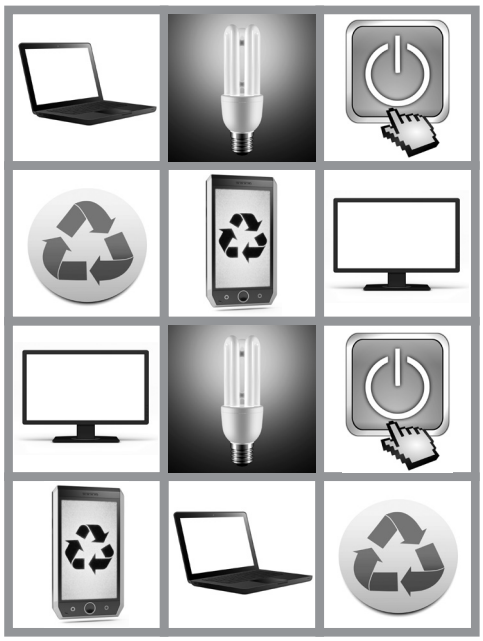
Explain why this is a logic error and not a syntax error. **1**

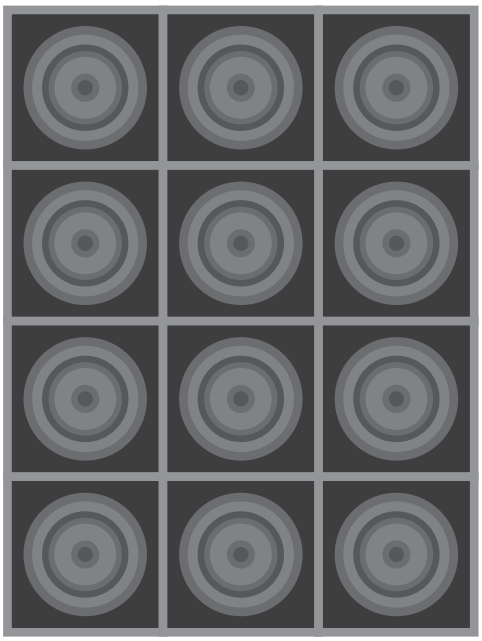
[Turn over

19. (continued)

(b) In the game section of the website, players are shown a board with pairs of picture tiles placed randomly.

These are then flipped over to hide the images. Players have to flip two tiles trying to find two matching images until all pairs have been found.





Images to be paired are displayed to user to be memorised	Tiles are then flipped to start the game

(i) Identify a situation in the game where Ally will need to implement the following programming constructs. **2**

Selection	
Repetition	

19. (b) (continued)

(ii) When a correct pair of images is found, a tip giving advice about energy use or conservation is displayed.

Write the **advice** that should be included with these images. **2**

Image	Advice
	"Recycle your old mobile phone to keep hazardous waste out of landfill"

(iii) When creating the website, Ally copies images, sections of text and ideas from a website about energy use.

Explain why she might be in breach of the Copyright Designs and Patents Act. **1**

_____

_____

(iv) When the website is released it has a pdf that can be downloaded free.

She has a wireless network available as well as her mobile phone network.

State **one** reason for selecting the wireless option to download the pdf. **1**

_____

_____

Total marks 10

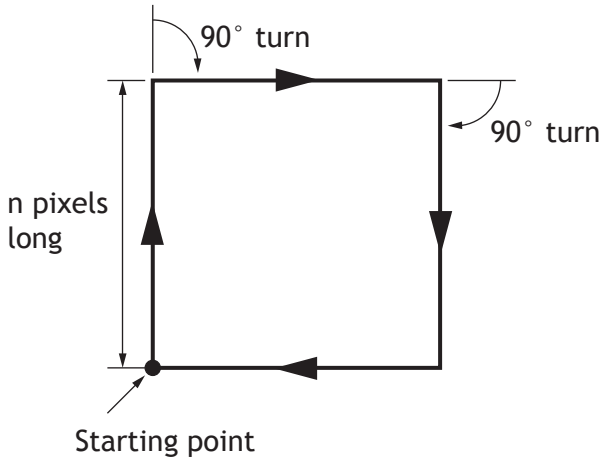
20. A programming language provides the following pre-defined functions.

move(n) n = distance moved in pixels

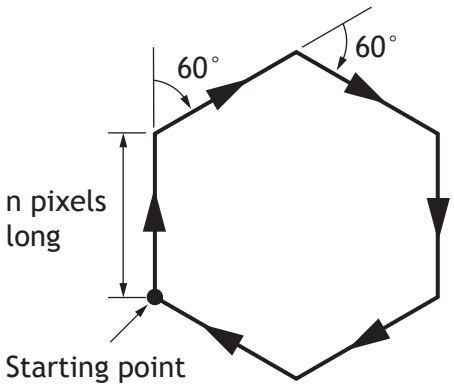
rotate(d) d = degrees turned (positive means clockwise)

These can be used by the programmer to draw lines.

A programmer writes the code to draw a square. The code is shown below.

Square(n) REPEAT 4 TIMES move(n) rotate(90) END REPEAT	

(a) Write the code that would draw a hexagon. **3**

Hexagon(n)	

(b) Describe one way you could make the programmer's code more readable. **1**

_____

(c) Suggest a new pre-defined function that could be added to this programming language. **1**

_____

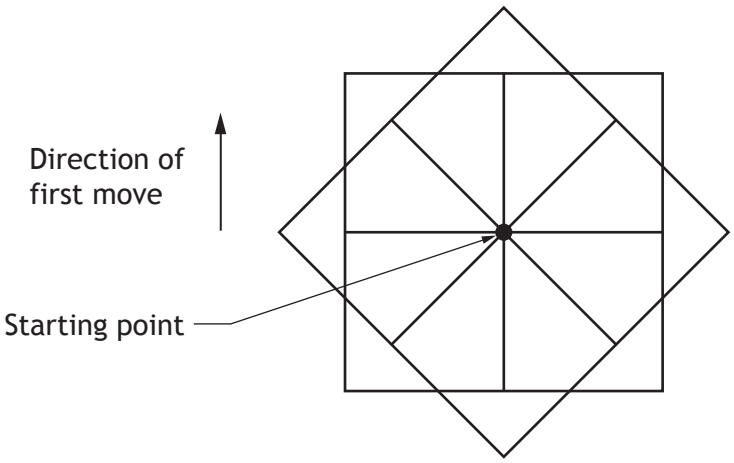
20. (continued)

(d) The following program uses the Square(n) function to draw a pattern.

Two values have been missed out from the code.

Complete the code by filling in the values in the two boxes. **2**

```
REPEAT [    ] TIMES
square(n)
rotate( [    ] )
END REPEAT
```



(e) The shapes that are drawn by the program can be saved as vector graphics.

Describe how a square would be saved as a vector graphic. **2**

_____

_____

(f) Every time a new function is added to the programming language it is designed using pseudocode.

State another design notation that could be used to design the new functions. **1**

_____

_____

Total marks 10

[Turn over

21. BigTech Gadgets are organising an exhibition to showcase cutting edge developments in technology. BigTech Gadgets want to store the details of products being demonstrated by companies.

Some sample data is shown in the table below.

Exhibitor Code	Company Name	Area	Stand Number	Product Reference	Item Name	Price (£)
SG100	FutureTech	Tech Zone	22	GD101	3D Printer	1245
SG100	FutureTech	Tech Zone	22	GD102	3D Printer XL	1699
SG176	Digital80	Photo Zone	49	GD208	360 Camera	800
SG203	TechATive	Active Zone	123	GD187	GoJet	1300
SG203	TechATive	Active Zone	123	GD324	RollerJet	500
SG489	ABCMusic	Music Zone	234	GD387	Xkey	350
SG489	ABCMusic	Music Zone	234	GD367	Xkey Plus	500
SG512	HitechGaming	Games Zone	288	GD654	HowPower2	149

(a) To avoid data duplication, a database with two linked tables is proposed – EXHIBITOR table and PRODUCT table.

(i) List the fields/attributes that should be included in each table. **2**

EXHIBITOR table	PRODUCT table

(ii) Identify the foreign key used to link the two tables. **1**

_____

(b) When implementing the database, BigTech Gadgets decide to include an image of each product.

Name the field **type** required to store an image. **1**

_____

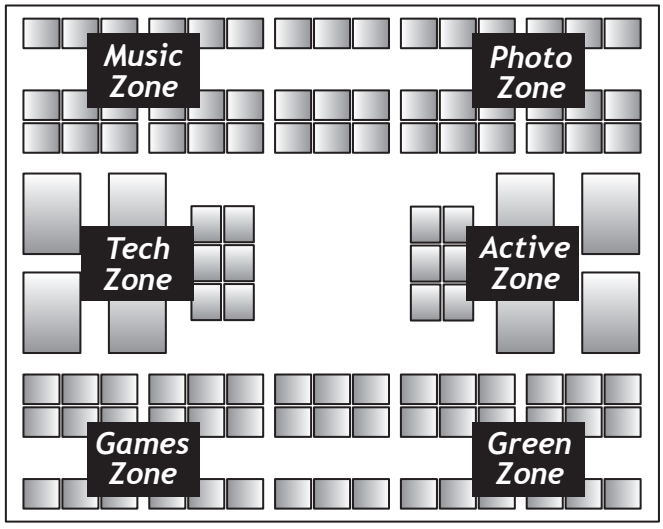
21. (continued)

(c) The Stand Number **must** contain the number of the exhibition stand to be used by the company.

Name the type of validation that should be implemented on this field. **1**

(d) Visitors to the exhibition will be able to find information using an interactive touchscreen kiosk.

The kiosk includes a map with the location of each zone in the exhibition hall.



(i) Identify **one** feature that makes this a suitable user interface for a touchscreen kiosk. **1**

(ii) When the visitor selects the **tech zone button** on the kiosk, a list of companies exhibiting in that area is displayed.

Describe what happens within the database when this button is selected. **2**

21. (continued)

(e) Another screen from the kiosk is shown below.

Identify **two** features used on this screen to aid navigation. **2**

_____

_____

Total marks 10

[END OF QUESTION PAPER]

MARKS | DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

MARKS | DO NOT WRITE IN THIS MARGIN

ADDITIONAL SPACE FOR ANSWERS

ACKNOWLEDGEMENTS

Question 15—76048909 slava296/Shutterstock.com; 100285553 Perfect Vectors/Shutterstock.com

Question 19(b)—138426713 Shutterstock.com; 138416144 Shutterstock.com; 137408105 Shutterstock.com; 121702501 Shutterstock.com; 130815062 Shutterstock.com; 117691858 Shutterstock.com

Question 19(b)(ii)—121702501 Shutterstock.com; 117691 Shutterstock.com; 138426713 Shutterstock.com