Centre Number					Candidate Number					
Surname										
Other Names										
Candidate Signature										

AQA

General Certificate in Secondary Education
Accredited Specimen Written Paper

Computer Science   code

Component 2   Computing fundamentals

You will need no other materials.

Time allowed
- 1 hour 30 minutes

Instructions
- Use black ink or black ball-point pen. Use pencil only for drawing.
- Answer **all** questions.
- Questions 13 and 14 should be answered in continuous prose. In these questions you will be marked on your ability to:
  - use good English
  - organise information clearly
  - use specialist vocabulary where appropriate.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 84.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use			
Number	Mark	Number	Mark
1		10	
2		11	
3		12	
4		13	
5		14	
6			
7			
8			
9			
Total (Column 1)			
Total (Column 2)			
TOTAL			
Examiner's Initials			

Code XXX1

Answer **all** questions in the spaces provided.
_____

1 **(a)** Give **one** reason why we use binary to represent data in computers.

....

(1 mark)

1 **(b)** State the binary representation of the denary number 91.

....

(1 mark)

1 **(c)** State the denary representation of the hexadecimal number A7. Show your working.

....

....

....

....

(2 marks)

1 **(d)** Which **three** of the following are common data types that most programming languages provide?

	Tick **three** boxes
Boolean	
Except	
Length	
Integer	
While	
Character	
Maximum	

(3 marks)

7

2 This is an example of a popular smart phone.

2 **(a)** For each feature of this phone listed in the table below, show whether it is an input method, an output method or both. Tick **one** box in each row.

	Feature	Input	Output	Both
2 (a) (i)	Vibration alert			
2 (a) (ii)	Touch screen			
2 (a) (iii)	Microphone			
2 (a) (iv)	Speaker			

(4 marks)

2 **(b)** Give **three** developments in hardware that have made smart phones like the one above possible in the last 10 years.

....

....

....

....

....

....

(3 marks)

7

3 Two personal computers (PCs) are advertised with different hardware specifications.

PC A has a quad-core processor with a clock speed of 2GHz.

PC B has a single core processor with a clock speed of 4.1GHz.

3 (a) Explain which processor **you think** is likely to run instructions more quickly.

…….

…….

…….

…….

…….

…….

(3 marks)

3 (b) Why is it important for both of these personal computers to have a sufficient amount of RAM?

…….

…….

…….

…….

(2 marks)

5

4 The following is a function:

```
FUNCTION IsPrefix (name, value)
    IF name[1] = value
        RETURN true
    ELSE
        RETURN false
    ENDIF
ENDFUNCTION
```

4 **(a)(i)** Give the name of **one** parameter used by this function.

....

(1 mark)

4 **(a)(ii)** State the data type of **name**.

....

(1 mark)

4 **(a)(iii)** State the data type of the return value.

....

(1 mark)

4 **(b)** Give **three** reasons why programmers use functions.

....

....

....

....

....

....

(3 marks)

Turn over for the next question

6

5 **(a)** Explain, with reasons, **two** disadvantages of using the ring topology in a computer network.

....

....

....

....

(4 marks)

5 **(b)** Some network terms have been labelled **A** to **F** in the table below.

Label	Network term
A	Protocol
B	Client
C	Server
D	Handshaking process
E	Web application
F	Topology

Write the correct label for each description in the table below.

	Description	Label
5 (b) (i)	An agreed method of communication	
5 (b) (ii)	The machine that mostly requests information	
5 (b) (iii)	Software that is accessed over a network, such as the Internet	

(3 marks)

5 **(c)** For each of the following events state whether it would typically occur at the client end, the server end, or at both. Tick **one** box in each row.

	Event	Client	Server	Both
5 (c) (i)	Updating a database			
5 (c) (ii)	Validation of user fields			
5 (c) (iii)	Checking username and password			

(3 marks)

10

6 **Figure 1** below shows a program that is supposed to add together all the elements of an array to give a total. The total is stored in the variable called `tot`. The program contains a run-time error and a logical error. Line numbers have been added to the program.

Figure 1

```
line 1:       tot ← 0
line 2:       arr ← [3, 19, 2, 8]
line 3:       FOR i ← 1 to LEN(arr) + 1
line 4:            tot ← arr[i]
line 5:       ENDFOR
```

6 **(a)** What is a syntax error?

....

....
(1 mark)

6 **(b)(i)** What is the final value of the variable `i` in **Figure 1** above?

....

....
(1 mark)

6 **(b)(ii)** Why might a run-time error occur on **line 4** in **Figure 1** above?

....

....
(1 mark)

6 **(c)(i)** Why are logical errors often the most difficult to find?

....

....
(1 mark)

6 **(c)(ii)** State the line number where the logical error occurs in **Figure 1** above and give the correct version of this line of code.

....

....

....

....

(2 marks)

6

7 **(a)** Write a program for a game (using either **pseudocode** or a **flowchart**) that does the following:

- assigns the value "mobile" to a variable called answer
- then assigns user input to another variable called guess
- if the user enters the value "mobile" then the program outputs "winner", otherwise it allows the user to have another guess
- allows the game to continue until the user guesses correctly.

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

(6 marks)

7 **(b)** The programmer is going to make a simple improvement to the game by including a variable to keep track of the number of guesses made.

State **two** other simple improvements that could be made to the program.

. ...

....

....

....

(2 marks)

8

Turn over for the next question

8 The two tables **Product** and **Supplier** form a relational database used by a shoe shop.

Product

ProductCode	Name	Cost	SupplierCode	Quantity
101AA	SandySole	21.50	32	105
321FD	Flipperty-Flop	5.80	51	19
423FF	RunFasterStripes	19.99	32	87
321FD	ComfyLoafers	38.99	51	43
431ED	SharpSpats	20.00	51	9
454CB	ArmyBoot	25.00	51	47

Supplier

SupplierCode	Name	PostCode
32	BillsBigBoots	CG4 6UP
51	Trainers4Us	RC23 5XA

8 **(a)** State the primary key of the **Supplier** table and justify your choice.

. ...

. ...

(2 marks)

8 **(b)** List the results of executing the following SQL query on the database above.

```
SELECT Product.Name, Product.Quantity, Supplier.PostCode
FROM Product, Supplier
WHERE Product.Quantity > 40 AND Supplier.Name = 'Trainers4Us'
     AND Product.SupplierCode = Supplier.SupplierCode
```

....

....

....

....

(4 marks)

8 **(c)** Write an SQL statement to **add** the following data to the **Product** table.

444AA	Slippers	6.99	32	100

....

....

....

(3 marks)

9 Explain what an algorithm is.

....

....

....

....

(2 marks)

10 A programmer is developing a computer game. She has to decide between using a text file and a relational database to store some data that is needed for the game.

State **two** possible situations when a text file would be a better choice than a relational database.

....

....

....

....

(2 marks)

Turn over for the next question

11 A programmer is developing a website for an online shopping company. He is using some code from an external source to create the input fields on a form.

11 **(a)** Give **two** reasons why the programmer might want to use an external source of code for his website.

....

....

....

....

(2 marks)

11 **(b)** Give **two** potential problems of using an external source of code for his website.

....

....

....

....

(2 marks)

4

12 Explain the possible limitations of using the ASCII character set for global communication.

....

....

....

....

....

....

....

....

(4 marks)

4

Turn over for the next question

13 Social networking websites have very recently been used by large groups of people around the world to organise protests against their governments.

Discuss **three** technical reasons why social networking sites may have been used for this purpose.

In this question you will be marked on your ability to use good English, to organise information clearly and to use specialist vocabulary where appropriate.

………………………………………………………………………………………………………

………………………………………………………………………………………………………

………………………………………………………………………………………………………..

………………………………………………………………………………………………………..

………………………………………………………………………………………………………..

………………………………………………………………………………………………………

………………………………………………………………………………………………………..

………………………………………………………………………………………………………..

………………………………………………………………………………………………………

………………………………………………………………………………………………………..

………………………………………………………………………………………………………

……

………………………………………………………………………………………………………

(6 marks)

6

14 A programmer wants to develop a large piece of software.

Discuss **two** possible software development lifecycle models she could use. In your answer compare the advantages and the disadvantages of both models.

In this question you will be marked on your ability to use good English, to organise information clearly and to use specialist vocabulary where appropriate.

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

(8 marks)

8

END OF QUESTIONS