Candidate Name	Centre Number	Candidate Number
		2

WJEC CBAC

GCE AS/A level

1101/01 **New AS**

COMPUTING CG1

A.M. FRIDAY, 15 May 2009

3 hours

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Answers should be written in the spaces provided. Where the space is not sufficient for your answer, continue the answer at the back of the book, taking care to number the continuation correctly.

The intended marks for questions or part questions are given in brackets [ ]. You are advised to divide your time accordingly. The total number of marks available is 100.

You are reminded of the necessity for good written communication and orderly presentation in your answers. Assessment will take into account the quality of written communication used in your answers to question 18.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	3	
2	5	
3	4	
4	8	
5	7	
6	4	
7	6	
8	5	
9	6	
10	9	
11	6	
12	7	
13	2	
14	3	
15	4	
16	6	
17	3	
18	12	
Total	**100**	

Examiner only

1. A school teacher has to prepare end of year reports for over a hundred pupils. Each report has to include the pupil's name and address and a grade for each subject being studied. All the data required for the reports is stored on the school's computer system.

(a) Name the facility of a word processor that could be used to combine this data to produce completed reports. [1]

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(b) It is intended that each report will be sent to the pupil's home as an email attachment. Briefly describe a benefit and a potential problem with sending reports home in this way. [2]

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2. Angharad is building her own personal computer. She has to decide which type of secondary storage devices to use. She considers the use of a floppy disc drive and a hard disc drive.

Recommend **two** other secondary storage devices that Angharad could use. Compare the speed of access of these devices and describe a typical use for **each** device. [5]

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Examiner only

3. The operating system of a desk top computer manages resources and provides an interface between the user and the machine. Describe **four** features of the user interface provided by the operating system. [4]

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Examiner only

4. *Power Motors* is a successful used car dealer. Currently the details about the cars for sale, cars sold and customers are stored in paper files in the office. The business is moving to a larger site.

Currently, paper files are often misplaced and customers cannot be contacted. With the expansion of the business the owner believes that the problems with the current paper-based system will increase.

(a) Briefly describe **two** other possible problems with the current paper-based system and describe how a computerised database system could solve **these** problems. [4]

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(b) The data is collected lawfully and will not be held longer than necessary. Describe **four** other ways in which the Data Protection Act will apply to the data stored by *Power Motors*. [4]

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Turn over.

5. A firm of accountants currently use a number of stand-alone personal computers. They decide to update their computer system and employ a computer consultant to make recommendations about a possible new computer system.

The consultant makes several recommendations.

(a) (i) The first recommendation is to have a computer network using a star network topology.

Draw a diagram that illustrates the star topology, giving **one** advantage of using a star network topology rather than other topologies. [2]

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(ii) Apart from sharing hardware, describe in detail **two** reasons why the consultant might recommend installing a network. [2]

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(b) The second recommendation is to issue the accountants with laptop computers so that they can work at any desk in the office and also use the laptop computers when out of the office visiting clients.

(i) Name the hardware required for the network and for each laptop computer to enable wireless communication between each laptop computer and the office network. [2]

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(ii) Briefly describe how an accountant could communicate using their wireless laptop computer from a client's premises. [1]

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6. Data being stored on a computer in an estate agent's office is subject to validation checks.

(a) Briefly describe when validation checks are carried out and their purpose. [2]

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(b) Briefly describe a validation check that would sensibly be carried out on the number of bedrooms in a house. Give an example of **invalid** data that would be detected by **this** check. [2]

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7. Sales persons in a mobile phone shop receive commission for the number of phones they sell each month.

When a sale is made they record details including the phone number, for example 07734 234567 and the customer's gender, M or F.

(a) State the data type that would be the most suitable for storing the phone number. [1]

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(b) State the data type that would be the most suitable for storing the gender of the customer. [1]

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(c) The monthly sales data for each sales person are recorded as shown below:

Staff Code	Total number of phones sold each month					
	Jan	Feb	Mar	Apr	May	. . .
001	34	43	23	. . .	. . .	. . .
002	26	47	54	. . .	. . .	. . .
003	. . .	. . .	. . .	. . .	. . .	. . .
. . .	. . .	. . .	. . .	. . .	. . .	. . .

(i) State the full name of this type of data structure. [1]

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(ii) State the data type that would be most suitable for storing the total number of phones sold each month. [1]

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(iii) State the data structure that would be most suitable to store the customer and phone information, briefly describing why it is the most suitable data structure. [2]

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Examiner only

8. Many people, including children, use social networking web sites. The users have profiles on these sites where they can post personal information about themselves and describe their interests. These sites allow them to make new friends and share ideas, music and videos.

Discuss the benefits and drawbacks of using social networking web sites. [5]

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Examiner only

9. *(a)* Name an application where *real time transaction processing* is necessary. Explain how *real time transaction processing* operates **in this case** and give **one** reason why *real time transaction processing* is necessary. [3]

(b) Name an application where *real time control processing* is necessary. Explain how *real time control processing* operates **in this case** and give **one** reason why *real time control processing* is necessary. [3]

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10. Below is an algorithm to determine the largest of three integers.

```
Algorithm FindBiggest

Num1 is integer                 {number input by user}
Num2 is integer                 {number input by user}
Num3 is integer                 {number input by user}
Biggest is integer              {stores the biggest number}


startmainprog

        repeat                  {input and validate Num1}
                input Num1
        until (Num1 is an integer)


        repeat                  {input and validate Num2}
                input Num2
        until (Num2 is an integer)


        repeat                  {input and validate Num3}
                input Num3
        until (Num3 is an integer)

        set Biggest = Num1

        if Num2 > Biggest then Biggest = Num2
        if Num3 > Biggest then Biggest = Num3

        output Biggest

endmainprog
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(a) Write down **one** example of a global variable from the algorithm. [1]

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(b) Write down **one** example of annotation from the algorithm and explain why annotation is used in computer programs. [2]

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(c) Using an example from the algorithm, describe in detail the purpose of repetition in computer programs. [3]

(d) Using an example from the algorithm, describe in detail the purpose of selection in computer programs. [3]

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11. The Government is very worried about the amount of petrol being used and the amount of pollution caused by cars in this country. The Government is considering whether to charge yearly tax for all the petrol cars in the country according to the official petrol consumption figures (in miles per gallon) and the carbon dioxide emissions produced (in grammes per km).

The algorithm under consideration is shown below:

```
1       input Emission
2       input Consumption
3       if ((Emission > 170) OR ((Emission > 160) AND (Consumption < 35)))
4           then output "£200" tax
5           else if ((Emission > 150) OR ((Emission > 140) AND (Consumption < 35)))
6               then output "£150 tax"
7               else output "£100 tax"
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(a) (i) State what the output will be when the inputs are:

Emission = 135 Consumption = 30 [1]

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(ii) State what the output will be when the inputs are:

Emission = 175 Consumption = 40 [1]

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(iii) State what the output will be when the inputs are:

Emission = 145 Consumption = 40 [1]

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(iv) State what the output will be when the inputs are:

Emission = 155 Consumption = 40 [1]

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(b) A change is made in line 5 of the algorithm as shown below:

```
5    else if ((Emission > 150) OR (Consumption < 35))
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(i) State which of parts (a) (i) to (a) (iv) now gives a different output. [1]

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(ii) Briefly explain why the Government may have made this change. [1]

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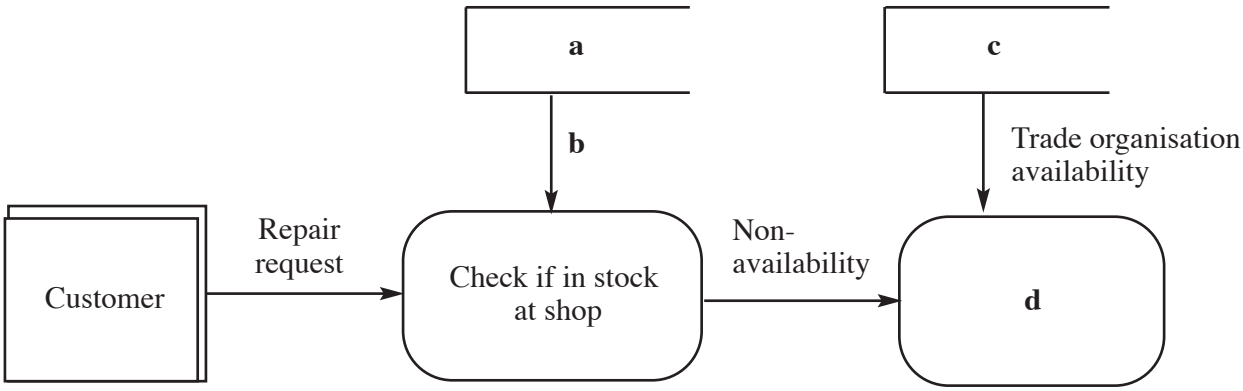
12. A specialist shop repairs antique clocks and watches, and keeps quite a large supply of suitable spare parts. Sometimes, however, a part may be required which is not kept in stock by the shop. When this happens, the shop owner contacts a national trade organisation which keeps a larger range of spare parts in stock.

The situation described is shown below:



(a) Diagrams like this are often used in discussion between software developers and users. Give **one** reason why this is the case. [1]

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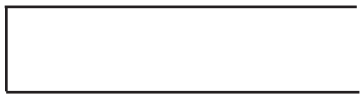
(b) What type of object does the following shape represent?



[1]

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(c) Write down the shape used in the diagram to represent a *data flow*. [1]

Examiner only

(d) Give a suitable name for the object shown as **a** in the diagram. [1]

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(e) Give a suitable name for the object shown as **b** in the diagram. [1]

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(f) Give a suitable name for the object shown as **c** in the diagram. [1]

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(g) Give a suitable name for the object shown as **d** in the diagram. [1]

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Examiner only

13. Below is an algorithm which calculates the mean of a series of positive integers input by a user.

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Algorithm FindMean

Num is integer          {number input by user}
Total is integer        {stores the total of the numbers input}
Count is integer        {stores the count of the numbers input}
Mean is real            {stores the mean of the numbers input}


startmainprog

        set Total = 0                       {initialise variables}
        set Count = 0
        set Mean = 0

        output "type in first number"
        input Num                           {input first number}

        repeat

                set Total = Total + Num
                set Count = Count + 1

                output "type in next number"
                input Num           {input subsequent numbers}

        until (Num < 0)

        set Mean = Total / Count
        output "The  mean is", Mean

endmainprog
```

Complete the table below to show how each variable changes when the algorithm is performed on the test data 7, 2, 5 and 6.

Num	Total	Count	Mean
	0	0	0
7	7	1	0
2	9	2	0
5	14		
6			
-1			

[2]

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Examiner only

14. Explain how a binary search is used to locate an element called **SearchValue** in an array called **SearchArray**. [3]

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15. Computers have both ROM and RAM memory.

(a) Briefly describe the difference between these types of memory. [2]

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(b) Give examples of what would be sensibly stored in each of these types of memory. [2]

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Examiner only

16. An electricity supply company uses serial and sequential files. The amount of electricity used by each customer is read from their electricity meter and stored in a serial file called the transaction file. The details about each customer and their previous electricity usage are stored in a sequential file called the master file.

(a) Briefly describe why a serial file is the most suitable for storing the amount of electricity used. [1]

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(b) Briefly describe why a sequential file is the most suitable for storing details about each customer. [1]

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(c) Draw a fully labelled diagram that clearly shows how the master file is updated using a transaction file when the electricity company produces customer bills. [4]

6

Examiner only

17. Customers of an on-line auction web site access their accounts using the Internet. When they are logged onto the web site they are able to view items for sale, place a bid for an item, make payments and leave customer feedback. These accounts could be subject to *malicious damage*.

Define the term *malicious damage* and give an example of *malicious damage* that a customer could suffer with an on-line auction account, explain how the auction web site could prevent *malicious damage*. [3]

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18. A bank, which has branches in most towns and cities in Britain, requires a new computer system. They have employed a team of analysts to develop this new computer system.

In order to understand the current system the analysts are going to carry out a thorough investigation.

Discuss the **different methods of investigation** available to the analysts justifying their suitability for different situations.

It is very important that the computer users, who will range from novices to experts, find the new system easy to use. Describe in detail the features you would expect to find in the **human computer interface** that the novice user would find useful and the features that the expert user would find useful. [12]

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