Surname	Centre Number	Candidate Number
Other Names		2

WJEC CBAC

GCE A level

1101/01

COMPUTING CG1
SOFTWARE AND SYSTEM DEVELOPMENT

A.M. FRIDAY, 25 May 2012

3 hours

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

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INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use pencil or gel pen. Do not use correction fluid.

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 17.

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1. Colin owns a small painting and decorating company. Colin visits a client's house to give an estimate for a painting job. Estimates are stored on his laptop computer.

(a) For **each** of the following data items name the most suitable data type for storing:

the client's phone number, ... [1]

the number of whole days it should take to complete the job, ... [1]

the area to be painted in square metres, for example 13·5, ... [1]

whether the client receives a discount, for example TRUE. ..... [1]

(b) State the data structure that would be most suitable to store all the data required for the estimate, briefly describing why it is the most suitable data structure. [2]

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Examiner only

2. *(a)* The organiser of a sponsored walk uses an application package to help arrange the event. The package has a mail-merge facility and also the facility to use macros. Describe *mail-merge* and *macros* giving a suitable example of how the organiser might make use of **each** facility. [4]

(b) The organiser stores personal information about participants. The Data Protection Act gives participants the right to know what information is held about them. The organiser has notified the Information Commissioner and must comply with the eight principles of the Act. Two principles of the Data Protection Act are:

- Data is fairly and lawfully processed
- Data is processed for limited purposes

State **three** other principles. [3]

Examiner only

3. A take-away restaurant takes orders for home food deliveries over the telephone. The orders are written down on paper and given to the chef.

The manager of the restaurant decides to computerise the ordering system. All the meals and prices will initially be entered into a database and customer addresses will be entered when they place their first order.

(a) Briefly describe **one** possible problem with the current paper-based system and describe how a computerised database system could solve **this** problem. [2]

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(b) Apart from solving problems with the current paper-based system, describe an additional benefit the new computerised system will provide for the customer. [1]

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(c) Briefly describe a useful report that the new computerised system could produce for the manager. [1]

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(d) When an order is placed data is entered into the new computerised system. Validation checks will be applied to the data.

One item of data that is validated is the total number of each menu item ordered. Describe a suitable validation check that could be carried out in this case. Give an example of **invalid** data that would be detected by **this** check. [2]

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(e) Another item of data that is validated is the customer's postcode. Describe a **different** suitable validation check that could be carried out on the customer's postcode, for example CX99 2QW, giving an example of invalid data that would be detected by this check. [2]

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4. Customers of a supermarket can create an on-line account using the supermarket's web site. When they are logged onto their account they are able to view past orders, change contact and payment details and view the points balance on their loyalty card. Some of this data could be subject to *accidental damage* caused by the customer or by a supermarket employee.

Define the term *accidental damage*. Give an example of *accidental damage* that could occur to data in the customer's account and briefly describe how the supermarket could prevent this problem. [3]

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Examiner only

5. Many homes now have several computers connected using a wireless network.

(a) Briefly describe the hardware required to set up a wireless network in the home. [2]

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(b) The wireless network allows portable devices such as laptop computers to connect to the network. Describe another type of wireless device that could be connected, giving a typical use of this device on the network. [2]

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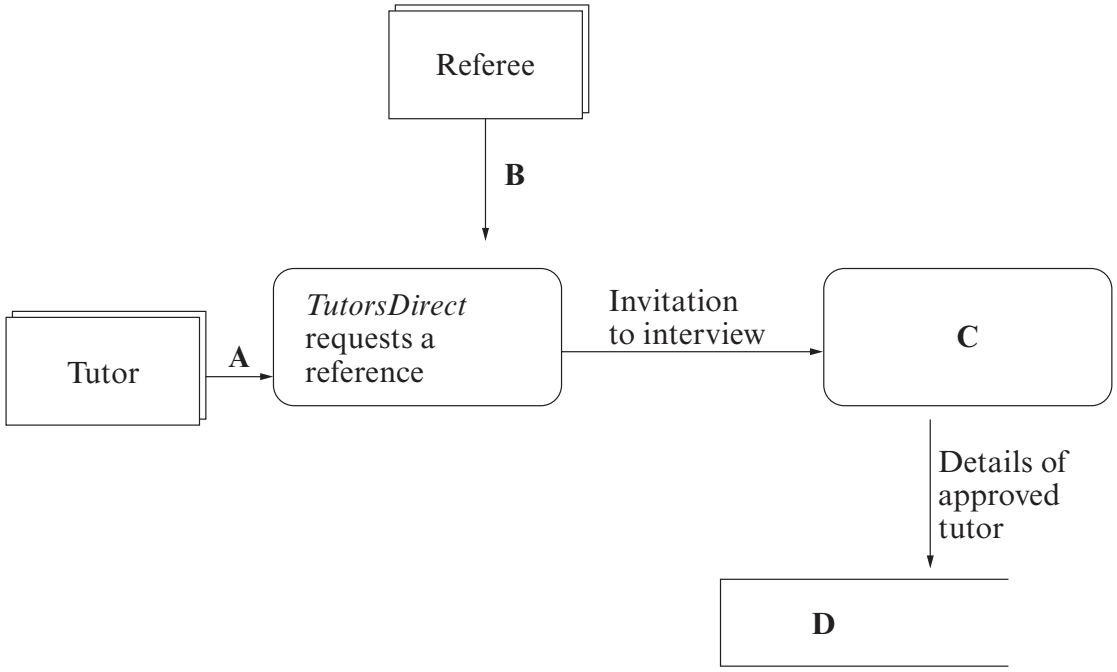
6. *TutorsDirect* is an agency which provides specialist subject tutors for private tuition of children. People who wish to work as tutors can apply to *TutorsDirect*, who request a reference. If the reference is satisfactory the tutor is invited for an interview. If the interview is satisfactory their details are added to *TutorsDirect's* own register.

The situation described is shown in the diagram below:



(a) What type of object does the shape below represent? [1]

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Draw the shape used in the diagram to represent an external entity. [1]

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

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

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

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

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6

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7. Below is an algorithm.

```
Algorithm Summer2012

X is integer
Y is integer
Z is integer
i is integer

startmainprog

        input X
        input Y

        set Z = 1

        for i = 1 to Y

                set Z = Z * X

        next i

        output Z

endmainprog
```

(a) Complete the table below to show how each variable changes when the algorithm is performed on the test data given. [4]

Test data: X = 2 and Y = 4

i	X	Y	Z
	2	4	1
1			

(b) Briefly describe the purpose of this algorithm. [1]

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8. Below is an algorithm.

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Algorithm

FirstNum is integer          {number input by user}
SecondNum is integer         {number input by user}

        declare subprocedure FindDifference {procedure to find the difference of two numbers}

        Difference is integer                {the difference of the two numbers}

        start

                if FirstNum > SecondNum then set Difference = FirstNum - SecondNum
                if SecondNum > FirstNum then set Difference = SecondNum - FirstNum
                if FirstNum = SecondNum then set Difference = 0
                output Difference

        end

startmainprog
        output "type in first number"
        input FirstNum
        output "type in second number"
        input SecondNum
        call FindDifference

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

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(b) Using examples from the algorithm opposite, describe the difference between local and global variables. [4]

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9. Below is a segment of an algorithm that **attempts** to determine the least number of coins that can be used to make up the number *AmountInPence* which is input by the user. This algorithm will not produce the correct output in every case.

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input AmountInPence

set AmountLeft = AmountInPence

if AmountLeft ≧ 50 then
        output " 50p "
        set AmountLeft = AmountLeft - 50
endif

if AmountLeft ≧ 20 then
        output " 20p "
        set AmountLeft = AmountLeft - 20
endif

if AmountLeft ≧ 10 then
        output " 10p "
        set AmountLeft = AmountLeft - 10
endif

if AmountLeft ≧ 5 then
        output " 5p "
        set AmountLeft = AmountLeft - 5
endif

if AmountLeft ≧ 2 then
        output " 2p "
        set AmountLeft = AmountLeft - 2
endif

if AmountLeft ≧ 1 then
        output " 1p "
        set AmountLeft = AmountLeft - 1
endif
```

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(a) **Using the algorithm opposite**, write down **all** the outputs, produced for the following test data: [3]

Test data: AmountInPence = 37 .....

Test data: AmountInPence = 97 .....

Test data: AmountInPence = 44 .....

(b) Briefly describe why the algorithm does not produce the correct output in every case. [1]

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Examiner only

10. *(a)* Briefly describe how records are added to a serial file and how records are added to a sequential file. [3]

(b) Compare **in detail** fixed and variable length records. [4]

(c) Files stored using a certain operating system can have four different file attributes which are *read-only, archive, system* and *hidden*.

State the attribute that would be the **most** suitable for the following.

A file no longer in regular use but may be required some time in the future. [1]

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A file the user should not be able to alter. [1]

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A file only used by the operating system. [1]

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Examiner only

11. Many people have a personal page on a social networking web site where they can communicate and share photographs with friends and family. Some people still prefer to write letters and send photographs using conventional post.

(a) Briefly describe any benefits of using a social networking web site for this type of communication with friends and family. [4]

(b) There can be drawbacks of using a social networking web site for this type of communication as it can be viewed by people other than friends or family. Stating why they might view the information, briefly describe **two** other types of people, other than friends or family, who might use the information from a personal page on a social networking web site. [2]

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Examiner only

12. Two search algorithms are *binary search* and *linear search*.

(a) Explain how a linear search algorithm would determine whether an item called *SearchValue* is present in an array called *SearchArray*. [3]

(b) Describe **two** different situations where a linear search will generally perform faster than a binary search.
Describe **one** situation where a binary search will generally perform faster than a linear search. [3]

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Examiner only

13. Briefly describe the difference between Read Only Memory (ROM) and Random Access Memory (RAM), giving examples of what would be sensibly stored in each of these types of memory. [4]

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14. Two computer programmers are discussing different computer languages. One of the programmers writes programs in a low level language and the other writes programs in a high level language.

Describe, giving a reason, a situation where a programmer may decide to use a low level programming language. Give one reason why most programmers prefer to use a high level programming language. [3]

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15. A company that employs many computer programmers requires them to sign a code of conduct. Give **two** reasons why most companies would find a *code of conduct* useful. [2]

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16. *(a)* Using examples, describe **in detail** the role of the operating system in managing computer resources. [6]

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(b) Tickets to see popular performers are often sold on the internet. They go on sale at a set time, there can be a rush to buy them and sometimes they sell out very quickly. The most suitable mode of operation for selling these tickets is a *real time transaction processing* system.

Describe **in detail** what happens when a ticket is sold and explain why real time transaction processing is the most suitable mode of operation. [3]

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17. A large organisation with offices throughout the country has employed a team of analysts to upgrade their existing computer systems. The team have designed and created new systems to replace the existing computer systems and are planning the changeover from the existing computer systems to the new systems.

Describe **in detail** the different methods of *changeover* available to the team, clearly explaining the advantages and disadvantages of **each** method.

Describe any benefits that using a team of analysts to carry out the changeover would have over an individual. [11]

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