Surname	Centre Number	Candidate Number
Other Names		2

WJEC CBAC

GCE AS/A level

1101/01

COMPUTING CG1
SOFTWARE AND SYSTEM DEVELOPMENT

P.M. MONDAY, 16 January 2012

3 hours

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

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 15.

Examiner only

1. A health and fitness club stores personal details of members. These include members' email addresses and subscription payment details.

(a) The club sends emails to its members about forthcoming events and fitness classes. Give **two** reasons, apart from cost, why the club prefers to use email instead of using conventional post and describe **one** problem that may arise for the club from using email in this way. [3]

(b) The club has to comply with The Data Protection Act. They comply with two principles of the Act by processing the data for limited purposes only and keeping the data accurate and up to date. State **four** other principles of the Act that the club must comply with. [4]

Examiner only

2. Teachers often attend conferences where they are given large amounts of information such as past examination papers, example coursework and administration forms on paper.

The conference providers decide to distribute this information electronically at the conference.

Describe, with justification, **two** possible methods for distributing this information electronically to teachers. [4]

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3. A garden centre stores data about trees and shrubs it has for sale on a computer system. Name the most suitable data type for the storage of the following data: [5]

The name of the plant, for example Oak .....

The number of each type of tree or shrub in stock, for example 14 .....

A single letter code to indicate whether the plant is a tree or a shrub, for example S .....

Whether or not the plant loses its leaves in the autumn, for example TRUE .....

Maximum height of the plant in metres, for example 2·5 .....

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Examiner only

4. A hairdressing salon currently stores the details of their clients on paper which is kept at reception. One problem with the current system is that sometimes the required paperwork for a client is lost.

(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]

Examiner only

(b) The client data will have to be input into the new computerised database system. Some items of data have validation and verification checks applied to them.

(i) One item of data that is validated is the client's date of birth. Describe a suitable *validation* check that could be carried out on the client's date of birth, for example 21/02/1985. Give an example of invalid data that would be detected by **this** check. [2]

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(ii) It is important that the client's email address is input correctly. Describe a suitable *verification* check that could be carried out on the client's email address. Briefly explain how this verification check would identify a mistake. [2]

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Examiner only

5. New cars often have a voice recognition system to operate the driver's mobile phone and the car's audio system.

(a) The systems have a set of pre-defined commands and can also be configured to recognise new commands or contact names for the mobile phone. Describe **in detail** why many car drivers find voice recognition systems useful and describe why other car drivers might choose not to use the system even when it is available. [6]

Examiner only

(b) *Bluetooth* is a wireless technology for exchanging data over short distances.

The driver's mobile phone can communicate with the car's audio system using a Bluetooth interface. Before any communication can take place the devices have to *handshake*. Explain the role of *handshaking*. The devices then communicate using wireless communication *protocols*. Explain the computer term *protocol*. [2]

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6. Describe **four** different risks that prolonged computer use can have on a user's health, describing how the risk can be reduced in **each** case. [4]

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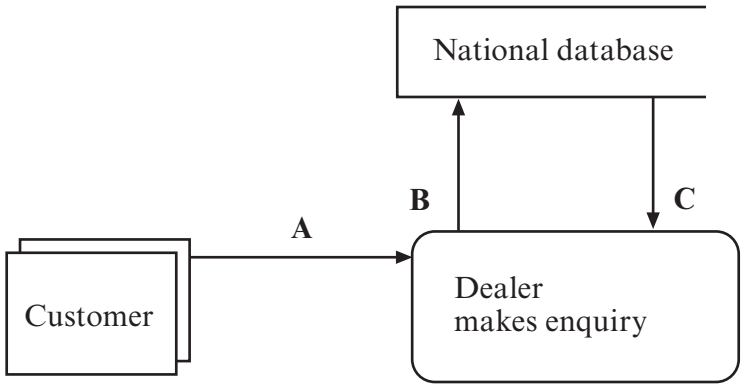
Examiner only

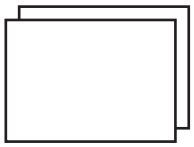
7. Customers wishing to buy paintings or sculptures contact a specialist art dealer. The dealer searches a national database for suitable items.

The situation described is shown in the diagram below:



(a) Write down the full name for this type of diagram. ..... [1]

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



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(c) Draw the shape used in the diagram to represent a process. [1]

(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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Examiner only

8. Below is an algorithm which calculates and outputs all the even numbers from two up to and including an even number input by the user.

```
Algorithm FindEvenNumbers

NumberOutput is integer                {even number calculated and output}
HighestEven is integer                 {highest even number required}

startmainprog

        set NumberOutput = 0           {initialise variable}
        input HighestEven

        repeat
                NumberOutput = NumberOutput + 2
                output NumberOutput
        until (NumberOutput = HighestEven)

endmainprog
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(a) Draw a rectangle on the above algorithm to clearly indicate an example of annotation. [1]

(b) Write down one example of a self documenting identifier from the algorithm. Describe **in detail** why programmers use self documenting identifiers. [3]

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(c) Write down an example of repetition from the algorithm opposite. Describe **in detail** the purpose of repetition in computer programs. [3]

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Examiner only

9. Below is an algorithm which attempts to determine the number of tens in any positive integer input by the user. For example there are **four** tens in the integer 47.

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Algorithm CountTens

NumberTens is integer              {number of whole tens}
NumberInput is integer             {number input by user}
NumberRemaining is integer         {working number used in calculation}

startmainprog

        set NumberTens = 0
        set NumberRemaining = NumberInput
        input NumberInput


        repeat

                set NumberRemaining = NumberRemaining -10


                set NumberTens = NumberTens + 1


        until (NumberRemaining = 0)


        output "Number of whole tens is ", NumberTens

endmainprog
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(a) The algorithm works correctly when NumberInput = 40. Describe the problem that will occur with the algorithm when NumberInput = 35. Give the reasons for this problem. [2]

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(b) Amend the algorithm to correct this problem. You may cross out and replace any lines of the algorithm. [2]

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WRITE IN THE BOX ABOVE – DO NOT WRITE ANYTHING HERE

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10. Below is an algorithm.

```
Algorithm January2012

W is integer
X is integer
Y is integer
Z is real

startmainprog

        set X = 0
        set Y = 0
        set Z = 0

        input W

        repeat

                set X = X + W
                set Y = Y + 1

                input W
        until (W < 0)

        set Z= X / Y
        output Z

endmainprog
```

Complete the table below to show how each variable changes when the algorithm is performed on the test data given.

Test data: 5 7 2 2 4 -1

W	X	Y	Z
	0	0	0
5	5	1	0
7			

[5]

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

(a) Briefly describe why sequential file organisation is the most suitable for the *master file* and why serial file organisation is the most suitable for the *transaction file*. [2]

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(b) The incomplete table below shows part of the design for each record in the master file. Complete the table by giving a **Field Name** and a **Field Type** for the Primary Key. In the table, write down **two** additional appropriate field names together with the **Field Type** and **Field Description** in each case. [3]

Do not include any additional personal customer information as all customer details have been included.

Field Name	Field Type	Field Description
		Primary Key
forename	String	Customer forename
surname	String	Customer surname
address	String	Customer address
postcode	String	Customer postcode
tel num	String	Customer contact number

Examiner only

(c) Using a clearly labelled diagram, describe in detail how the *transaction file* and the *master file* are used to produce a gas bill for every customer. [4]

Draw your diagram below.

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12. *(a)* Using examples, describe **in detail** the role of the operating system in providing an interface between the user and the hardware. [6]

Examiner only

(b) *Real time control processing* could be used to control the temperature of a chemical in an industrial process. Briefly describe how the temperature is maintained at a specified value and explain why real time control processing is the most suitable mode of operation. [3]

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Examiner only

13. Different high-level programming languages have features which make them suitable for writing a variety of computer applications.

(a) Describe, giving a reason, a feature of a high-level language that could be used for creating web pages. [2]

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(b) Describe, giving a reason, a different feature of a high-level language that could be used for creating a graphical user interface. [2]

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Examiner only

14. Many people use the Internet to download music files. Many of these files are legally available for free download, others can be legally purchased while some are downloaded illegally without payment.

Discuss the effect these different types of music download have on people working in the music industry and people who download music.

You should include in your answer a discussion of:

- the ethical and legal issues
- the effects on employment
- any possible social and economic changes [9]

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15. A global company with staff and offices situated around the world decide to upgrade their current computer systems. A team of analysts have been employed to investigate the existing computer systems.

Describe **in detail** the different methods of investigation the team could use, giving benefits and drawbacks of each method.

Describe the benefits of using a team of analysts to carry out the investigation rather than an individual analyst. [11]

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