Surname	Centre Number	Candidate Number
Other Names		2

GCE AS/A level

1101/01 – **LEGACY**

S16-1101-01

COMPUTING – CG1

Software and Systems Development

A.M. MONDAY, 6 June 2016

3 hours

For Examiner's use only		
	Maximum Mark	**Mark Awarded**
Total	**100**	

1101
010001

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

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. If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) 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 **16**.

Examiner only

1. *(a)* A college stores the names and addresses of all students on a computer system. The college plans to send a letter to every student reminding them about a college open evening. Describe the steps required, using an automated feature of a word processing application package, to create a personalised letter for every student. [3]

(b) The Data Protection Act applies to the students' details held on their computer system. It ensures that the data is held securely and not stored for longer than necessary.

State **three** other principles of the Act that will apply to the data stored by the college. [3]

Examiner only

2. Name the five primitive data types and give an example of data that would sensibly be stored using **each** data type. [5]

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3. Most paper-based systems have been replaced by computerised databases. One reason for using computerised databases is that they are far quicker to search and another is that the data output is always legible.

Describe **three other** problems associated with paper-based systems and how computerised databases could solve these problems. [6]

Examiner only

4. *(a)* Giving a benefit, describe a situation where data compression would sensibly be used. [2]

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(b) A simple algorithm for compressing text is:

1. Find all combinations of characters that occur more than once
2. Replace all combinations of characters that occur more than once with a single substitute symbol

The following sentence has to be compressed using the algorithm:

The cat sat on the mat.

(i) State **two** character combinations that would be replaced in the above sentence. [2]

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(ii) Give a suitable substitute symbol that could be used when compressing English sentences similar to the one above. [1]

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(iii) Explain why your chosen substitute symbol in part *(b)* (ii) is appropriate. [1]

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Examiner only

5. *(a)* Describe the problems associated with using voice recognition systems for vocabulary dictation. [6]

Examiner only

(b) Describe a situation where voice recognition for command input is a suitable method and explain why it is a suitable method. [2]

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6. An insurance company has a website where users can receive a quote for car insurance. Users enter their personal details along with their car details and a quote is sent by email.

Validation checks will be applied to the data as it is entered.

(a) The first item of data input is the estimated value of the car. Apart from a presence check, describe another suitable **validation** check that could be carried out on this data. Give an example of **invalid** input data that would be detected by this check. [2]

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(b) Another item of data input is the number of seats. Apart from a presence check, describe another **different** suitable validation check that could be carried out on this data. Give an example of **invalid** input data that would be detected by this check. [2]

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Examiner only

(c) Describe how a verification check would detect errors. [2]

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7. Clearly stating the terminating conditions for the algorithm, explain how a sequential search is used to locate an element called **SearchValue** in an array sorted in ascending order called **SearchArray**. [4]

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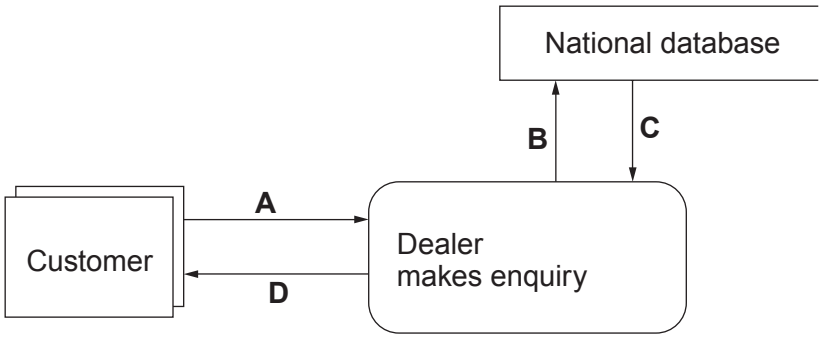
Examiner only

8. Customers wishing to buy antique jewellery can contact a specialist dealer who has access to a national database of available antique jewellery.

The situation described is shown in the diagram below:



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

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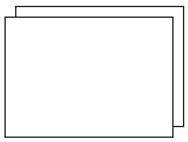
What type of object does the shape below represent? [1]



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Draw the shape used in the diagram to represent a process. [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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Turn over.

Examiner only

9. Below is an algorithm.

```
Algorithm June2016

M is integer
P is integer
i is integer

startmainprog

        input M

        if M < 1 then
                output "Number input must be greater than zero"
        else
                for i = 1 to 4
                        set P = M * i
                        output P
                endfor
        endif

endmainprog
```

Write down all the outputs from the algorithm when the following values of M are used as test data: [5]

Test data M = –3

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Test data M = 3

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Examiner only

10. Computer systems require both testing and maintenance.

(a) Three testing methods often used are *alpha*, *beta* and *acceptance* testing. Briefly describe **who** would sensibly carry out the three different tests. [3]

(b) Three types of maintenance are *perfective*, *adaptive* and *corrective*. In each case, give an example of how a computer system might be amended as a result of each of the three types of maintenance. [3]

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11. Discuss the differences between fixed and variable length records and give advantages and disadvantages of programming with both types of record. [6]

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12. Below is an incomplete segment of an algorithm that sorts an array of seven integers.

Lines 4, 11, 12, 13 and 21 are incomplete.

```
1    SortArray is integer array [1 to 7]
2    i is integer
3    Last is integer
4    SwapMade is
5
6          declare subprocedure ProcOne
7
8          Temp is integer
9
10         start
11               set Temp =
12               set SortArray[i] =
13               set
14         end
15
16   startmainprog
17
18         set Last = 7
19
20         repeat
21               set SwapMade =
22
23               for i = 1 to (Last-1)
24                        if SortArray[i] > SortArray[i + 1] Then
25                        call ProcOne
26                        set SwapMade = TRUE
27                    endif
28               next i
29
30               set Last = Last – 1
31
32         until (Last = 1) OR (SwapMade = FALSE)
33
34   endmainprog
```

(a) Complete lines 4, 11, 12, 13 and 21. [5]

Amend the algorithm in the box– DO NOT WRITE ANYTHING HERE

(b) Briefly describe what sub procedure ProcOne does. [1]

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Examiner only

13. Customers of an online shop are able to login to view past orders and amend their stored payment details. Without suitable preventive measures, this data could be subject to damage.

Name and describe the different types of damage that could occur to data stored by the online shop. Describe the circumstances in which each type of damage may occur and give one preventive measure the online shop should have in place to prevent each type of damage occurring. [6]

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14. Discuss the benefits and drawbacks of using social networking websites. [6]

Turn over.

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15. Describe **in detail** the role of the operating system in managing computer resources. [6]

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16. A computing consultancy firm has been given the task of redesigning the computer systems of a national retail company. A team of analysts will investigate the current system and implement a new system.

Describe **in detail** the different methods of investigation available to the team, clearly explaining the advantages and disadvantages of each method. [11]

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END OF PAPER

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For continuation only.