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|-------------|---------------|------------------|
| Surname     | Centre Number | Candidate Number |
| Other Names |               | 2                |



**GCE AS/A level**

1101/01

**COMPUTING CGI  
SOFTWARE AND SYSTEM DEVELOPMENT**

P.M. MONDAY, 16 January 2012

3 hours

**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.

| 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           |              |
| <b>Total</b>            | <b>100</b>   |              |



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]

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(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]

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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]

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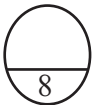
(b) The client data will have to be input into the new computerised database system. Some items of data have validation and verification checks applied to them.

(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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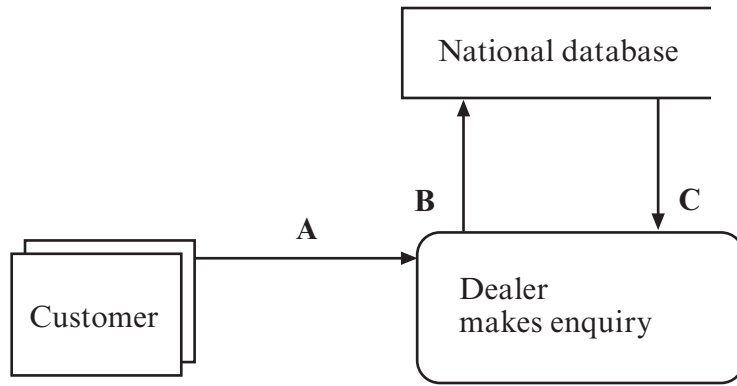






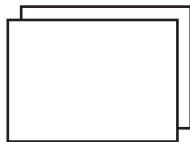
- 7. Customers wishing to buy paintings or sculptures contact a specialist art dealer. The dealer searches a national database for suitable items.

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.

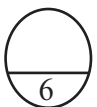
[1]

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(f) Give a suitable name for the object shown as **C** in the diagram.

[1]

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- 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.

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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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10. Below is an algorithm.

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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
    
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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 |   |   |   |
|   |   |   |   |
|   |   |   |   |
|   |   |   |   |
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[5]



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]

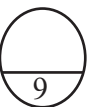
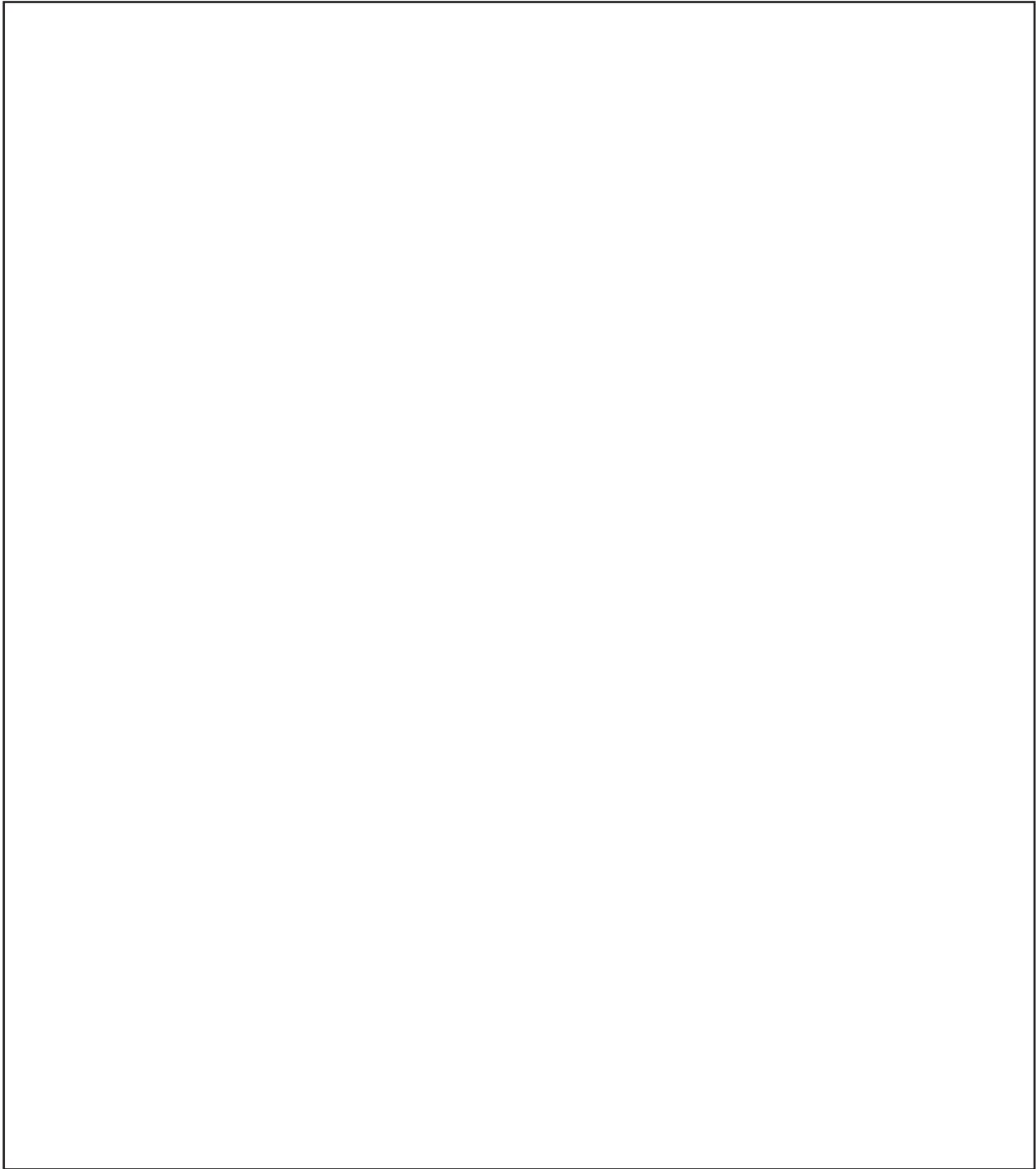
Do not include any additional personal customer information as all customer details have been included.

| 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 |
|            |            |                         |
|            |            |                         |



- (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.







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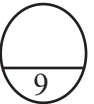
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13. Different high-level programming languages have features which make them suitable for writing a variety of computer applications.

(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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