Surname	Centre Number	Candidate Number
Other Names		2

GCE AS/A level

1101/01

COMPUTING – CG1
Software And System Development

P.M. MONDAY, 3 June 2013

3 hours

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010001

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. 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 17.

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1. *(a)* A supermarket stores information about customers and their purchases. They regularly send the same email to thousands of customers.

(i) Briefly describe the facility provided by an electronic mail system that would allow the same email to be sent to thousands of customers. [1]

(ii) The supermarket saves money by communicating with customers using email rather than conventional post. Briefly describe **two other** advantages of using email rather than conventional post. [2]

(b) The Data Protection Act applies to data stored by the supermarket. The supermarket, which has notified the Information Commissioner, ensures that their data is fairly and lawfully processed and processed for limited purposes.

State **four** other principles of the Act that will apply to the data stored by the supermarket. [4]

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2. *(a)* Name the most suitable data type for the storage of the following data about a company employee:

the forename of the employee; ..... [1]

a single letter code for their pay scale; ..... [1]

whether the employee is a member of the company pension plan, for example TRUE;

..... [1]

the proportion of their pay that they contribute to the pension plan, for example 8·5;

..... [1]

the number of whole years in the company pension plan. ..... [1]

(b) Compare the amount of memory required to store an employee forename, for example Gareth, compared with the single letter code for their pay scale, for example B. [2]

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3. *(a)* Explain how *spooling* is carried out when a user prints several documents at the same time. Give **one** benefit for the user of spooling. [3]

(b) Briefly describe what happens to a file when it is compressed and give **one** reason for compressing a file. [2]

(c) Explain the term *fragmentation* and briefly describe the effect that fragmentation will have on disc access. [2]

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4. A dental practice currently stores patients' details on paper which are kept in a filing cabinet. It is time consuming for the receptionist to find the required paperwork for a patient and sometimes difficult to read the handwriting. The dentist has purchased a computerised database system to store all the patients' details.

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

(b) The new system will verify and validate some of the data input. It is important that the patient's telephone number is input correctly.

(i) Describe a suitable validation check that could be carried out on the patient's telephone number giving an example of invalid data that would be detected by **this** check. [2]

(ii) Describe a suitable verification check that could be carried out on the telephone number and describe how this check detects input errors. [2]

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5. A small business is expanding and moving to new premises. They have to decide which of the three network topologies bus, star or ring they should install.

Give reasons why they should install a star network topology and why they should **not** install a bus or a ring topology. [5]

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6. An accountant who works from home has very important data stored on a personal computer that changes daily. Describe a suitable procedure, **fully justifying** any hardware required, for the accountant to safely and securely back up the data. [5]

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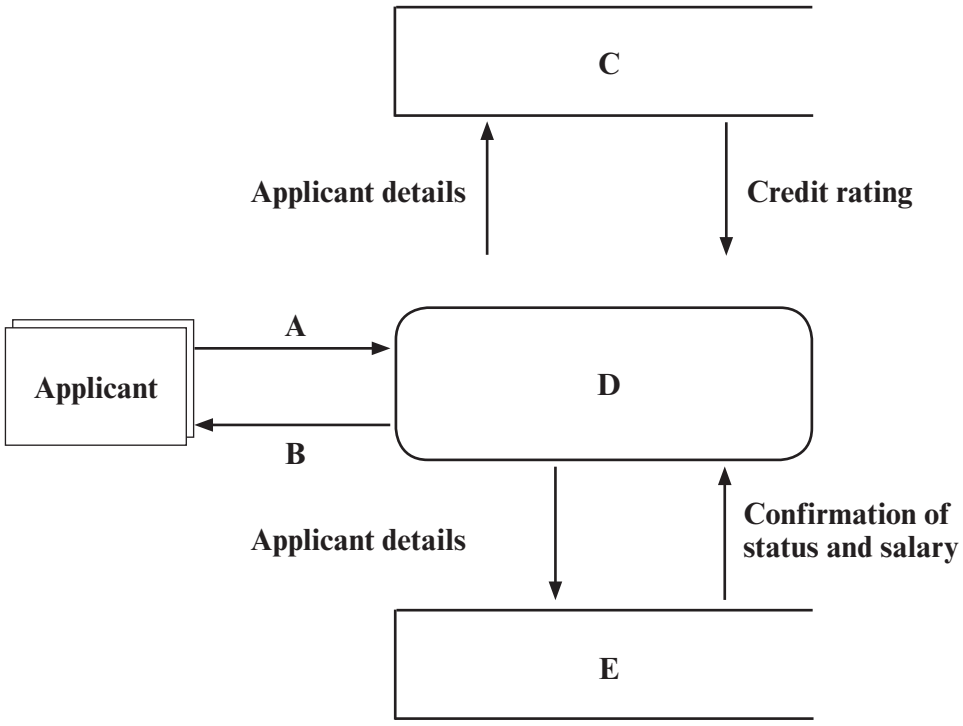
7. Applicants applying for a mortgage complete an application form. The mortgage company checks the applicant's credit rating with a credit agency and contacts the applicant's employer to confirm their employment status and salary. A decision is made to approve or decline the mortgage application.

The situation described is shown in the data flow diagram below:



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

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

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8. The Internet has allowed many software production companies to reduce the size of their offices as computer programmers do not have to be in the office to write programs and can be situated anywhere in the world.

Describe the benefits for the company of this arrangement. [6]

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9. Users of a social networking web site can post personal information, post messages, share music and share videos. Discuss the benefits and drawbacks of using social networking web sites for these purposes. [5]

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10. *(a)* State the most appropriate organisation for the following files:

unsorted transaction file; [1]

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master file. [1]

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(b) Records can be fixed or variable length. Describe **two** advantages of using fixed length records and **two** advantages of using variable length records. [4]

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11. Below is a segment of an algorithm.

```
input T

set i = 1
set X = 0
set Y = false

repeat
    if T = A[i] then
            set X = i
            set Y = true

    else
            set i = i + 1
    endif

until (Y = true) OR (i > 7)
```

Complete the table below to show the value of each variable when the algorithm is performed on the data given.

The value input for T is 81. The array A contains the values as shown with A[1] containing 25, etc.

A =

25	47	17	63	81	33	71

i	A[i]	X	Y
1	25	0	false
2	47		

[4]

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12. Below is a segment of an algorithm.

```
set EntryAllowed = False

if (Membership = Gold) then set EntryAllowed = True

if ((Membership = Silver) AND (Day = Weekday) AND (Time < 17)) OR
        ((Membership = Silver) AND (Day = Weekend)) then set EntryAllowed = True

If (Membership = Bronze) AND (Day = Weekend) then set EntryAllowed = True
```

Write down the value of EntryAllowed after the segment of the algorithm has executed for the following data:

Membership: Gold **Day:** Weekday **Time:** 14; ..... [1]

Membership: Silver **Day:** Weekday **Time:** 11; ..... [1]

Membership: Bronze **Day:** Weekday **Time:** 12; ..... [1]

Membership: Silver **Day:** Weekend **Time:** 12; ..... [1]

Membership: Silver **Day:** Weekday **Time:** 19. ..... [1]

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13. The operating system on a personal computer provides an interface between the user and the hardware and manages the resources.

(a) Briefly describe the role of the operating system in providing an interface between the user and the hardware. [2]

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(b) Two resources managed by the operating system are the processor and memory. Briefly describe the role of the operating system in managing these resources of a personal computer. [2]

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14. Files stored using a certain operating system can have four different file attributes which are *read-only*, *archive*, *system* and *hidden*. Briefly describe a reason for setting a file attribute to:

read-only; [1]

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archive; [1]

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system; [1]

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hidden. [1]

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15. *(a)* There are many different high level programming languages. Give a suitable use for the following type of programming languages:

mark-up; [1]

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visual; [1]

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procedural. [1]

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(b) Some computer applications are written in low level computer languages. Describe, giving a reason, a situation where a programmer may decide to use a low level programming language as opposed to a high level language. [2]

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16. Below is an algorithm to produce the multiplication table for a given positive integer.

```
Algorithm MultiplicationTable

Multiplier is integer          {input by user}
Product is integer             {used to store current answer}
i is integer

startmainprog

    input Multiplier

    if multiplier < 1 then
        output "Number input must be greater than zero"
    else
        for i = 1 to 12
            set Product = i * Multiplier
            output Product
        endfor
    endif

endmainprog
```

(a) Write down an example of annotation from the algorithm above. [1]

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(b) Write down an example of a meaningful identifier from the algorithm above. [1]

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(c) Explain the role of the variable **i** in the above algorithm. [1]

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(d) Draw a circle on the algorithm to clearly indicate an example of repetition. Describe in detail the purpose of **this type** of repetition. [3]

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17. A manufacturing company has a large production site and many administration offices throughout the country. They are intending to upgrade their existing computer systems and have employed a team of analysts. The analysts will investigate the current system and develop a new system.

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

Maintenance documentation will be produced and delivered with the new system. Describe the purpose and contents of maintenance documentation. [12]

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