Surname	Centre Number	Candidate Number
Other Names		2

GCE AS/A level

1101/01

COMPUTING – CG1
Software and System Development

A.M. FRIDAY, 17 January 2014

3 hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**6**	
2.	**8**	
3.	**9**	
4.	**9**	
5.	**7**	
6.	**4**	
7.	**6**	
8.	**5**	
9.	**5**	
10.	**6**	
11.	**7**	
12.	**6**	
13.	**4**	
14.	**6**	
15.	**12**	
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 that assessment will take into account the quality of written communication used in your answers.

The quality of written communication will be assessed in question **15**.

Examiner only

1. A secondary school uses their computer system to prepare reports for every pupil. Each report has to include the pupil's contact details and a comment from each subject teacher.

(a) Describe **in detail** how the contact details and the teacher comments could be stored and combined to produce completed reports. [3]

(b) The school will send the reports to parents or guardians as an email attachment. Describe **three** benefits of sending the reports in this way compared to posting them using conventional post. [3]

6

Examiner only

2. *(a)* A college stores data about students. Name the most suitable data type for the storage of the following data:

the surname of the student; ..... [1]

a single letter code indicating whether they are male or female; ..... [1]

whether or not the student is entitled to receive free meals; ..... [1]

the number of whole days the student is absent; ..... [1]

their average exam mark. ..... [1]

(b) State the most appropriate data structure for storing all the personal information about each student. [1]

.....

Explain why this data structure is the most suitable. [2]

.....

.....

.....

.....

.....

.....

8

1101 010003

Examiner only

3. *BYOdirect* has a web site that allows customers to purchase a personal computer. The customer selects a base computer with standard components and then has the opportunity to upgrade each component. The web site recommends components to upgrade.

(a) One recommendation is to upgrade from the standard 4 gigabytes of RAM to 8 gigabytes. Briefly describe the role of RAM in a personal computer and explain why *BYOdirect* recommends this upgrade. [2]

.....

.....

.....

.....

(b) Another recommendation is to upgrade from the standard 1 terabyte hard disc drive to a 4 terabyte hard disc drive. Briefly describe the role of the hard disc drive in a personal computer and explain why *BYOdirect* would recommend this upgrade. [2]

.....

.....

.....

.....

(c) Another recommendation is to upgrade to a processor with a word size of 64 bits instead of the standard 32 bits. Briefly explain why *BYOdirect* would recommend this upgrade. [1]

.....

.....

.....

Examiner only

(d) Another recommendation is to upgrade to a Solid State Drive (SSD) which has no moving parts. Briefly explain why *BYOdirect* would recommend an SSD instead of a traditional hard disc drive. [1]

.....

.....

.....

(e) The Data Protection Act applies to the customer data stored by *BYOdirect*. *BYOdirect*, which has notified the Information Commissioner, ensures that their 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 *BYOdirect*. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

1101 010005

9

Turn over.

Examiner only

4. A mobile hairdresser visits clients' homes. She currently stores the clients' personal details and styling history on paper in a ring binder and client appointments in a diary.

The stylist has purchased a laptop computer to store all the clients' details and all her appointments.

(a) State the most appropriate software that could be used to store the information. [1]

.....

(b) Briefly describe **two** possible problems with the current paper-based system and describe how the new computer system could solve **these** problems. [4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Examiner only

(c) The client's data will have to be input into the new computerised system. Validation checks will be carried out on some of the data input.

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

.....

.....

.....

.....

.....

.....

(ii) Describe a **different** suitable validation check that could be carried out on the date of a client's appointment giving an example of invalid data that would be detected by **this** check. [2]

.....

.....

.....

.....

.....

.....

1101 010007

9

Turn over.

Examiner only

5. *(a)* Describe **three** advantages of using a star network topology compared with a bus or ring topology. [3]

(b) Describe the hardware required by a device, for example, a laptop computer **and** the hardware required by a network to enable a wireless connection to be made between a device and a network. [1]

(c) State a suitable use for the following protocols:

HTTP (Hypertext Transfer Protocol); [1]

FTP (File Transfer Protocol); [1]

IMAP (Internet Message Access Protocol). [1]

7

Examiner only

6. The performance of a hard disc drive on a personal computer can be impaired when the amount of data stored on the disc is close to the disc's capacity and files on the disc can become fragmented.

(a) Briefly explain the term *fragmentation* and explain **in detail** how defragmenting a file will improve the access time. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

(b) Files can be compressed to increase the available storage space on a disc. Briefly describe **one** method of compressing a file. [1]

.....

.....

.....

.....

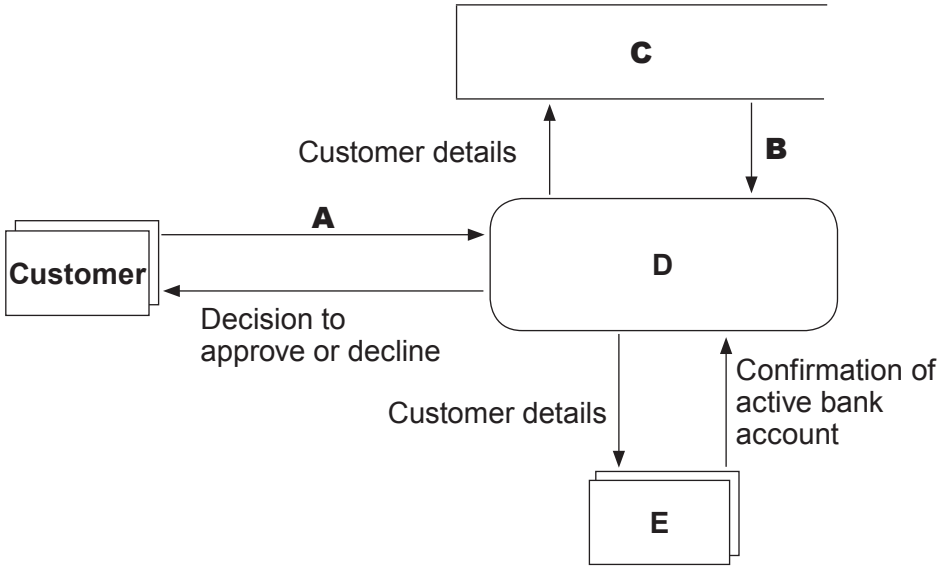
4

Turn over.

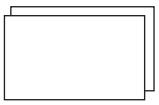
Examiner only

7. Customers purchasing a new car can apply for a loan by completing an application form. The loan company checks that the customer is a registered house owner with their database of house owners and contacts the customer's bank to confirm that they have an active bank account. A decision is then made to approve or decline the loan application.

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



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



.....

Examiner only

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

.....

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

.....

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

.....

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

.....

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

.....

6

Examiner only

8. A company has written a new computer game.

(a) The game was tested near the end of development. Name this method of testing and describe **who** would typically carry out this testing. [2]

.....

.....

.....

.....

.....

(b) The company release the game without payment to customers who have previously purchased games. These customers play the game to test it. Name this type of testing and give a benefit for the company and a benefit for the customer testing the game of using this method of testing. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

5

Examiner only

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

(b) Giving a reason, describe the advantage of using fixed length records compared with using variable length records. [2]

5

Turn over.

Examiner only

10. The operating system on many computer systems such as personal computers, large mainframe computers or hand held devices has to manage the resources of the system. Describe **in detail** the role of the operating system in managing the resources. [6]

6

Examiner only

11. Below is a segment of an algorithm.

```
set S = 0
set E = 7
set F = False
set P = –1

input SV

repeat
    set M = (S + E) DIV 2

    if SV = Array[M] then
        set F = True
        set P = M
    endif

    if SV > Array[M] then
        set S = M + 1
    endif

    If SV < Array[M] Then
        set E = M – 1
    endif

until (F = True) OR (E < S)
```

Test data

Array	[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	13	27	33	49	55	67	75	79

SV = 75

NOTE: DIV is integer division, e.g. 7 DIV 2 = 3

Complete the table below to show how each variable changes when the algorithm is performed on the test data given above. [7]

S	**E**	**M**	**Array[M]**	**F**	**P**
0	7	3	49	False	–1
4	7			False	–1
	7				

7

Examiner only

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

```
SortArray is integer array [1 to 7]
i is integer
Last is integer
SwapMade is boolean

    declare subprocedure ProcOne

    Temp is integer

    start
        set Temp  =  SortArray[i]
        set SortArray[i]  =  SortArray[i + 1]
        set SortArray[i + 1]  =  Temp
    end

startmainprog

    set Last  =  7

    repeat
        set SwapMade  =  false

        for i  =  1 to (Last – 1)
            if SortArray[i]  >  SortArray[i + 1] Then
                call ProcOne
                set SwapMade  =  true
            endif
        next i

        set Last  =  Last – 1

    until (Last  =  1) OR (SwapMade  =  false)

endmainprog
```

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

.....

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

.....

Examiner only

(b) Explain the difference between the use of global and local variables. [2]

.....

.....

.....

.....

.....

(c) Explain the role of the procedure ProcOne in the algorithm. [2]

.....

.....

.....

.....

.....

6

Examiner only

13. Below is an incomplete algorithm that attempts to produce the multiplication table for a given positive integer.

```
Algorithm Multiplication Table

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 =
            output Product
        endfor
    endif

endmainprog
```

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

.....

(b) Why should algorithms be written with meaningful identifiers? [1]

.....

.....

(c) Explain the role of the following line of code from the algorithm. [1]

```
if multiplier  <  1 then
```

.....

.....

(d) Complete the algorithm so that it produces a multiplication table for a given positive integer. [1]

WRITE IN THE BOX ABOVE – DO NOT WRITE ANYTHING HERE

4

Examiner only

14. Companies advertise their products on social networking web sites. The companies can target users with selected products based on the personal information given to the social networking web site. Users of the web site are able to indicate that they like the advertised product and tell their on-line friends that they like the product. The users are also able to dismiss an advert indicating that they are not interested.

Give **one** drawback of this method of advertising.

Describe the benefits of advertising in this way for:

- the companies
- users of the social networking web sites. [6]

Examiner only

15. A computing consultancy firm has been given the task of completely upgrading 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. [12]

Examiner only

END OF PAPER

12

Examiner only

For continuation only.

Examiner only