Candidate Name	Centre Number	Candidate Number

WELSH JOINT EDUCATION COMMITTEE
General Certificate of Education
Advanced Subsidiary/Advanced

CYD-BWYLLGOR ADDYSG CYMRU
Tystysgrif Addysg Gyffredinol
Uwch Gyfrannol/Uwch

341/01

COMPUTING CP1

SOFTWARE AND SYSTEM DEVELOPMENT

P.M. FRIDAY, 13 January 2006

(1½ hours)

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	6	
2.	6	
3.	5	
4.	4	
5.	5	
6.	7	
7.	6	
8.	6	
9.	5	
10.	10	
Total	**60**	

INSTRUCTIONS TO CANDIDATES

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 60.

You are reminded of the necessity for good written communication and orderly presentation in your answers.

1. Information about the employees of a company is held in a computer system.

(i) Describe employee data which would best be stored in **each** of the following data types:

integer data type; [1]

.....

.....

real data type; [1]

.....

.....

boolean data type; [1]

.....

.....

string data type. [1]

.....

.....

(ii) Describe employee data which could be conveniently stored in a *record*, but which could **not** be stored in a *two-dimensional array*. [1]

.....

.....

Explain why the data could not be stored in a *two-dimensional array*. [1]

.....

.....

6

2. A programmer is required to do some maintenance on an existing computer program.

(i) What term is used for the information produced by the original programmer to help maintain the program? [1]

.....

(ii) The program requires amending so that it will run on a different operating system. What is the name for this type of maintenance? [1]

.....

(iii) Name and describe **two** other types of program maintenance. [4]

Name

.....

Description

.....

.....

Name

.....

Description

.....

.....

6

3. *(a)* Describe **two** features which would be useful in a programming language designed to produce web pages. [2]

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(b) Another programming language has very good record-handling and file-handling facilities. What type of application might this language be useful for? [1]

.....

(c) Describe the difference between *systems software* and *applications software*. [2]

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.....

.....

5

4. The following program extract is intended to output the maximum of a set of three numbers.
The extract contains **two** different types of program error.
In **each** case, write down the statement number, name the type of error and write down the corrected statement. [4]

```
Statement
   1   input Number1
   2   input Number2
   3   input Number3
   4   MaxNumber = Number1
   5   if Number2 > MaxNumber thne MaxNumber = Number2
   6   if Number3 > MaxNumber then MaxNumber = Number2
   7   output MaxNumber
```

Error type 1

Statement Number .....

Name of error type .....

Corrected statement .....

Error type 2

Statement Number .....

Name of error type .....

Corrected statement .....

4

5. *(a)* Data is often *sorted* by computers. Why is this a useful operation? [1]

.....

.....

(b) (i) Explain, using a diagram if you wish, how a *binary search* is used to locate an element in an array. [3]

.....

.....

.....

.....

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.....

.....

(ii) When can a binary search **not** be used? [1]

.....

.....

5

6. A decorating shop uses a paper-based system to manage its stock and customer orders.

A systems analyst has been asked to carry out a systems analysis and design for a new computer-based system. The systems analyst can use a number of techniques to find out how the existing system works. These include:

- *interviewing* staff who use the current system
- asking staff to complete *questionnaires*.

(i) Describe **one** advantage of using *interviews* rather than *questionnaires*. [1]

.....

.....

(ii) State **two** other methods which the systems analyst might use in this case to find out about the current system. [2]

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.....

(iii) The systems analyst has agreed to produce an *evaluation of alternative proposals* for the solution. Describe how this should be carried out. [1]

.....

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(iv) Describe **two** activities which should take place during the testing of the new computer system. [2]

.....

.....

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.....

(v) For the new computer system to be successful, it needs to be developed on time. State **one** other basic requirement. [1]

.....

7. A mail order firm sells plants to gardeners. The firm is very keen to reward customers who spend a large amount of money or who introduce new customers to the firm. They send £10 or £20 vouchers to customers according to the following algorithm:

```
Statement
1    input Sales
2    input NewCustomerIntroduced
3    if ((Sales > 200) OR ((Sales > 100) AND (NewCustomerIntroduced = TRUE)))
4        then output "Send £20 voucher"
5        else if ((Sales > 100) OR ((Sales > 50) AND (NewCustomerIntroduced = TRUE)))
6            then output "Send £10 voucher"
7            else output "No voucher"
```

(a) (i) State what the output will be if the inputs are:

Sales = 250 NewCustomerIntroduced = FALSE [1]

.....

(ii) State what the output will be if the inputs are:

Sales = 40 NewCustomerIntroduced = TRUE [1]

.....

(iii) State what the output will be if the inputs are:

Sales = 150 NewCustomerIntroduced = FALSE [1]

.....

(iv) State what the output will be if the inputs are:

Sales = 150 NewCustomerIntroduced = TRUE [1]

.....

(b) The firm decides to change the algorithm by removing statements 5 and 6. The algorithm now becomes:

```
Statement
1    input Sales
2    input NewCustomerIntroduced
3    if ((Sales > 200) OR ((Sales > 100) AND (NewCustomerIntroduced = TRUE)))
4            then output "Send £20 voucher"
7            else output "No voucher"
```

(i) Tick **one** box to show which of the inputs given in part *(a)* would give a **different** output compared with the original algorithm. [1]

inputs	*tick one box*
250 FALSE	
40 TRUE	
150 FALSE	
150 TRUE	

(ii) Suggest why the firm might have made this change. [1]

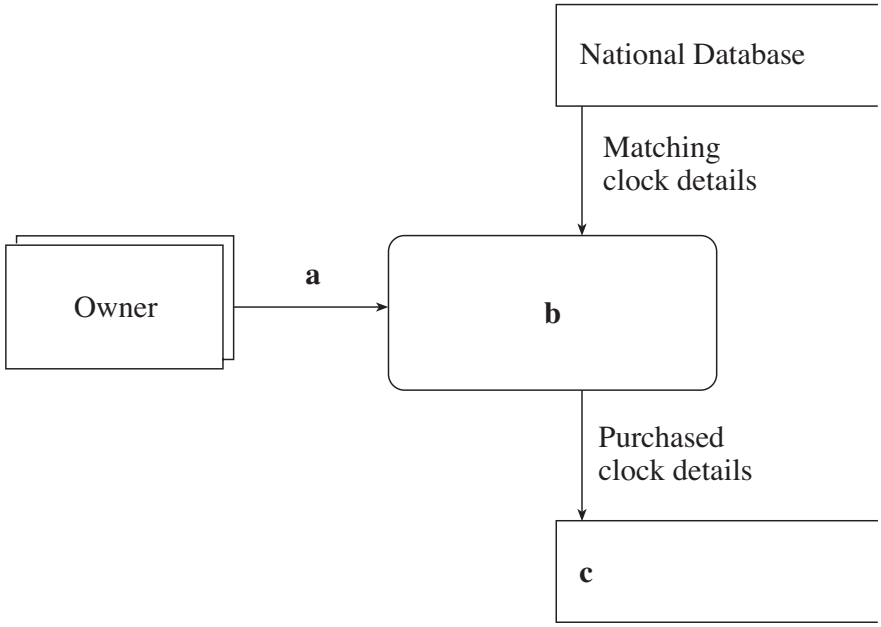
.....

.....

6

8. *Bigtime* is an antique business which specialises in buying and selling long-case (grandfather) clocks. When a clock owner contacts them with a clock to sell, a member of *Bigtime* staff carefully examines the clock and searches in a national database for information on similar clocks. If *Bigtime* and the customer can agree a price, the clock is purchased by *Bigtime*, and its details added to *Bigtime's* catalogue.

The following diagram illustrates the situation described above.



(i) What is the name of this type of diagram? [1]

.....

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

(iii) What type of object does the shadow box in the diagram represent? [1]

.....

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

.....

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

.....

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

.....

9. *(a)* Computer programs are often written using *standard modules*. Give **two** reasons why it is sensible to use *standard modules*. [2]

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.....

.....

.....

(b) Why is it useful to organise a program into small sections? [1]

.....

.....

(c) Many computer programs use *iteration*. What is meant by the term *iteration*? [1]

.....

.....

(d) What is meant by the *scope* of a variable in a computer program? [1]

.....

.....

5

10. In the following question, additional credit (up to 3 marks) will be gained if your answer demonstrates skill in written communication.

The secretary in a small firm uses an integrated package for word processing and spreadsheet applications, and uses the available *search* facility, *mail-merge*, and *macros*.

The secretary is not an expert computer user, and the quality of the *human computer interface* (HCI) is consequently very important.

Describe in detail the facilities named above in italics and **describe in detail** how the secretary might use them.

Also **describe in detail** how an HCI can be designed to be helpful for an non-expert user.

[7+3]

Examiner only
Arholwr yn unig

L3

C7

T10

For continuation only (any question)