

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

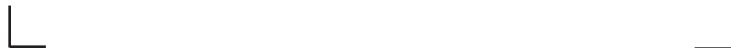
SOFTWARE AND SYSTEM DEVELOPMENT

P.M. MONDAY, 15 January 2007

(1½ hours)



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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.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	4	
2	6	
3	6	
4	2	
5	5	
6	6	
7	2	
8	6	
9	7	
10	5	
11	11	
Total	60	

1. Users of a computer system and also maintenance programmers find different types of documentation helpful.

(i) Briefly describe a type of documentation which the *user* might find helpful. [1]

.....
.....

(ii) Briefly describe a type of documentation which the *maintenance programmer* might find helpful. [1]

.....
.....

(iii) Give **two** reasons why it is particularly important that the *maintenance programmer* has suitable documentation available. [2]

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2. John Williams is studying 3 A-level subjects at his school.
 His mark in one of these subjects is 62.5.
 There are a number of tutor groups in the school, each of which is designated by a single letter;
 John is in Tutor Group E.
 Some students, including John, require wheelchair access to the buildings.

- (i) The above information refers to five different types of data.
 Write down the different types of data, and give an example taken from the above
 information about John Williams in **each** case. [4]

One is done for you.

Data type 1	Integer	Example	3
Data type 2	.....	Example	.....
Data type 3	.....	Example	.....
Data type 4	.....	Example	.....
Data type 5	.....	Example	.....

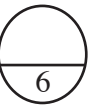
- (ii) (I) Name **one** data structure which could store all five items of data for one student as a
 single item. [1]

.....

- (II) Why is this data structure appropriate in this case? [1]

.....

.....



3. (a) (i) Describe what is meant by the term *syntax error*. [1]

.....
.....

(ii) Another type of error occurs when division by zero is attempted.

(I) What name is given to this type of error? [1]

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(II) Give another example of this type of error. [1]

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(b) (i) What is the name of the type of maintenance where errors in a program are found and rectified? [1]

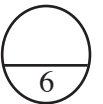
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(ii) Name and describe **one** other type of maintenance. [2]

Name:

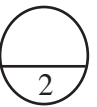
Description:

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4. A company employs a number of staff who sell different types of cleaning products (for instance car-cleaning kits, window-cleaning kits) to members of the public door-to-door.

Show using a labelled diagram, how monthly sales data from the above situation could be stored in a *two-dimensional array*. [2]



5. A binary search is often used to search for a particular value in an array.

(i) Under what circumstances can a binary search be used? [1]

.....

(ii) Give an example of **actual numerical data** where a linear search would work but where a binary search would not work. [1]

.....

(iii) Why is a binary search preferable to a linear search, in circumstances where it is possible to use either search? [1]

.....

(iv) What should happen at the end of a binary search if the value is not found? [1]

.....

(v) It is known that, for a binary search on an array of 4000 data values, the maximum search length is about 12. Assuming this is true, what would be the maximum search length for an array of 2000 data values? [1]

.....



6. A school uses a software package which combines a word processor, a spreadsheet and a database.

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

.....

(ii) Occasionally the school secretary produces a letter for each pupil, which automatically combines their name and address with other data.

(I) What is the name for this process? [1]

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(II) Explain how this process works. [2]

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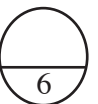
(iii) The same software package allows the user to create *macros*. Explain what is meant by the term *macro* and give an example of where a macro might be used in this situation. [2]

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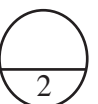
7. (i) In a computer program, a certain variable is defined within one subprogram only. What is the name given to this type of variable? [1]

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(ii) Describe what is meant by a *global* variable. [1]

.....

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8. A credit card company sends a reminder letter to any customer if the amount they owe is giving reason for concern. Each customer has a credit limit (the maximum they are supposed to owe) and is expected to make a payment each month.

The following algorithm is used:

```

1  input AmountOwing
2  input CreditLimit
3  input PaymentMadeLastMonth
4  if ((AmountOwing > CreditLimit) OR (PaymentMadeLastMonth = FALSE AND AmountOwing > 0.5 *
   CreditLimit))
5  then print a reminder letter
    
```

- (i) What will happen if the inputs are:

	AmountOwing	CreditLimit	PaymentMadeLastMonth	Your answer
(I)	1400	1000	FALSE	.....
(II)	2000	1000	TRUE	.....
(III)	400	1000	TRUE	.....
(IV)	600	1000	FALSE	.....

[4]

- (ii) The credit card company decides that in some serious cases, it needs to “freeze” the account so that the customer cannot use it further.

Two statements are added to the algorithm as follows:

```

6  if ((AmountOwing > 1.5 * CreditLimit) OR (PaymentMadeLastMonth = FALSE AND AmountOwing > 0.75 *
   CreditLimit))
7  then freeze account
    
```

Which example(s) from part (i) would result in the account being frozen?

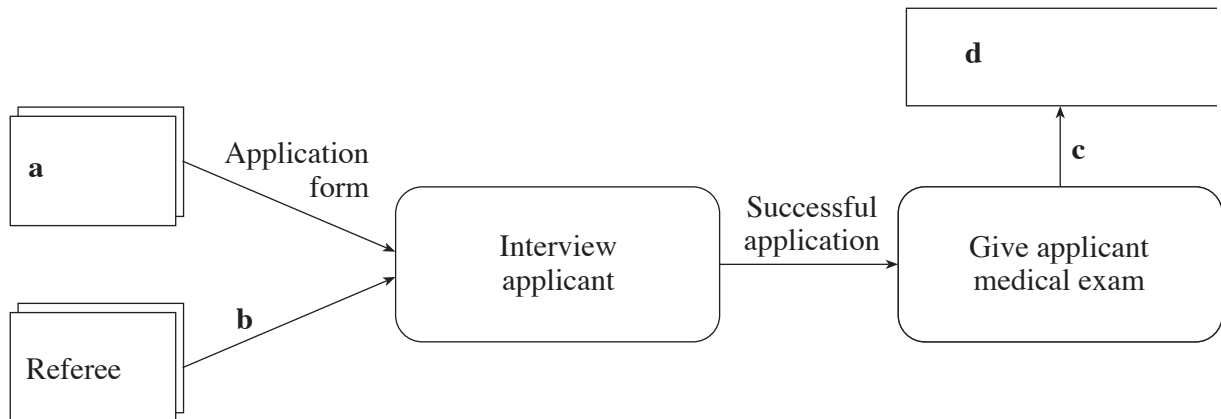
[2]

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9. *Black Mountain Hospital* keeps a list of auxiliary nurses who can be employed when necessary. When someone wishes to be put on this list, they need to fill in an application form, and ask someone (a referee) to supply a reference. They are then interviewed, and if successful they are given a medical examination. If they also pass the medical examination, their details are put on the approved auxiliary nurse list.

The situation is shown on the data flow diagram below:



- (i) When the system was being developed, the systems analyst said:

“I like this type of diagram because one diagram’s worth a thousand words”.

Why might the systems analyst find this particular type of diagram so helpful? [1]

.....

.....

- (ii) What type of object does the *shadow box* represent? [1]

.....

(iii) Draw the shape used in the diagram to represent a data flow. [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]

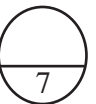
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(vi) Give a suitable name for the object shown as **c** in the diagram. [1]

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

.....



10. (a) Well designed software often includes *self-documenting identifiers* and *self-documenting code*.

Explain each of these terms:

(i) *self-documenting identifiers*; [1]

.....
.....

(ii) *self-documenting code*. [1]

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.....

(b) Authoring languages and also languages such as HTML are often used to develop web pages. Describe **two** features which make such languages suitable for the purpose. [2]

Feature 1

.....
.....

Feature 2

.....
.....

(c) Many computer algorithms include examples of *selection*.

Explain what is meant by the term *selection* in this case. [1]

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.....



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

An estate agent has a number of branches which potential buyers visit to gather paper-based information about properties for sale. A systems analyst has been asked to design a new computer system to replace the current system and enable potential buyers to view photographs and videos of properties.

Part of this task is to *specify suitable hardware* and *specify suitable software* for the new system. Describe the features which the systems analyst would be likely to specify in each case.

It is very important that the buyers, who may not be experienced computer users, find the new system easy to use. Describe in detail what features you would expect to find in the *human computer interface* (HCI) in this case.

The new system will require testing before use. Describe the activities which would normally be carried out during *testing*. [8 + 3]

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