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ZIMBABWE SCHOOL EXAMINATIONS COUNCIL
General Certificate of Education Advanced Level

COMPUTING
PAPER 2

9195/2

NOVEMBER 2005 SESSION

3 hours

Additional materials:
Answer paper

TIME 3 hours

INSTRUCTIONS TO CANDIDATES

Write your name, Centre number and candidate number in the spaces provided on the answer paper/answer booklet.

Answer **all** questions.

Write your answers on the separate answer paper provided.

If you use more than one sheet of paper, fasten the sheets together.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets [] at the end of each question or part question.

You are reminded of the need for good English and clear presentation in your answers.

This question paper consists of 6 printed pages and 2 blank pages.

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[Turn over



- 1 (a) Explain the difference between problem oriented programming languages and machine oriented programming languages. [2]
- (b) Of the two types of languages mentioned above, which one would be more appropriate for programming embedded systems. Explain. [2]
- (c) Explain the term **systems software** and give **two** examples of programs which form part of it. [4]
- 2 The following is an example of a recursive routine, which displays the numbers 1, 2, 3 and 4 in that order.

Study the program and answer the questions that follow.

```
Program recursion example;  
Var Abc : Integer;
```

```
Procedure PrintList (Num : Integer);  
Begin  
    Num := Num - 1 ;  
    If Num > 1  
    Then PrintList (Num);  
Write/ln (Num); {Line A}  
End; {Procedure PrintList}
```

```
{**** Main Program ****}  
Begin  
Abc := 4  
PrintList (Abc);  
Write/ln (Abc); {Line B}  
End
```

- (a) Explain how a final list is obtained. [4]
- (b) Describe **two** advantages and **two** disadvantages of recursion. [4]

3 Study the following assembler language program.

label	Operator Code Origin	Operands 26	Comments
			Assign space for data items beginning at memory location 26
A	STORAGE	4B	Assign 4 bytes of memory to a data item called A
B	STORAGE	4B	Assign 4 bytes of memory to a data item called B.
C	STORAGE	4B	Assign 4 bytes of memory to a data item called C.
D	STORAGE	4B	Assign 4 bytes of memory to a data item called D
X	STORAGE	4B	Assign 4 bytes of memory to a data item called X
	ORIGIN	O	Originate the program at memory location zero
	LOAD	R1, B	Load value of data item B into register 1(R1)
	LOAD	R2, C	Load value of data item C into register 2 (R2)
	DIVIDE	R1, R2	Divide contents of (R1) by the contents in R2 leaving the answer in R1
	LOAD	R2, A	Load value of data item A into R2
	ADD	R1, R2	Add contents of R1 and R2 leaving the answer in R1
	LOAD	R2, D	Load value of data items D into R2
	ADD	R1, R2	Add contents of R2 to contents of R1 leaving your answer in R1
	STORE	R1, X	Store final results in memory space set aside for data item X



Showing all steps, what will be the final results stored in X given that

(i) A = 3 B = 15 C = 3 D = 10 [6]

(ii) A = 3 B = 15 C = 0 D = 10 [2]

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R1	R2	R1	R2
15	3	15	0
5	3	5	3
3	10	14	10
17		24	

[Turn over

- 4 (a) One of the stages in systems development is the fact finding stage. Some of the techniques used in fact finding include **documentation study, observation and automatic methods**.
Write brief notes on each of the terms in bold. [6]
- (b) State the constraints of using interviews and questionnaires in fact finding. [4]
- 5 (a) Numbers can be stored in a computer in either integer form or floating point form.
Give
(i) **two** reasons for using floating point representation, [2]
(ii) **one** reason for using integer representation. [1]
- (b) Explain the role of the Random Access Memory (RAM), Read Only Memory (ROM) and the secondary storage in storing data and programs from the instant of switching on a personal computer (PC) up to the state when the desktop is ready. [3]
- (c) Explain why the ROM and the RAM are referred to as non-volatile and volatile memory respectively. [2]
- (d) Give **one** advantage and **one** disadvantage of having data stored only in the backup storage whilst working with it on a computer. [2]
- 6 An indigenous company is considering buying software for their data processing.
(a) State **five** advantages to the company of buying an applications specific package. [5]
(b) State **three** factors to consider when buying a package. [3]
(c) State **two** disadvantages of a generalised application package. [2]
- 7 (a) Describe the lexical analysis stage of compilation. [3]
(b) A successfully compiled program might fail to execute successfully. Give **three** different cases in which this can occur. [3]
(c) Explain the terms **user-defined data type** and **built-in data type** giving an example for each. [4]

- 8 (a) An advertising agency produces advertisements for national publication. Images on the advertisements are either hand drawn or photographic. The images are enhanced by using special software.

(i) Identify and explain **one** suitable application package for producing advertisements. [2]

(ii) State **three** ways in which a photographic image may be enhanced for inclusion in advertisements. [3]

- (b) Study the following part of a binary search algorithm.

```

flag := 0
left := 1
right := n
while ((right >= left) and (flag = 0))
  x := (left + right) / 2
  If item = table [ x ] Then
    flag := 1
  Else
    If item < table [x] Then
      Right := x - 1
    Else
      Left := x + 1
  End if
End while

```

- (i) Copy and complete the table below to demonstrate the operation of the algorithm to search for 42 from the following data.

27 33 35 37 41 41 41 42 49
51 52 53

FLAG	LEFT	RIGHT	X
0	1	12	6

Assume that integer division rounds down. e.g. $(5 + 8)/2$ gives the result 6.

[5]

- (ii) State **one** situation where this algorithm will not be appropriate.

[1]

- 9 (a) Briefly explain what is involved in the implementation stage of a new computerised system. [6]
- (b) Once the system is installed, acceptance testing may be carried out under the direction of the customer, who may provide the test plan. [6]
- State and briefly explain **three** objectives included in the test plan. [6]
- 10 (a) The choice of file organisation is considered to be vital by the file designer. A number of questions need to be considered. [5]
- Briefly explain **five** important questions to be used by file designers. [5]
- (b) Given an example of an application where
- (i) serial files,
 - (ii) sequential files,
 - (iii) indexed sequential files,
 - (iv) random files,
- are sensible to use, explaining why each file structure is appropriate. [8]