

Answer **all** questions.

- 1 (a) State what is meant by *system software*. [1]
- (b) State **two** utilities which you would expect to find as part of the operating system for a PC, and explain what each is used for. [4]
- 2 (a) Name **three** registers used during the fetch-decode-execute cycle and state the purpose of each. [6]
- (b) State the sequence of steps in the fetch-decode-execute cycle when the next instruction to be executed is an unconditional jump instruction. You should include the possibility of an interrupt occurring during the cycle. [7]
- 3 (a) Batch-processing and real-time processing are commonly used in data processing. Explain the terms
- (i) *batch-processing* [1]
- (ii) *real-time processing*. [1]
- (b) (i) Give an application that is suitable for batch-processing and give **two** reasons why batch-processing is appropriate. [3]
- (ii) Give an application that is suitable for real-time processing and give **one** reason why real-time processing is appropriate. [2]
- 4 A student has been asked to computerise the loan of books from a college library.
- (a) State **two** advantages of using a relational database rather than flat files. [2]
- (b) State **three** tables that are essential for this database. [3]
- (c) List the attributes (fields) that will be needed in each table. [6]
- (d) State the **two** items of data that need to be collected when a student borrows a book. [2]
- (e) Describe an efficient method of collecting this data. [1]
- (f) Explain the processing that takes place when the data is entered into the system. [2]
- (g) Explain how your system can be used to produce a list of students with overdue books. [3]
- 5 (a) The most commonly used programming languages are imperative languages. State what the term *imperative language* means. [1]
- (b) Declarative languages include functional and logic languages. Describe the terms
- (i) *functional language* [2]
- (ii) *logic language*. [2]
- (c) (i) Explain the purpose of parameters when using functions and procedures. [2]
- (ii) Parameters may be passed by value and by reference. Explain the terms *passed by value* and *passed by reference*. [2]
- (d) State **three** facilities that a programmer can use to help others understand a program written in a high-level language. [3]

- 6 (a) (i) With the aid of a diagram, describe the data structure known as a linked list. [4]
- (ii) The words

Jack and Jill went up the hill

are to be stored in a linked list that is stored in a two-dimensional array as shown in Fig. 6.1. Using a copy of this table, show how the linked list is stored so that the data is in alphabetical order.

Index	Data	Pointer
0	Jack	
1	and	
2	Jill	
3	went	
4	up	
5	the	
6	hill	
7		

Fig. 6.1

[4]

- (b) A stack is stored in an array as shown in Fig. 6.2. The minimum array index is zero and the maximum index is 6.

Index	Data
0	The
1	cat
2	jumped
3	over
4	the
5	
6	

Top\_of\_Stack = 4

Fig. 6.2

- (i) Give an algorithm to add an item to the stack. [4]
- (ii) Give an algorithm to remove an item from the stack. [4]

- 7 (a) During program development, a programmer can use both an editor and a debugger.
- (i) State the purpose of the editor. [1]
  - (ii) State **three** facilities you would expect a debugger to provide. [3]
- (b) Explain why an interpreter is often used during program development rather than a compiler. [2]
- (c) Explain why a compiler is usually used when a program has been developed rather than an interpreter. [2]
- (d) State the meaning of the terms
- (i) syntax error
  - (ii) logical error
- giving an example of each. [4]
- 8 (a) Give **two** examples of selection constructs using a high-level language of your choice. [2]
- (b) Give **two** examples of repetition constructs using a high-level language of your choice. [2]
- (c) Object Oriented Programming is becoming the standard programming technique. Describe what is meant by *Object Oriented Programming*. [2]
- (d) (i) Explain what is meant by top-down design when writing software. [2]
- (ii) State **four** advantages of writing a piece of software in modules. [4]
- 9 Read the following algorithm.

```

READ number
i = 0
REPEAT
    digit(i) = number MOD 2           ;Gives remainder after division by 2
    number = number DIV 2           ;Gives integer result after division by 2
    i = i + 1
UNTIL number = 0
FOR j = i - 1 TO 0 STEP -1
    OUTPUT digit(j)                 ;Output on current line
NEXT j
END

```

- (a) Write down the output when the input is
- (i) 14 [1]
  - (ii) 45. [2]
- (b) State the purpose of the algorithm. [1]

# COMPUTER STUDIES

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Paper 1276/0  
Written

## Comments on individual questions

- 1 a The question was not read well. An attachment is a facility offered by email, but only when you send email and not when you receive email.
- Reply  
Response is automatically sent by recalling address from which original was sent  
Filling/Saving  
Saving message for future use/in a selection of user defined files/folders  
Copying/forwarding/multiple forwarding  
Making a copy and forwarding it to other recipients by typing in their addresses/using address book  
Deletion  
Removing message to free up space in box  
Mark as read/unread  
To ensure message remains in inbox for future reference
- b Answers like mail getting lost when send by post is not acceptable by Cambridge as an answer. Remember Cambridge does not need to fetch post, it gets delivered, so time is not an issue.
- Communication is immediate  
large files/video/sound can be sent as attachments  
far more communication because of ease/expectation of reply  
communication open to hacking/more secure because of encryption  
much communication is unnecessary  
large volume of unsolicited mail  
questionable content of some mail  
danger of system being attacked  
(Nothing about reducing paper or about cost unless explained)
- 2 a Authoring can be used for web page designing as well as designing training material.
- (i) to keep the company accounts  
(ii) to create a catalogue  
(iii) to design a chair leg  
(iv) to create a web site for the company
- b More detailed answers were needed.
- generalized letter created on word processor with ...  
dummy contents in some areas e.g. customer name  
table of customers in database searched for buyers of tables  
items in fields in their records used  
to fill dummy contents in word processed letter
- c (i) Spooling does not mean that jobs are placed in a spool queue, only reference to the job is places in the queue.
- Jobs sent to storage/hard drive  
Details of job/location of job stored in spool queue  
Location in spool queue determined by priority  
When one job is finished, job at head of spool sent for printing  
Reference to job is deleted from spool queue

- (ii) Candidates referred back to c(i) rather than thinking at utility programs at large.

File handling

Need to delete/move/rename

User interface

Alter the view the user gets according to need/software/user

Security routines

Identify user and verify their access rights

Virus checker

To maintain integrity of the data

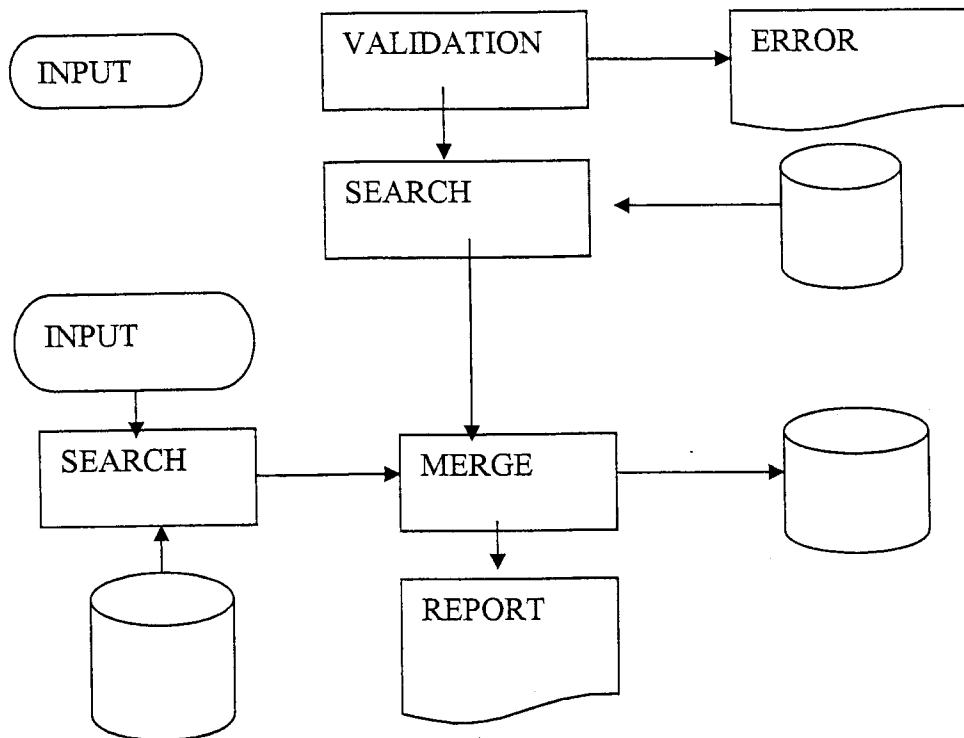
Directory management

To allow creation/amendment of folders/files

Automatic backup

To secure data

3.



Validation routine

Error report

Reading of values from student attendance file

Input request form teacher

Search comment bank for details

Merge attendance with comments form comment bank

Save report

Print report

Error reports and validation routines were not mentioned by most candidates.

4. a Most candidates only answered the first part of the question and didn't indicate how they are used.

- (i) Contains the address of the next instruction  
Passed to the MAR at the start of the cycle
- (ii) contains the address in memory of the instruction/data  
contents of the address held in MAR sent to MDR
- (iii) contains code of operation to be carried out and a row address  
operation code is decoded to set up pathways/address may be modified before being sent to MAR



Count = end\_of\_array

```
    End if
Next
If flag = 0 then report "tyre not found"; end
Else if number > 3 then total = price * number * .9
    Else total = price * number
    End if
    Output total
End if
End
```

Mark points:

Use of flag

Input statement with ..

Validation check

Loop to read array ...

With working condition

Within loop – correct use of array designation

Correct condition statement

Correct reading tyre price

Error report

Condition of number > 3

Calculation if discount given

Calculation if no discount

Output total

b Candidates confused validation with verification.

- (i) check on input data  
To make sure that it is sensible
- (ii) if number < 2  
range check  
condition flag = 0 after loop completed  
existence check

c This was unknown to Namibian candidates. A menu based interface is actually a text base interface.

- (i) easy to use/users may not be computer literate  
limited number of inputs  
helps to verify/validate inputs  
dirty environment limits hardware possibilities
- (ii) touch screen/keyboard with flexible covering ...  
easy to use/not affected by dirty environment  
printer ...  
to give hard copy of quote for customer

### Specific, content related comments

Generally, the projects suffer because the problems that are being solved are far beyond the scope of this syllabus. The vast majority seem to select problems for which there is available commercial software which is expensive, the reason being the skill and time it takes to produce the software. A hospital administration system, and airline booking system,...these are major problems which understandably become, in the hands of a student, a simple one table database solution making the testing of the (unreasonable) objectives impossible and the assertions in the evaluation somewhat fictional. Even the "old standby" of the video shop is extremely complex if solved satisfactorily, requiring a number of linked tables and a number of link entities which are not obvious.

Data flow in section 3 must include a DFD. At the moment the diagrams being presented re process diagrams, it is the flow of the data around the system which is required. This was one area where the moderated marks needed to be changed because of this lack of evidence. The module diagrams are weak. Perfection is not expected, but for full marks the candidate ought to be able to get two layers acceptable with the accompanying links. This did not cause problems in any but one of the sample, but it is something to improve and, perhaps, when working with teachers it is an area that needs highlighting. It is very difficult for a candidate to earn full marks for the clarity, or the plausibility, of their algorithms when the original problem they are trying to solve is so unrealistic. We need, as moderators, to try and get the message across that we really do want quality rather than quantity, we want something that solves a problem rather than something that goes some way to solving a problem that was too complex in the first place. The algorithms can hardly be given full credit if the resultant algorithms do not work. The justification for the choice of hardware is presently almost totally generic rather than being related to the problem. It is about that characteristic which makes it important in this example. The award had to be reduced in 6 of the seven pieces of work seen here.

The evaluation sections were very weak. The evaluations made need to be based on evidence, but for the reasons given above there was an almost total lack of evidence, consequently the evaluation marks should be low. We should be expecting that candidates use their testing to justify statements made and that they manage in the testing to show evidence that they are satisfying the original objectives.

The 'plan' should be a plan of campaign to solve the problem, not a plan of the systems life cycle. If the candidate can do no more than produce a timetable of the stages of the life cycle, they deserve no more than 1 mark.