Question 23 (20 marks) Use a SEPARATE writing booklet.

Use the information below and the algorithm on page 16 to answer Question 23.

An event ticket agency sells tickets for theatre, cinema and pop concerts. You have been employed to rectify errors in their ticketing system.

The goal of the ticketing system is to accept messages from remote terminals that include transaction details relating to events and ticket sales. The system collects the transactions and stores the relevant data in TICKET and EVENT files.

Following a ticket sale, tickets are printed at the remote terminal with a unique ticket number and the date and time of printing.

At the end of the day a supervisor concludes the processing by entering SystemStatus equals 'OFF'.

Question 23 continues on page 16

Question 23 (continued)

The algorithm for the ticketing system is:

```
1   BEGIN TicketSystem
2       SystemStatus = 'ON'
3       READ LastEventNumber
4       READ SystemDate, SystemTime
5       WHILE SystemStatus = 'ON'
6           READ MessageHeader
7           IF MessageHeader = 'EVENT' THEN
8               ProcessEvent
9           ENDIF
10          IF MessageHeader = 'TICKET' THEN
11              ProcessTicket
12          ELSE
13              SystemStatus = 'OFF'
14          ENDIF
15          READ SystemDate, SystemTime
16      END WHILE
17  END TicketSystem

18  BEGIN ProcessEvent
19      EventNumber = LastEventNumber + 1
20      LastEventNumber = EventNumber
21      STORE LastEventNumber
22      OPEN EVENT
23      STORE (EventName, EventDate, EventTime, EventLocation,
24              EventTicketsAvailable, EventNumber)
25      CLOSE EVENT
26  END ProcessEvent

27  BEGIN ProcessTicket
28      OPEN EVENT
29      IF EventTicketsAvailable < > 0 THEN
30          EventTicketsAvailable = EventTicketsAvailable – NumberTicketsSold
31      ENDIF
32      CLOSE EVENT
33      OPEN TICKET
34      STORE (TicketEventNumber, TicketEventName, NumberTicketsSold,
35              TicketEventDate, TicketEventTime)
36      FOR PrintTicket = 1 to NumberTicketsSold
37          PRINT (TicketCurrentTicketNumber, TicketEventName,
38                  TicketEventDate, TicketEventTime, SystemDate, SystemTime)
39      ENDFOR
40      CLOSE TICKET
41  END ProcessTicket
```

Question 23 continues on page 17

Marks

Question 23 (Continued)

(a) There are a number of errors in this algorithm. One error is as follows:

If the program reads an unrecognisable message, then the program does not perform as expected. This error occurs between lines 7 and 16 of the algorithm.

(i) Identify this error in the algorithm. **2**

(ii) Modify the appropriate line(s) of the algorithm to solve this error. **3**

(iii) There are three classes of messages involved with the operation of this ticketing system. These messages are passed from the remote terminals to the main module. **2**

What is the data type of each message class?

(iv) Using a desk check, identify TWO further errors in the algorithm. **3**

(b) The users of the remote terminals produce end-of-day reports listing the number of tickets sold for each event. The TICKET and EVENT files will be numerically sorted by ticket number and event number prior to processing. **6**

Write an algorithm to produce a report. The algorithm must:

- create an array of records (TicketArray) and insert the number of tickets sold, and the name and number of each event;
- sort the array by event number; and
- calculate and print the number of tickets sold and the event name for each event for the day.

(c) The ticket agency is currently reviewing the manner in which it provides documentation for the users of the remote terminals. **4**

After a study of the users it has been determined that they need support to:

- learn the application;
- learn specific functions in the application; and
- understand the application and its function and purpose.

The ticket agency wants to ensure that its user documentation meets these needs and is considering three alternative formats: paper, online documentation and video documentation.

Briefly describe TWO of these user documentation formats and evaluate the suitability of ONE of the formats described for the ticket agency.

End of Question 23

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Question 23

Q23 (a) (i)

The error is found in the "IF" statements header between lines 7 and 66. If the ~~input~~ is not 'event' or 'ticket', then the system turns ~~off~~ (systemstatus = 'OFF'). This process is only meant to happen when the supervisor inputs "systemstatus equals OFF". Hence, the algorithm ~~can~~ does not function as expected. This can be fixed by validating the data (Q23a(ii)).

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(23)(c) (ii)

Change the IF selection structure to a multiway structure:

```
6   READ MessageHeader
7   CASEWHERE MessageHeader =
8           "EVENT" :                   Process Event
9           "TICKET" :                  Process Ticket
10          "SystemStatus equals off" : SystemStatus = "OFF"
11          OTHERWISE :                 OUTPUT "Inappropriate header. Please
                                                re-input header"
12  ENDCASE
13  Read SystemDate, SystemTime
```

etc.

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23(a) (iii)

The "systemstatus=OFF" message is a string
The "EVENT" and "TICKET" messages are records

(iv) Desk-checking lines 29 to 31 give us:

NumberTicketsSold	EventTicketsAvailable	
2	1	
2	-1	...continues infinitely!
2	2	
	0	stops!
2	3	
	1 ...	can continue!

From this, we can see that if EventTicketsAvailable is less than 0, the processes can still occur (but it is impossible to sell tickets if there are none left!). Hence, it is an error. This can be fixed by ensuring NumberTicketsSold is ~~always~~ never larger than EventTicketsAvailable and changing line 29 to "IF EventTicketsAvailable > 0 THEN"

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23 (a) (iv)

Deskchecking line ~~38~~ 36–38 gives us:

Print Ticket	Number Tickets Sold	Ticket Current Ticket Number
1	4	1000
2		1000
3		1000
4		1000

As shown above, the ticket number does not change (TicketCurrentTicketNumber) remains as the same number. Hence, every ticket will NOT be unique, resulting in another error. This can be fixed by incrementing the TicketCurrentTicketNumber variable at the end of the "For" loop. (between lines 38 and 39).

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Q23 (b) BEGIN Report.

Length is the total number of events.

TicketArray is an Array of Ticket Records, indexed from 1 to ~~Length~~ Length.

Ticket is a record, containing,

NumberSold, an integer.

EventName, a string

EventNumber, an integer

END.

FOR index goes from 1 to Length

OPEN TICKET

STORE TicketEventNumber in TicketArray(index).EventNumber

STORE TicketEventName in TicketArray(index).EventName

STORE NumberTicketsSold in TicketArray(index).NumberSold

CLOSE TICKET.

ENDFOR.

SortArray (TicketArray)

DisplayArray (TicketArray)

END Report

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(b)

```
BEGIN SortArray (Array: Ticket)
    Set count to length of Array.
    FOR index goes from 2 to Count.
        FOR index goes from 2 to Count
            IF TicketArray(index).eventNumber >
                TicketArray(index+1).eventNumber THEN.
                Swap (TicketArray(index), TicketArray(index+1))
            ENDIF.
        ENDFOR
    ENDFOR
    Return TicketArray
END SortArray

BEGIN Swap (Ticket(index), TicketArray(index+1))
    Temp = Ticket(index).
    Ticket(index) = Ticket(index+1)
    Ticket(index+1) = Temp
    Return Ticket(index), Ticket(index+1)
END Swap
```

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(b)

```
BEGIN DisplayArray (Array)
    Set Count to Length of Array
    FOR index goes from 1 to Count
        Tickets = 0
        Ticket = Array(index).NumberSold + Tickets
        IF Array(index).eventnumber = Array(index+1).eventnumber THEN
            Tickets = Array(index+1).NumberSold + Tickets
        ELSE
            DISPLAY Array(index).eventname, Array(index).eventnumber, Tickets
        ENDIF
    ENDFOR
END DisplayArray
```

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23 (c) Briefly described one video and paper documentation

~~of paper documentation~~ Paper documentation involves hardcopy documents (ie printed on paper). This includes manuals, ~~and~~ system manuals, troubleshooting guides, installation guides and introductory manuals). Paper documentation lacks a dynamic nature as it must be reprinted & redistributed if it is to be updated.

Video documentation is in the next booklet...

Online documentation involves softcopy documents (ie. viewed on the screen). These would include HTML documents. They allow for ~~interactivity~~ interactivity (using hyperlinks), a variety of media types (use of audio, video, images and text) to promote ~~understanding~~ understanding and maintain interest. They have a very ~~dynamic~~ dynamic nature and allow for fast data retrieval. (every word is indexed and it stores previous search paths and keywords). It is convenient because it allows the person to view to documentation whilst at the computer.

next booklet...

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23 (c).

They can be easily updated in the sense that the newer versions can easily replace the older versions and it is very portable. Text from online documentation can be copied into a word file and stored for later reference. Balloon text provides information about screen elements and tutorial-type assistance help users to complete information processes. However, despite the benefits, there are costs ~~there~~ The must be more storage space and faster processing and the development process is lengthened. Hence, the benefits ~~outweigh~~ outweigh the costs and ~~is~~ thus online documentation is very suitable.

Next page for video documentation...

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(23) (c)

Video documentation involves documents in a VHS format that can be played by a VCR. (It is a in an analogue video format). They help to explain concepts easily by providing a graphical ~~rep~~ representation of various features. However, they are sequential in order of access and hence lack interactivity.