

AS CS T1 QP [25 Marks]

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- (a) Four program modules form part of a program for a library.

A description of the relationship between the modules is summarised as follows:

Module name	Description
UpdateLoan ()	<ul style="list-style-type: none">Calls either LoanExtend () or LoanReturn ()
LoanExtend ()	<ul style="list-style-type: none">Called with parameters LoanID and BookIDCalls CheckReserve () to see whether the book has been reserved for another library userReturns TRUE if the loan has been extended, otherwise returns FALSE
CheckReserve ()	<ul style="list-style-type: none">Called with BookIDReturns TRUE if the book has been reserved, otherwise returns FALSE
LoanReturn ()	<ul style="list-style-type: none">Called with parameters LoanID and BookIDReturns a REAL (which is the value of the fine to be paid in the case of an overdue loan)

Draw a structure chart to show the relationship between the four modules and the parameters passed between them.

[5]

(b) The definition for module `LoanReturn()` is amended as follows:

Module name	Description
<code>LoanReturn()</code>	Called with parameters <code>LoanID</code> , <code>BookID</code> and <code>Fine</code> The module code checks whether the book has been returned on time and then assigns a new value to <code>Fine</code>

- `LoanID` and `BookID` are of type `STRING`
- `Fine` is of type `REAL`

Write the pseudocode header for the **amended** module `LoanReturn()`.

..... [2]

A program is being designed for a smartphone to allow users to send money to the charity of their choice.

Decomposition will be used to break the problem down into sub-problems.

Identify **three** program modules that could be used in the design **and** describe their use.

Module 1

Use

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Module 2

Use

.....

.....

.....

Module 3

Use

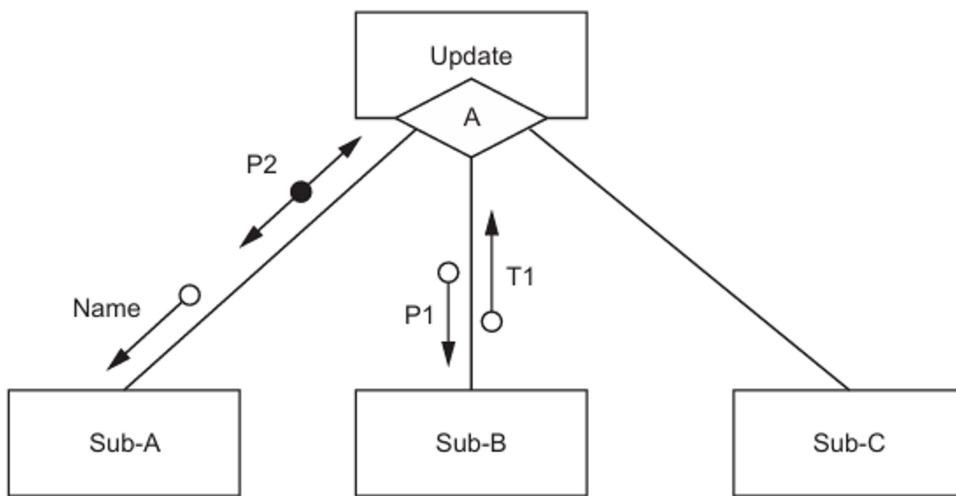
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[3]

(b) The structure chart illustrates part of the membership program:



Data item notes:

- Name contains the name of a club member
- P1 and T1 are of type real.

(i) Explain the meaning of the diamond symbol (labelled with the letter A) in the chart.

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[2]

(ii) Write the pseudocode module headers for Sub-A and Sub-B.

Sub-A

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Sub-B

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[4]

- 7 Seven program modules form part of a program. A description of the relationship between the modules is summarised below. Any return values are stated in the description.

Module name	Description
Mod-A	calls Mod-B followed by Mod-C
Mod-B	<ul style="list-style-type: none">• called with parameters Par1 and Par2• calls either Mod-D or Mod-E, determined when the program runs• returns a Boolean value
Mod-C	<ul style="list-style-type: none">• called with parameters Par1 and Par3• Par3 is passed by reference• repeatedly calls Mod-F followed by Mod-G
Mod-D	called with parameter Par2
Mod-E	<ul style="list-style-type: none">• called with parameter Par3• returns an integer value
Mod-F	called with parameter Par3
Mod-G	<ul style="list-style-type: none">• called with parameter Par3• Par3 is passed by reference

Parameters in the table are as follows:

- Par1 and Par3 are of type string.
- Par2 is of type integer.

(a) (i) Identify the modules that would be implemented as functions.

..... [1]

(ii) Modules Mod-F and Mod-G are both called with Par3 as a parameter.

In the case of Mod-F, the parameter is passed by value.

In the case of Mod-G, the parameter is passed by reference.

Explain the effect of the **two** different ways of passing the parameter Par3.

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[2]

(b) Draw a structure chart to show the relationship between the seven modules and the parameters passed between them.

[6]