



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS General Certificate of Education

	UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS General Certificate of Education Advanced Subsidiary Level and Advanced Level
CANDIDATE NAME	
CENTRE NUMBER	CANDIDATE NUMBER

COMPUTING 9691/21

Paper 2 October/November 2013

2 hours

Candidates answer on the Question Paper.

No additional materials are required.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer all questions.

At the end of the examination, fasten all your work securely together.

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



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www.PapaCambridge.com 1 The Computing Department has a problem keeping track of its teaching resources. student, has been asked to design and program a solution as his computing project. be the first large problem he has worked on.

He intends to write one large program that follows the process right through. His teacher tells him to break the problem into smaller parts.

(a) State and justify three of the reasons his teacher could give him for breaking the

problem into smaller parts.	
Reason 1	
	••••
Reason 2	
Reason 3	
	[6]

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Juan decides that the design will include the following modules:

- update the resource file when a new teaching resource is purchased
 - o input all the data about the resource
 - o generate a resource ID for the resource
 - o store in the resource file
- update the resource file when a current resource is discarded

(b)	(i)	Describe one diagrammatic method for showing how these modules are related.
		[2]

(ii) Use your method with the modules above.

For iner's

	4
	6
(e)	Juan will need the program to hold large amounts of data. His design will reading the data from the sequentially-organised resource file into several arrays. Describe three differences between the features of an array and a sequential file.
	Describe three differences between the features of an array and a sequential file.
	1
	2
	3
	[6]
(f)	Juan wants to use an array, NumberOfCopies to store whole numbers.
	In a high-level programming language:
	 declare the array of size 5000 initialise the array to 0
	Programming language
	Code
	[4]

2 (a) Juan has little programming experience, but has to write code for this program. written the following pseudocode statements.

	44
	7
	an has little programming experience, but has to write code for this program. It then the following pseudocode statements. The each statement describe what is wrong and write a correct version. IF Index > 5000 OR < 0 THEN OUTPUT "Error"
For	each statement describe what is wrong and write a correct version.
(i)	IF Index > 5000 OR < 0 THEN OUTPUT "Error"
	Description
	Correct statement
	[2]
(ii)	NumberOfCopies[Index] + 1 ← NumberOfCopies[Index]
	Description
	Correct statement
	[2]
(iii)	<pre>NumberOfCopies[Index]</pre>
	Description
	Correct statement
	[2]

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- www.PapaCambridge.com (b) Juan needs to design the code for a part of the program that determines resources are kept. If the resource has:
 - an ID less than 1001 it will be kept in Cabinet 1
 - an ID between 1001 and 3000 it will be kept in Cabinet 2
 - even numbered IDs in Drawer 1
 - odd numbered IDs in Drawer 2
 - an ID between 3001 and 5000 it will be kept in Cabinet 3

Write pseudocode that processes the variable ResourceID and outputs where the resource is kept. Use nested IF statements.
[6]

www.PapaCambridge.com (c) In a high-level programming language write code that processes the ResourceID and outputs where the resource is kept. Use a CASE/SEL statement. Programming language

[6]

3 (a) An interface is to be designed to add a new resource. The user must:

- enter the name of the resource
- · choose the type of the resource
- select the purchase date

The program generates and displays:

- a new resource ID
- where the resource is kept

The user must be able to save the data, clear/cancel the input, and move on to entering another resource.

Design a graphical user interface (GUI). Pay particular attention to layout and effective use of the controls you would expect to find in a GUI.

Add new resource(s)			

[6]

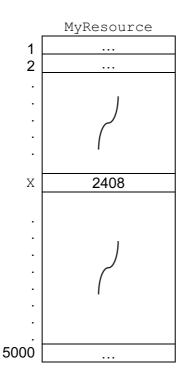
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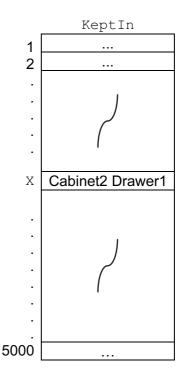
"	A report will show all the items that have been entered on a particular day.
	It will show each resource ID and where the resource is kept. The resources will be grouped by type.
	Design the report layout.

[5]

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www.PapaCambridge.com An array, MyResource, size 5000, data type INTEGER, is used to store the resource An array, Keptin, size 5000, data type STRING, is used to store where a resource is ke A resource with resource ID MyResource [X] is kept at KeptIn[X], where X is an integer variable.





Juan writes the pseudocode that searches MyResource for a given resource ID and outputs where the resource is kept.

```
flag \leftarrow 0
INPUT P
FOR X ← 1 TO 5000
IF myresource[X] = P
THEN
OUTPUT keptin[X]
flag \leftarrow 1
ENDIF
NEXT
IF flag = 0
THEN
OUTPUT "Not Found"
ENDIF
```

www.PapaCambridge.com (c) Give four techniques that should have been applied to the pseudocode to easier to understand. (d) Re-write the pseudocode using a REPEAT – UNTIL loop. Make use of the techniques you gave in (c) to produce self-documented code.

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14 un on the pseudocode using a trace table, sta	e) (i)	(e)
Tige		
N COM		
night find later. Give an example.		
[4]		
nd one module appears not to work.	(ii)	
eak point and stepping to debug his program.		
[7]		
night find later. Give an example. [4] nd one module appears not to work.	(ii)	

Juan is also learning about recursion. He writes the pseudocode for a recursive functional formation of the contract of the co

FUNCTION Add(N)	Tiby. Theirs
DECLARE R	1 2
IF $N \ll 0$, co
THEN	- On
R ← 0	10
ELSE	
$R \leftarrow N + Add(N - 1)$	

	10NO110N Maa (N)	-
2	DECLARE R	7
3	$IF N \ll 0$	
4	THEN	
5	$R \leftarrow 0$	
6	ELSE	
7	$R \leftarrow N + Add(N - 1)$	
8	ENDIF	
9	RETURN R	
10	ENDFUNCTION	
(a)	What is the scope of the variable R?	
		[1]
(b)	State the line number which shows that this function is recursive.	
		[1]
(-)	List the function called that are represented by an initial call of 3.11(0)	
(C)	List the function calls that are generated by an initial call of Add (3).	
		••••
		[3]
		[J

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