



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 May/June 2012

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.

UNIVERSITY of **CAMBRIDGE**

International Examinations

	2	1
Lite She	na wants to find out about her fellow students' reading habits. It will be part erature coursework. e will ask questions online, so starts by designing a screen layout. The first forestions will ask for: student's first name	ani
•	student's first name date of birth type of book they prefer (printed, audio-book or e-book) whether student reads novels (yes/no)	
(a)	Draw a suitable screen layout.	
	[2	 4]
		.1
(b)	Justify the design of your screen layout in (a).	

[3]

- of the formation of the
- (c) The responses from each student will be stored as a record consisting of the following fields:
 - FirstName
 - DateOfBirth
 - BookType
 - ReadsNovels

Complete the following table. Only a single value should be given for the Field Size.

Field Name	Data Type	Field Size (bytes)
FirstName		
DateOfBirth		
BookType		
ReadsNovels		

(d) Anna is to write a program to analyse the responses.

The state of the s	
4	
Anna is to write a program to analyse the responses.	For
Anna is to write a program to analyse the responses. Using nested IFTHEN statements, complete the pseudocode to calculate the total for each BookType (printed, audio-book or e-book).	Ge .
	100
REPEAT	
READ next record	
UNTIL no more student records [5]	

(e) Anna will want a report that shows these totals.

Design a printed report that shows for each BookType:

•	the	total	for	that	type
---	-----	-------	-----	------	------

•	the	percen	tage	for	that	type

		[3]
(f)	The records will be held in a serial file.	
	Give three statements from a high-level language that may be used for the finandling and explain what each does.	ile
	Language	
	1	
	2	

www.PapaCambridge.com Philipe is trying different ways of designing the process of entering data into an array. He declares a variable called ArraySize and sets it to 3. He declares an array Number [ArraySize].

He then writes the following pseudocode.

2

```
Element \leftarrow 1
WHILE Element < ArraySize DO
   INPUT Number[Element]
   Element ← Element + 1
ENDWHILE
```

(a) In the following table trace the effect of entering 24, 57, 12.

ArraySize	Element	Element <arraysize< th=""><th></th><th>Number</th><th></th></arraysize<>		Number	
Allaysize	ETement	ElementCAllaySize	[1]	[2]	[3]
3					
	1				
		true			

There appears to be an error in the above pseudocode. State the type of error.	
[1]
The error can be corrected by changing one line. Write the corrected line of pseudocode.	of
	The error can be corrected by changing one line. Write the corrected line of

[5]

	7	
(c)	Philipe is not convinced that a WHILE loop was the best choice for this pseud Instead he considers using a REPEATUNTIL loop. Rewrite the corrected pseudocode using a REPEATUNTIL loop.	For iner's
		C.COM
	[2]	
(d)	Philipe wants to increase the size of the array to 500. This is too large to check with a trace table. Describe how you would check that the logic of the pseudocode is correct for 500 iterations.	
	[3]	

- 3 Gina is developing her programming skills in string handling. She is going to input two strings. Each string is made up of three parts:
 - letters, followed by
 - a single '*' character, followed by
 - letters

The groups of letters after the '*' characters are joined together to form a new string which is then output.

For example, with "DFG*COM" and "B*PUTER" as inputs, the new string output will be "COMPUTER".

(a)	Using a high-level programming language, write the code to perform this task. (Ensure that you use meaningful variable names and lay the code out clearly.)
	Programming language
	Code
	[8]
	[0]

		e writes this code as the function <code>JoinStrings</code> because it is to be used ses. State the parameters of the function.
		9
(b)	She	e writes this code as the function JoinStrings because it is to be used ses.
	(i)	State the parameters of the function.
		[2]
	(ii)	Write the function header in the language you used in part (a).
		[2]
	(iii)	State why Gina used a function rather than a procedure.
		[1]
		ites software for a melon packing plant. He wants to check his understanding of arithmetic operators for a melon packing problem that he has to solve.
(a)	Eva	luate the following expressions for Raul.
	(i)	10/3
	(ii)	10 MOD 3
	(iii)	10 DIV 3[3]
(b)		ul has Y melons which are to be packed into boxes. Each box contains X melons. te expressions to calculate:
	(i)	the number of full boxes
		[1]
	(ii)	the number of melons left over

[1]

5 Romana is learning about recursion. She designs a recursive function.

```
FUNCTION Happening (Num)
01
              IF Num = 1
02
03
                THEN
04
                   Happening \leftarrow 1
05
                ELSE
06
                   Happening \leftarrow Happening (Num - 1) + Num
07
              ENDIF
08
           ENDFUNCTION
```

(a) Calculate the value returned by the function call Happening (4). Show your working.

For viner's

Happening(4)= [6]

	the state of the s	
	11	
(i)	State two line numbers in the given pseudocode (other than lines 01 and show the subroutine is a function. Give your reason for choosing these.	M
	Line numbers	-
	Reason	
	[3]]
(ii)	State the line number in the given pseudocode that shows the function is recursive. Give your reason for choosing this.	;
	Line number	
	Reason	
	[2]]
Sta	te what will happen if the function is called with Happening (-1).	
	[1]]
Dis	cuss the merits of iterative and recursive solutions to this problem, particularly when	1
	[4]	
	Sta	(i) State two line numbers in the given pseudocode (other than lines 01 and on show the subroutine is a function. Give your reason for choosing these. Line numbers Reason [3] (ii) State the line number in the given pseudocode that shows the function is recursive. Give your reason for choosing this. Line number Reason [2] State what will happen if the function is called with Happening (-1). [1] The same process could have been solved iteratively using a FOR loop. Discuss the merits of iterative and recursive solutions to this problem, particularly when the initial value of Num is very large.

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