



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS  
 General Certificate of Education  
 Advanced Subsidiary Level and Advanced Level

CANDIDATE  
 NAME

CENTRE  
 NUMBER

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CANDIDATE  
 NUMBER

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**COMPUTING**

**9691/23**

Paper 2

**May/June 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.

This document consists of **12** printed pages.



- 1 Meena wants to develop a program to keep a record of her examination results. She will want to enter, sort and print out data which is stored as a file of records.

Each record will contain at least the following data:

- subject
- examination title
- level
- date sat
- mark

An example of an examination title is 'General Certificate of Education'.  
The DateSat field will contain only the month and year that the examination was taken.  
For all subjects the mark is between 0 and 100 inclusive.  
The level is 'O' or 'A'.

- (a) Complete the table. Use a single value for the size.

Data	Identifier	Data Type	Size (in bytes)
subject	Subject	STRING	
examination title			
level	Level		1
date sat	DateSat		
mark	Mark		

[6]

- (b) Estimate how many records could be held in the file if there are 5KB available for the file.

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..... [4]

(c) (i) Each record needs another field to uniquely identify that record.

State an appropriate identifier for this field and state a suitable data type for it.

.....  
.....  
..... [2]

(ii) In a programming language write the declaration for the record structure, giving it the identifier Exam.

Programming language .....

Declaration .....

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.....  
.....  
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.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

(d) Meena decides to modularise the solution.

Describe **two** ways in which a procedural programming language is appropriate when modularising a solution.

1 .....

2 .....

[4]

- (e) Describe what the function `EOF()` does when used in a program.

.....  
 .....  
 .....  
 ..... [2]

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Use

- 2 The data in each field is validated as it is entered.

- (a) Write the logic expression to validate `Mark`.

.....  
 ..... [3]

- (b) The following table shows the four records currently stored in the file `ExamResults` for the examinations sat so far.

Subject	Title	Level	DateSat	Mark
Art	...	...	...	28
Music	...	...	...	57
Biology	...	...	...	75
History	...	...	...	41

Meena will write a module based on the following pseudocode.

```

OPENFILE ExamResults FOR INPUT
Count ← 1
REPEAT
  FILEREAD next ExamResults record
  IF Mark > 70
    THEN
      Count ← Count + 1
    ENDIF
UNTIL EOF()
OUTPUT Count
CLOSEFILE ExamResults

```



(c) The pseudocode given in (b) uses a REPEAT-UNTIL loop:

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```
OPENFILE ExamResults FOR INPUT
Count ← 1
REPEAT
  FILEREAD next ExamResults record
  IF Mark > 70
    THEN
      Count ← Count + 1
  ENDIF
UNTIL EOF()
OUTPUT Count
CLOSEFILE ExamResults
```

Rewrite the pseudocode to count how many records have a mark below 40. This time use a WHILE-ENDWHILE loop.

```
OPENFILE ExamResults FOR INPUT
```

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```
CLOSEFILE ExamResults
```

[4]

3 Meena needs to be aware of her average mark and declares a variable with identifier `MyAvMark` which she decides will be a global variable.

(a) State where in the program a global variable will be declared.

..... [1]

(b) Using only global variables is poor programming practice.

Give a possible problem that could result from this.

.....  
..... [1]

The program will read the marks from the file into a one-dimensional array, `MyMarks`. The array has 50 elements, and marks range from 0 to 100 inclusive.

(c) State a suitable value to initialise each element of the array.

..... [1]

(d) In a programming language, write code that will declare and initialise `MyMarks`.

Programming language .....

Code .....

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
..... [4]

- (e) 20 marks have been read into elements 1 to 20. In a programming language, write code that will print out the highest and lowest marks that have been entered.

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Programming language .....

Code .....

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.....

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..... [6]

- (f) MyAvMark is a variable of data type REAL.  
Meena wants the value of MyAvMark converted to the nearest whole number.

State a function that will perform the conversion.

..... [1]



The module to calculate the average mark could be written as a procedure or a function.

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**(g) (i)** State **one** difference between a procedure and a function.

.....  
..... [1]

**(ii)** State why the module to calculate the average mark could be written as a procedure or a function.

.....  
.....  
.....  
..... [2]

- 4 (a) Meena hopes some of her friends will use her program. When designing the user interface, state **three** design features she can incorporate if one of her friends has a sight impairment.

.....

.....

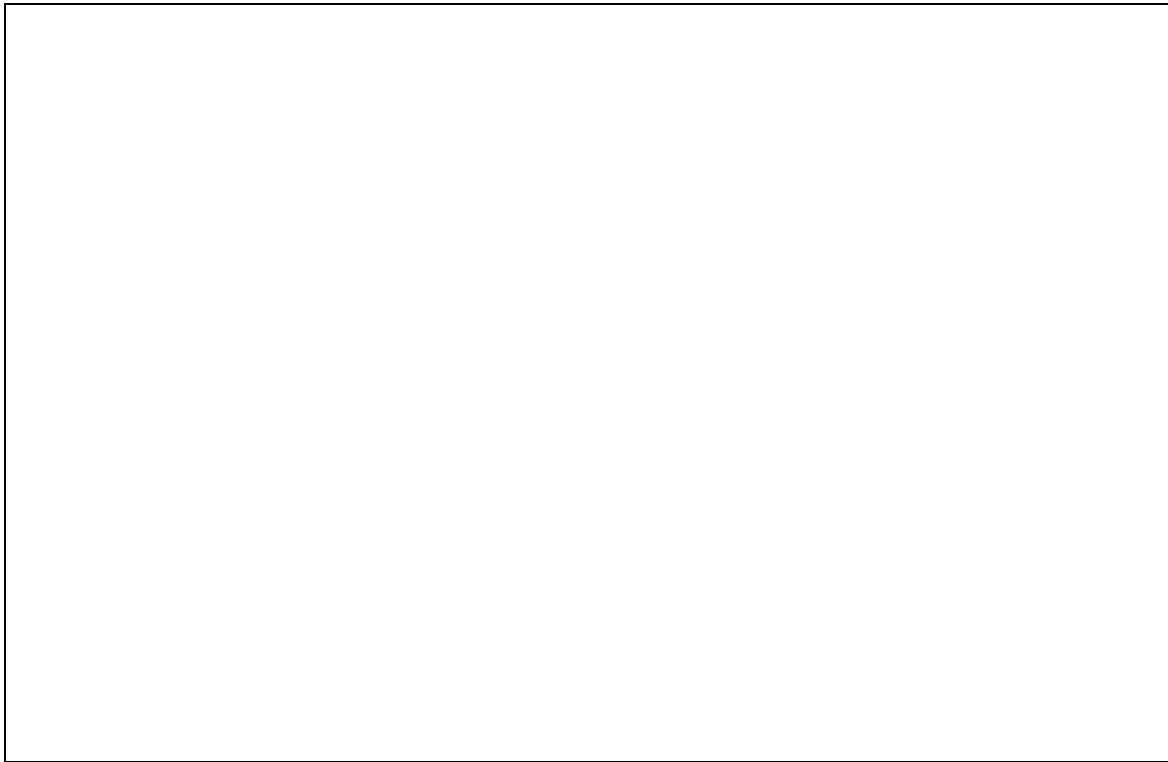
.....

.....

.....

..... [3]

- (b) Design the interface. It must allow for entry of marks and the output of the average mark. Remember, one of her friends has a sight impairment.



[6]

(c) Meena has compiled the program and she thinks it is working.

What **two** types of error could still occur in the program?  
For each type give an example.

Error type 1 .....

Example .....

.....

.....

Error type 2 .....

Example .....

.....

..... [4]

For  
Examiner's  
Use

