

CANDIDATE  
NAME

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CENTRE  
NUMBER

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**COMPUTING**

**9691/23**

Paper 2

**October/November 2015**

**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 an HB pencil for any diagrams, graphs or rough working.

Do not use staples, paper clips, 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 (a) A college provides courses for the local community. The Computing teacher, Ravi, wants to develop a program to keep details of the courses. One way of storing this data will be to use records. Each record will contain the fields shown in the table below.

Complete the table.

Field	Identifier	Data type	Example of input data	Field size (in bytes)
course code	CourseCode		015110217	
title	Title		Programming for Beginners	
tutor (3-letter initials)	Tutor		PGL	
day of week (1 – Monday 7 – Sunday)	Day		2	
lab based?	IsLabBased		TRUE	
session duration in hours	SessionHours		2.5	
fee (\$)	CourseFee		25.50	
date course starts	StartDate		02/11/2015	
date course ends	EndDate		03/12/2015	

[5]

- (b) Use a high-level programming language to define a course record with identifier `CourseRecordType` and the fields listed in **part (a)**.

Programming language .....

Code .....

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[4]



(d) Ravi has entered some course data. His program saved the array records to a serial file `CourseData.DAT`. Only those array elements containing entered course details were saved to the file.

A program is to be written to read the data from `CourseData.DAT` into consecutive locations of the array `Course`.

(i) Explain what the function `EOF()` does when used in a program.

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

Ravi wants to write another module in his program. The new module will:

- read data from `CourseData.DAT`
- write these data into consecutive elements of the array `Course`

(ii) Write **pseudocode** to read the data from the file `CourseData.DAT` into the array `Course`.

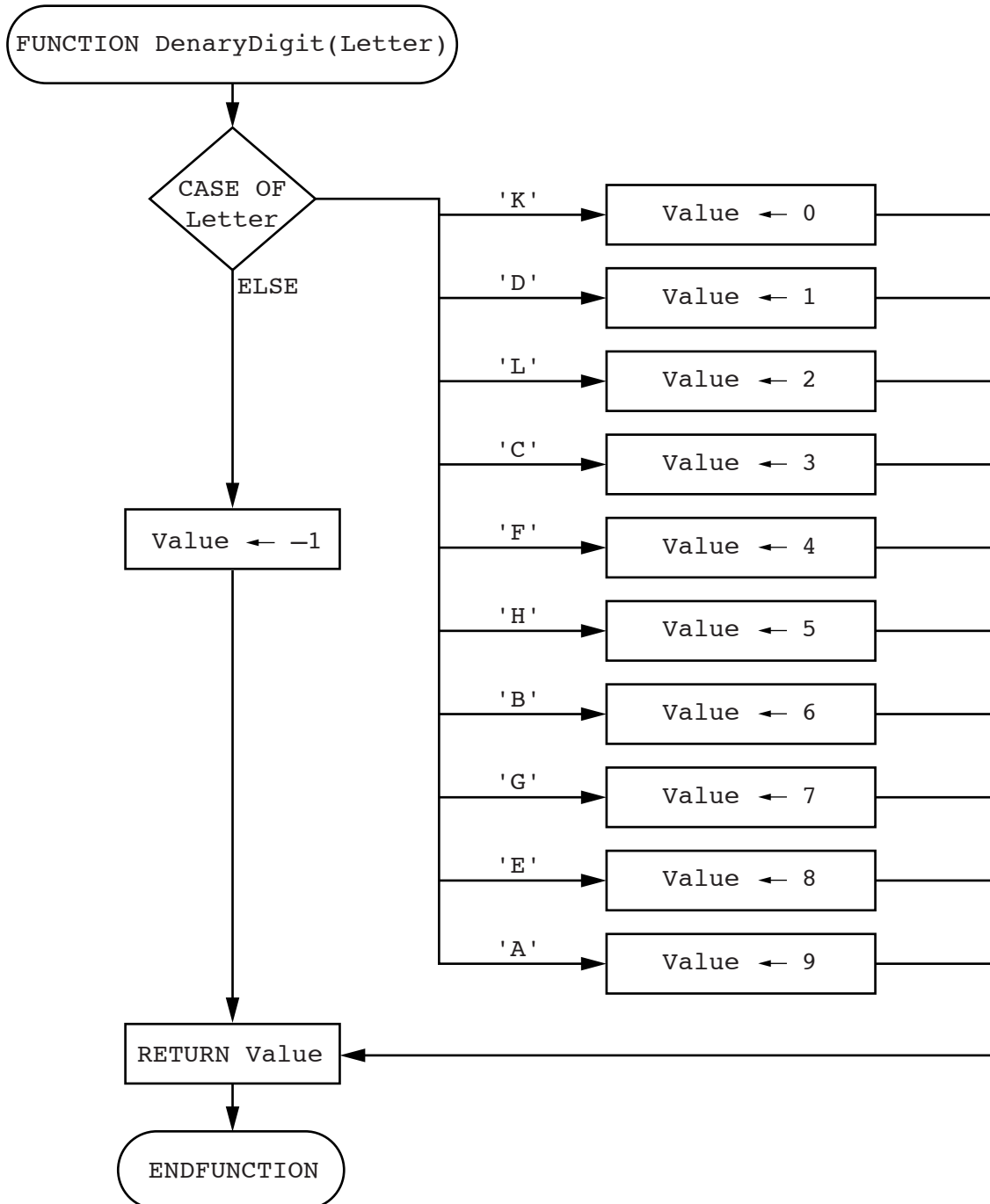
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.....[6]



- 2 Alia received a number coded as a sequence of letters. She wants to write a program to change this sequence of letters back to the original number. She knows that each digit of the original number was replaced by exactly one letter. The letters used are shown in the flowchart below.

She has drawn the flowchart as part of the design for her solution.

The function `DenaryDigit(Letter)` returns an integer.





(b) Alia writes pseudocode to convert a coded number using

- the function `DenaryDigit()` from **part (a)**
- the string manipulation functions `MID()` and `LENGTH()`

Study the pseudocode:

```

01 PROCEDURE ConvertToDenary(CodedNumber : STRING)
02
03     Denary ← 0
04
05     FOR i ← 1 TO LENGTH(CodedNumber)
06         ThisChar ← MID(CodedNumber, i, 1)
07         ThisNumber ← DenaryDigit(ThisChar)
08         Denary ← Denary + (ThisNumber * 10)
09     ENDFOR
10
11     OUTPUT Denary
12 ENDPROCEDURE
    
```

(i) Dry-run the procedure call `ConvertToDenary("LED")` by completing the trace table .

CodedNumber	Denary	i	ThisChar	ThisNumber	OUTPUT
"LED"	0				

[5]

(ii) The denary value of the coded number LED is 281. There is an error in the pseudocode above.

Give the line number of the statement that needs correcting.

.....

Write the corrected statement.

.....

.....[2]



(iii) State the type of error Alia made in her pseudocode.

.....[1]

(iv) There are **two** other types of error that can occur when writing or executing program code.

Name each type of error and describe when and how it is detected.

Error type 1 .....

When .....

.....

How .....

.....

Error type 2 .....

When .....

.....

How .....

.....[6]

(c) (i) The pseudocode in **part (b)** has some features that make it easier to read and understand.

State **three** such features.

1 .....

.....

2 .....

.....

3 .....

.....[3]

(ii) State **one** other feature Alia could have used to help the understanding of this code.

.....[1]



(iv) The parameter of `ConvertToDenary` might not be a valid coded number.

An error message is to be output if the string provided as a parameter is not valid.

Describe the changes required to the code design.

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

3 Ravi and Alia want to use debugging tools available in their program development environments.

(a) Explain how each of the following are used:

(i) Breakpoint

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

(ii) Stepping

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

(iii) Variable check/watch

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

(b) Name the type of testing that is performed with such debugging tools.

.....[1]

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