



Cambridge International AS & A Level

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COMPUTER SCIENCE

9618/02

Paper 2 Fundamental Problem-solving and Programming Skills

For examination from 2021

SPECIMEN PAPER

2 hours

You must answer on the question paper.

You will need: Insert (enclosed)

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use an HB pencil for any diagrams, graphs or rough working.
- Calculators must **not** be used in this paper.

INFORMATION

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [].
- No marks will be awarded for using brand names of software packages or hardware.
- The insert contains all the resources referred to in the questions.

This document has **14** pages. Blank pages are indicated.

Refer to the Insert for the list of pseudocode functions and operators.

1 (a) Program variables have values as follows:

Variable	Value
Today	"Tuesday"
WeekNumber	37
Revision	'C'
MaxWeight	60.5
LastBatch	TRUE

(i) Give an appropriate data type for each variable.

Variable	Data type
Today	
WeekNumber	
Revision	
MaxWeight	
LastBatch	

[5]

(ii) Evaluate each expression in the following table.
If an expression is invalid then write ERROR.

Refer to the **Insert** for the list of pseudocode functions and operators.

Expression	Evaluates to
MID(Today, 3, 2) & Revision & "ape"	
INT(MaxWeight + 4.2)	
LENGTH(MaxWeight)	
MOD(WeekNumber, 12)	
(Revision <= 'D') AND (NOT LastBatch)	

[5]

(b) Simple algorithms usually consist of input, process and output.

Complete the table to show if each statement is an example of input, process or output. Place one or more ticks (✓) for each statement.

Item	Statement	Input	Process	Output
1	<code>SomeChars ← "Hello World"</code>			
2	<code>OUTPUT RIGHT(SomeChars, 5)</code>			
3	<code>READFILE MyFile, MyChars</code>			
4	<code>WRITEFILE MyFile, "Data is " & MyChars</code>			

[4]

(c) Write in pseudocode a **post-condition loop** to output all the odd numbers between 100 and 200.

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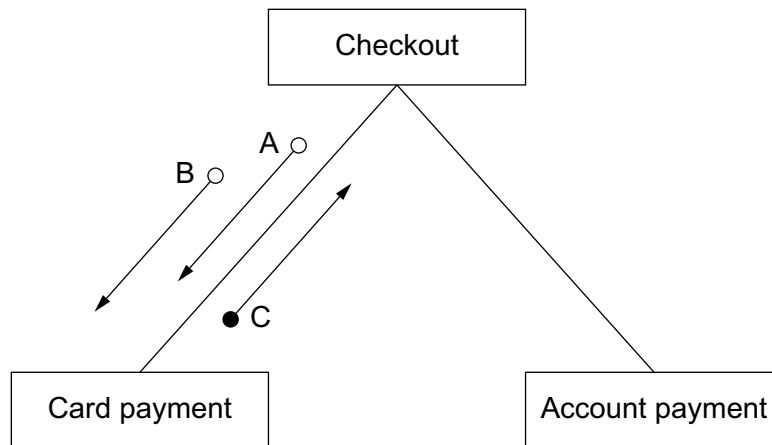
.....

.....

.....

..... [4]

2 Roberta downloads music from an online music store. The diagram shows part of a structure chart for the online music store program.



(a) State **three** items of information that the diagram shows about the design of the program.

- 1
- 2
- 3

[3]

(b) Examples of the data items that correspond to the arrows are given in the table.

Arrow	Data item
A	234.56
B	"Ms Roberta Smith"
C	TRUE

Use pseudocode to write the function header for the Card payment module.

-
- [3]

3 A stack is created using a high-level language. The following diagram represents the current state of the stack. The `TopOfStack` pointer points to the last item added to the stack.

Address	Value	Pointer
99		
100		
101	E	← <code>TopOfStack</code>
102	D	
103	C	
104	B	
105	A	

(a) Two operations associated with this stack are `PUSH()` and `POP()`.

Describe these operations with reference to the diagram.

`MyVar = POP()`

.....

.....

.....

`PUSH('Z')`

.....

.....

.....

[4]

(b) Two programs use a stack to exchange data. Program `AddString` pushes a string of characters onto the stack one character at a time. Program `RemoveString` pops the same number of characters off the stack, one character at a time. The string taken off the stack is different from the string put on the stack.

Explain why the strings are different.

.....

.....

.....

[2]

4 (a) Parameter x is used to pass data to procedure `MyProc` in the following pseudocode:

```
x ← 4
CALL MyProc(x)
OUTPUT x
```



```
PROCEDURE MyProc(x : INTEGER)
  DECLARE z : INTEGER
  x ← x + 1
  z ← x + 3
ENDPROCEDURE
```

There are two parameter passing methods that could be used.

Complete the following table for each of the two methods.

Name of parameter passing method	Value output	Explanation
.....
.....

[6]

(b) The pseudocode includes the use of parameters.

State **two** other features in the pseudocode that support a modular approach to programming.

- 1
-
- 2
-

[2]

- 5 A company keeps details of its product items in a 1D array, `Stock`. The array consists of 1000 elements of type `StockItem`.

The record fields of `StockItem` are:

Field	Typical value
<code>ProductCode</code>	"BGR24-C"
<code>Price</code>	102.76
<code>NumberInStock</code>	15

- (a) Write pseudocode to declare the record structure `StockItem`.

.....

 [3]

- (b) Write pseudocode to declare the `Stock` array.

.....
 [3]

- (c) Write pseudocode to modify the values to element 20 as follows:

- set the price to 105.99
- increase the number in stock by 12

.....

 [2]

(d) A stock report program is developed.

Write pseudocode to output the information for each stock item that has a price of at least 100.

Output the information as follows:

Product Code: BGR24-C Number in Stock: 15

.....

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..... [4]

(b) The `ValidatePassword` function will be tested.

(i) Give a valid password that can be used to check that the function returns TRUE under the correct conditions.

Password1: [1]

(ii) Password1 is modified to test each rule separately. Give **four** modified passwords and justify your choice.

Password to test rule 1:

Reason:

.....

.....

Password to test rule 2:

Reason:

.....

.....

Password to test rule 3:

Reason:

.....

.....

Password to test rule 4:

Reason:

.....

.....

[4]

(iii) When testing the `ValidatePassword` function it is necessary to test all possible paths through the code.

State the name given to this type of validation testing.

..... [1]

- (iv) A program consisting of several functions can be tested using a process known as 'stub testing'.

Explain this process.

.....

.....

.....

..... [2]

