



Name: _____ Index: _____ Reg.no.: _____ Class: _____ Date: _____

November 2024 (21)

(b) The accepted password, Password, is to be written to the file MyPassword.txt

Write pseudocode to:

- open the file
- write the accepted password to the file
- close the file.

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(c) Explain why the accepted password needs to be stored in a file.

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..... [2]

SP 2023 / 2B

4 (a) Circle the **two** actions that a program needs to take to store data in a file.

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|----------|-----------|--------|------|--------|
| activate | calculate | close | open | output |
| print | read | search | sort | write |

[2]

- (b) A program halted unexpectedly with the error message 'File not found' whilst trying to read data from a file.

Outline the actions that the program needs to take to prevent this error occurring.

..... [2]

November 2024 (22)

- 10** The function `LENGTH (X)` calculates the length of a string X

Write the pseudocode statements to:

- allow a line of text to be input to an appropriate variable
- store this line of text in a text file called `Main.txt`
- calculate the length of the line of text and output the text in lower case along with its length
- store the lower-case line of text in a text file called `Lowercase.txt`

Make sure that any variables used are declared and that both text files are closed after they have been used.

[6]

7 (a) Outline why it is useful to store data in a file.

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(b) The function `LENGTH (X)` calculates the length of a string `X`

Write the pseudocode statements to:

- read the contents of the text file `Quotation.txt` into an appropriate string variable that has been declared
- output the string in upper case and the length of the string.

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SP 2023 / 2B

10 A function `LENGTH (X)` finds the length of a string `X` and a function `SUBSTRING (X, Y, Z)` finds a substring of `X` starting at position `Y` and `Z` characters long. The first character in the string is position 1.

(a) Show the value of the variable after each pseudocode statement has been executed.

01 `P ← "Computer Science"`

02 `Q ← LENGTH (P)`

03 `R ← SUBSTRING (P, 10, 7)`

04 `S ← LENGTH (R)`

05 `T ← SUBSTRING (R, 1, 3)`

[5]



- (b) Write a pseudocode statement to extract the word `Computer` from `P` and store it in the variable `F`.

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..... [2]

June 2024 (22)

- 4 A program needs to make sure the characters input for a product code meet these rules:

- The product code is six characters in length.
- The first two characters must be "PD".
- The last four characters must be a number in the range 1000 to 9999 inclusive.

- (a) Identify **three** validation checks and state how each check would make sure the product code met one of these rules.

Check 1

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Check 2

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Check 3

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..... [6]

- (b) The program design will include a pseudocode algorithm. Assume that the product code is stored in the variable `Product`

- (i) Write the pseudocode to make sure that the product code is six characters in length.

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- (ii) Write the pseudocode to make sure that the first two characters of the product code are "PD".

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June 2024 (23)

- 7 (a) The string operation `SUBSTRING(FullText, X, Y)` returns a string from `FullText` beginning at position `X` that is `Y` characters long. The first character in `FullText` is in position 1.

Write the pseudocode statements to:

- store the string "IGCSE Computer Science at Cambridge" in `FullText`
- extract and display the words "Computer Science" from the string and store it in a suitable variable
- output the original string in upper case.

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- (b) Write the pseudocode statements to:

- store the content of the variable you created in part (a) to a text file named "Subjects.txt"
- close the text file at the end of the algorithm.

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June 2025 (21)

- 4 A telephone number with 13 characters is input. The first character is a '+', followed by a 2-digit country code, for example:

+20xxxxxxxxxx where 20 is the country code and x is a digit between 0 and 9 inclusive.

The algorithm includes checks for the country codes: 44 for the UK and 20 for Egypt.

- (a) Write an algorithm using pseudocode to:

- input the telephone number
- extract the 2-digit country code
- output the matching country
- output 'Unknown' if there is no matching country.

[5]

- (b) Explain how you could change the algorithm to repeatedly prompt for the telephone number until the number entered is 13 characters in length.

Any code used must be fully explained.

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June 2023 (21)

- 2 Tick (✓) **one** box to show the name of the data structure used to store a collection of data of the same data type.

- A Array ☐
- B Constant ☐
- C Function ☐
- D Variable ☐

[1]

- 4 Explain the purpose of the library routines `DIV` and `ROUND`

`DIV`

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`ROUND`

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[4]



2 Explain the purpose of the library routines MOD and RANDOM

MOD

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RANDOM

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[4]

Practice Questions

1. Write a program using pseudocode to calculate how many full boxes can be filled and how many items remain if a given number of items is packed into boxes of fixed capacity.

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2. Write pseudocode to simulate rolling randomly two dice and output their sum.

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November 2024 (23)

- 6 An incomplete algorithm has been written in pseudocode to count the number of values stored in an array and to find their average.
Values have been stored in the array starting at A[1]
All the values to be counted are non-zero.
A value of zero in the array indicates there are no more values stored.

```
01 DECLARE A : ARRAY[1:50] OF INTEGER
02 DECLARE C : INTEGER
03 DECLARE W : INTEGER
04 DECLARE X : INTEGER
05 W ← 0
06 C ← .....
07 WHILE A[C] <> 0
08     W ← .....
09     C ← C + 1
10 ENDWHILE
11 X ← .....
```

- (a) Complete the given pseudocode algorithm.

[3]



(b) Write pseudocode to display, with suitable messages:

- the number of values stored in the array
- the average of those values stored.

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..... [3]

(c) Meaningful identifiers have **not** been used in this algorithm.

Suggest suitable meaningful identifiers for:

The array

A

The variables

C

X

W [3]

November 2023 / 22

5 Explain how variables and constants should be used when creating and running a program.

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3 Four pseudocode statements and five pseudocode uses are shown.

(a) Draw **one** line to link each pseudocode statement to the most appropriate pseudocode use.

Not all pseudocode uses will be required.

Pseudocode statement	Pseudocode use
CALL Colour(NewColour)	counting
Value $\leftarrow$ (A1 + A2 + A3) / 3	finding an average
Loop1 $\leftarrow$ Loop1 + 1	totalling
IF Count > 7 THEN X1 $\leftarrow$ 0	using a conditional statement
	using a procedure

[4]

(b) A one-dimensional (1D) array called `Temperatures[]` has 25 elements beginning at index 1. It holds values that range between -20 and 100 inclusive.

Write a pseudocode algorithm using a single loop to find the lowest value in this array and output the result only once.

You do **not** need to declare or populate this array.

[4]

- 5 Write the pseudocode statements to perform this task:
- accept the input of a whole number from 1 to 4 inclusive
 - use a CASE statement to:
 - output the number (1 to 4 inclusive) that was entered
 - output the word "ERROR" if a 1 to 4 inclusive number was **not** entered.

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SP 2023 / 2B

- 12 (a) Rewrite this pseudocode algorithm using a WHILE ... DO ... ENDWHILE loop.

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B ← FALSE
INPUT Num
FOR Counter ← 1 TO 12
    IF A[Counter] = Num
        THEN
            B ← TRUE
        ENDIF
NEXT Counter
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(b) Identify the purpose of the algorithm in (a).

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(c) Explain the difference between a WHILE ... DO ... ENDWHILE and a REPEAT ... UNTIL loop.

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June 2025 (21)

- 3 The following pseudocode algorithm uses a count-controlled loop to read in 10 names and store them in the array `Names []`

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FOR Count ← 1 TO 10  
    OUTPUT "Please enter a name"  
    INPUT Name  
    Names[Count] ← Name  
NEXT Count
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Rewrite the algorithm in pseudocode, using a condition-controlled loop instead of a count-controlled loop.

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November 2023 (23)

- 7 A program uses both local variables and global variables.

Describe **two** differences between local variables and global variables.

Difference 1

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Difference 2

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[4]

June 2024 (21)

- 2 Four descriptions of programming concepts and five programming concepts are shown.

(a) Draw **one** line to link each description to the most appropriate programming concept.

Not all programming concepts will be used.

Description	Programming concept
a subroutine that may not return a value	function
a value that is declared and used within a specific procedure	procedure
a value that a procedure expects you to supply when it is called	parameter
a subroutine that will always return a value	global variable
	local variable

[4]

- (b) Write the pseudocode to use a procedure named *Average* that passes the values 25 and 50 to the procedure.

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[2]



- (c) Outline the role of procedures and functions in creating a program that is easier to maintain.

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..... [3]

March 2023 (22)

- 10 The variables X, Y and Z are used in a program: X stores a whole number, Y stores a decimal number and Z stores a flag that can be set to TRUE or FALSE

- (a) Write pseudocode statements to declare the variables X, Y and Z

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..... [3]

- (b) The function Same (A, B) returns TRUE if the value of A is the same as the value of B when B is rounded to the nearest whole number and FALSE otherwise.

Write pseudocode statements to:

- define the function
- call the function with X and Y and store the return value in Z

Function definition

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Function call
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..... [6]

(c) State the difference between defining and calling a function.
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..... [1]

JUNE 2023 / 23

3 Describe what happens when a function is called during the execution of a program.
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NOVEMBER 2023 / 22

8 Explain why a programmer would use procedures and parameters when writing a program.
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Practice Questions

1. Write a procedure **GreetUser** that takes a string parameter **Name** and **displays a greeting message** in the format:

"Hello, [Name]! Welcome to the program."

Then, call the procedure with the name **"Alice"**.

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2. Write a procedure **CalculatePerimeter** that takes **two integer parameters, Length and Width**, and **calculates and displays** the perimeter of a rectangle.

(The formula for the perimeter is: $\text{Perimeter} = 2 * (\text{Length} + \text{Width})$)

Then, call the procedure with **Length = 8** and **Width = 6**.

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6 Describe **two** types of iteration that a programmer can use whilst writing a program.

[4]

10 A programmer has written a program that will be maintained by another programmer. Explain how the program can be written to make sure it can be easily maintained by the other programmer.

[6]