Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

L6879708211

COMPUTER SCIENCE **0478/21**

Paper 2 Problem-solving and Programming **October/November 2018**

1 hour 45 minutes

Candidates answer on the Question Paper.

No Additional Materials are required.

No calculators allowed.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of this page.
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.

DO NOT ATTEMPT TASKS 1, 2 AND 3 in the pre-release material; these are for information only.

You are advised to spend no more than **40 minutes** on **Section A** (Question 1).

No marks will be awarded for using brand names of software packages or hardware.

Any businesses described in this paper are entirely fictitious.

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.

The maximum number of marks is 50.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **14** printed pages and **2** blank pages.

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Section A

You are advised to spend no longer than 40 minutes answering this section.

Here is a copy of the pre-release material.

DO NOT attempt Tasks 1, 2 and 3 now.

Use the pre-release material and your experience from attempting the tasks before the examination to answer Question 1.

Pre-release material

You are working at a local take-away shop and you have decided to write a program to track daily takings and profit. Here is the menu:

Menu item	Price
French fries	$2.00
1/4 pound burger	$5.00
1/4 pound cheeseburger	$5.55
1/2 pound burger	$7.00
1/2 pound cheeseburger	$7.50
Medium pizza	$9.00
Medium pizza with extra toppings	$11.00
Large pizza	$12.00
Large pizza with extra toppings	$14.50
Garlic bread	$4.50

Write and test a program or programs.

- Your program or programs must include appropriate prompts for the entry of data.
- Error messages and other output need to be set out clearly and understandably.
- All variables, constants and other identifiers must have meaningful names.

You will need to complete these **three** tasks. Each task must be fully tested.

TASK 1 – Setting up the menu.
Set up a series of arrays to store the menu items and the prices, using the data supplied in the menu. Devise an item code for each menu item and store these in another array. Output a new menu including the item codes so that customers can place an order using the item codes.

TASK 2 – Placing an order.
Extend the program so that when a customer places their order from the menu you enter each item code and the quantity. When the order is completely entered, a unique order code is generated. Display the order ensuring that the unique order code, menu items and quantities are shown, along with the item prices and the total cost of the order. Set up arrays for the day to store the unique order code and the total cost of each order.

TASK 3 – Calculating daily takings and profit.
10% of the takings are profit. Extend the program to display the total daily takings and profit.
Modify your program to allow you to enter the percentage of the takings that are profit. Output the total daily takings, the profit and the percentage used in the calculation.

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1 **(a)** All arrays, variables, constants and other identifiers should have meaningful names.

(i) State the name, data type and use of **two** arrays you created for **Task 1**.

Array 1 name.....

Data type.....

Use.....

.....

Array 2 name.....

Data type.....

Use.....

.....

[4]

(ii) State the name, data type and use of **two** variables you have created for **Task 2**.

Variable 1 name .....

Data type.....

Use.....

.....

Variable 2 name .....

Data type.....

Use.....

.....

[4]

(b) Write an algorithm to enter each item code and quantity. Then when the order is completely entered, generate a unique order code (part of **Task 2**), using **either** pseudocode, programming statements **or** a flowchart. You should assume that **Task 1** has already been completed.

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(c) Explain how your program calculates the profit using your input (last part of **Task 3**) with variable profit percentage and outputs the results. Any programming statements you use in your answer must be fully explained.

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(d) State **three** items of test data you could use in **Task 3** to test the input of the percentage profit value and explain why you chose them.

Your reasons must be different for each item of test data.

Test data 1 .....

Reason .....

.....

Test data 2 .....

Reason .....

.....

Test data 3 .....

Reason .....

.....

[3]

Section B

2 **Six** terms associated with programming and **six** descriptions are listed.

Draw a line to link each term with its most appropriate description.

Term	Description
Top-down design	Pre-written code to include in your own program to carry out a common task.
Structure diagram	Shows the steps representing an algorithm using various shapes of boxes.
Flowchart	Shows the hierarchy of the different components which make up a system.
Pseudocode	Shows the values of variables as you manually test your program.
Library routine	Breaks down a system into successively smaller pieces.
Trace table	Describes a program using a simplified high-level notation.

[5]

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3 Describe, giving a different example for each, the purpose of these validation checks used in programming.

Range check .....

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Example .....

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Length check .....

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Example .....

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Type check .....

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Example .....

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[6]

4 An algorithm is written in pseudocode:

```
Total ← 0
FOR Count ← 1 TO 50
  INPUT Num
  Total ← Total + Num
NEXT Count
OUTPUT Total
```

(a) Describe the purpose of the algorithm.

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.....[3]

(b) Re-write the algorithm in pseudocode using a different type of loop.

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(c) Describe how you could modify the original algorithm shown at the start of question 4, to allow any number of inputs.

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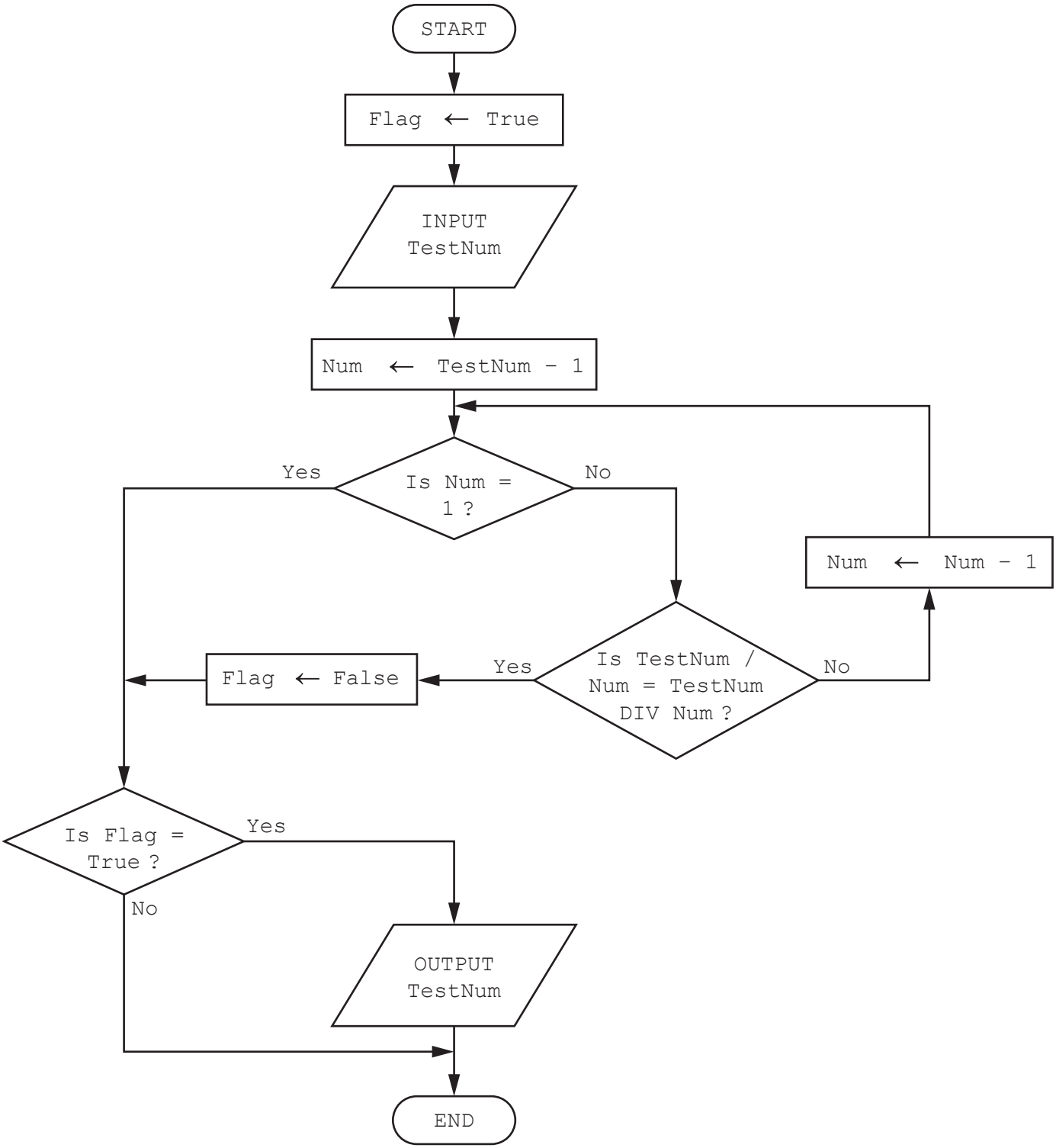
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.....[2]

Question 5 starts on page 12.

5 The flowchart performs a mathematical process on a number input called `TestNum`

`DIV` is used to represent **integer division** e.g. `7 DIV 3 = 2`



(a) Complete the trace table for the input data: **7**

Flag	TestNum	Num	OUTPUT

[2]

(b) Complete the trace table for the input data: **6**

Flag	TestNum	Num	OUTPUT

[2]

(c) State the purpose of the algorithm in the flowchart.

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.....[1]

6 The database table, PCSTOCK, is a part of the database in an electronics shop, showing some of the desktop (DT), tablet (TB) and laptop (LT) computers they have in stock.

PCID	ScreenSize	RAM	Type	HDD(GB)	Price
DT303240	30	32	DT	4000	$5000.00
DT303220	30	32	DT	2000	$4500.00
DT301620	30	16	DT	2000	$4000.00
DT231610	23	16	DT	1000	$3000.00
LT191620	19	16	LT	2000	$3000.00
LT171610	17	16	LT	1000	$2500.00
DT230820	23	8	DT	2000	$2000.00
DT190810	19	8	DT	1000	$1500.00
LT190810	19	8	LT	1000	$1500.00
LT170805	17	8	LT	500	$1200.00
DT230420	23	4	DT	2000	$1000.00
DT190410	19	4	DT	1000	$750.00
LT190410	19	4	LT	1000	$950.00
TB100206	10	2	TB	64	$200.00

(a) Complete the table to show the most appropriate data type for each field based on the data shown in the table at the start of question 6.

Field	Data type
PCID	
ScreenSize	
Type	
Price	

[2]

(b) Using the query-by-example grid, write a query to identify all the desktop computers with a hard drive larger than 1000 GB. All fields in the table should be shown, sorted in descending order by price.

Field:						
Table:						
Sort:						
Show:	☐	☐	☐	☐	☐	☐
Criteria:						
or:						

[4]

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