Cambridge IGCSE

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Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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6885163701

COMPUTER SCIENCE **0478/23**

Paper 2 Problem-solving and Programming **May/June 2019**

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 regulated for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **15** printed pages and **1** blank page.

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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

A discount stationery store sells items in bulk at a discount to its customers. Customers can order from a small range of items available on that day. The greater the quantity of an item they buy in one order, the greater the discount for that item.

Quantity of an item	Discount
10	5%
20	10%
50	25%
100	35%
500	50%

In addition to this, new customers can use a $10 voucher, provided their order comes to more than $50. Also, returning customers are given a discount voucher with a monetary value.

Write and test a program or programs for the discount stationery store.

- Your program or programs must include appropriate prompts for the entry of data; data must be validated on entry.
- 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 – Stationery available on the day.

Using arrays, set up a list of at least 10 different items available that day. For every item include: item code, description, price and the amount in stock. All item codes must be different. Display the item code, description, price and the amount in stock on the screen.

Task 2 – Customer places an order.

The customer chooses an item code from the list of currently available items. Any items that are out of stock are not displayed and any items that have low stock of 10 or fewer are highlighted. The customer enters the number they wish to purchase. If there are not enough items in stock the number is rejected. The price to pay and any discount is shown on the screen. When the order is complete, any customer discount voucher is applied and the total price is shown. If the customer confirms the order, the stock numbers are then updated.

Task 3 – At the end of the day.

List the item codes of any items that have sold out. Display the item code of any items of which none have been sold. Display the item code and description of the item of which the greatest quantity have been sold today.

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

Describe the data structures you have used in **Task 1** to record the items available that day. Include some sample data for each data structure you have described.

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(b) Explain how your program for **Task 1** ensures all the item codes are different.

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(c) Explain how your program for **Task 2** highlights items where the stock level is low.

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..... [3]

(d) Write an algorithm for **Task 2** using **either** pseudocode, programming statements **or** a flowchart. Assume that **Task 1** has been completed and the list of items currently available has already been displayed.

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[5]

(e) Explain how your program completes **Task 3**. Any programming statements used in your answer must be fully explained.

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Question 2 begins on page 8.

Section B

2 **(a)** An algorithm has been written in pseudocode to input the weight of 500 items and reject any that are over-weight or under-weight, then print the percentage rejected.

```
Count ← 1
Reject ← 0
Over ← 62
Under ← 58
REPEAT
  INPUT ItemWeight
  IF ItemWeight > Over AND ItemWeight < Under
    THEN
      Reject ← Reject - 1
  ENDIF
  Count ← Count + 1
UNTIL Count > = 500
Reject ← Reject / 100
PRINT "Percentage rejected is ", Reject
```

Find the **four** errors in the pseudocode and suggest a correction for each error.

Error 1 .....

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Correction .....

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Error 2 .....

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Correction .....

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Error 3 .....

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Correction .....

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Error 4 .....

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Correction .....

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[4]

(b) Describe how you would change the corrected algorithm to calculate the number accepted instead of rejected, using a variable `Accept`, and print a warning if fewer than 50% are accepted.

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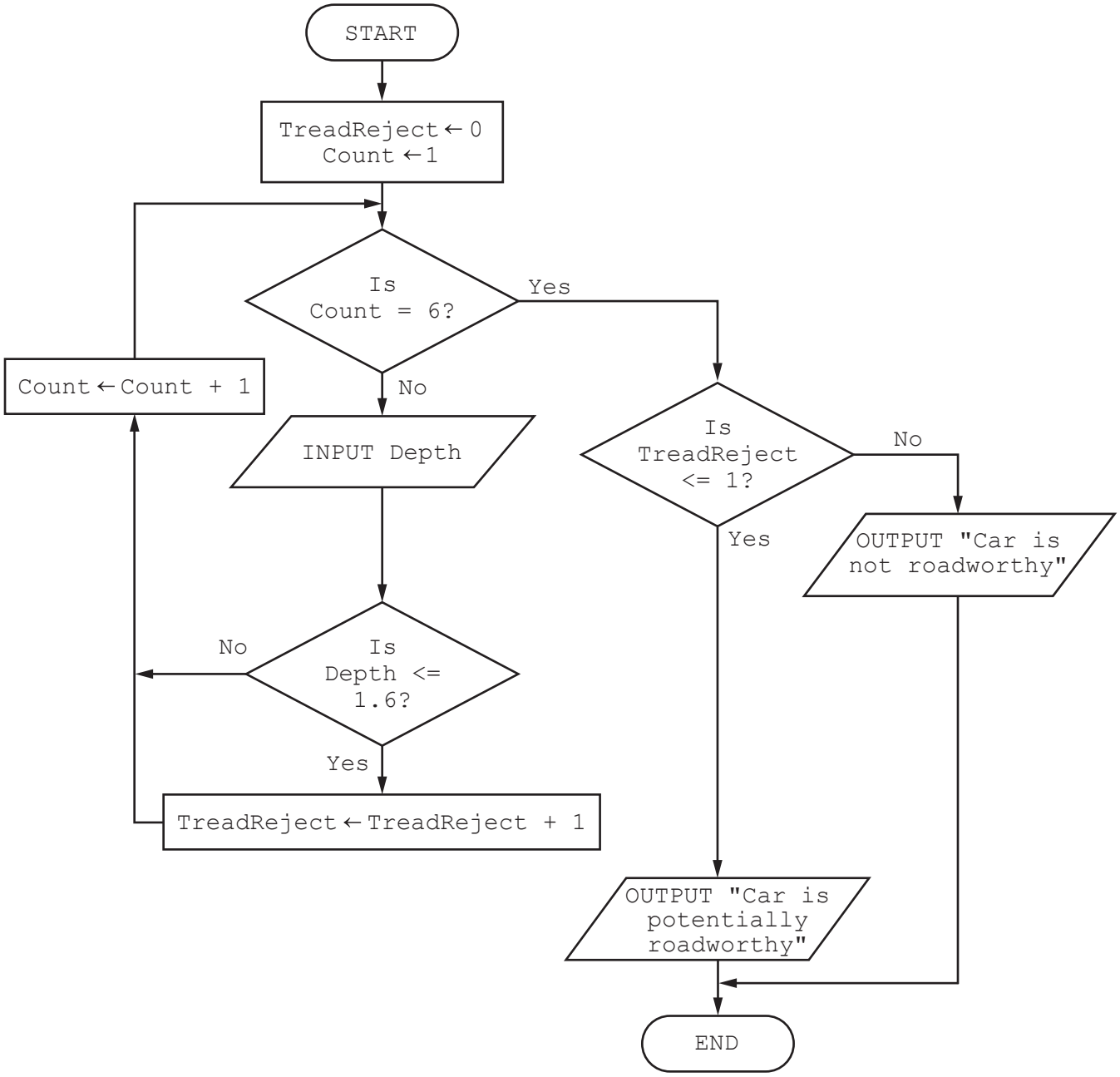
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..... [4]

3 This flowchart inputs the tread depth of five tyres, four on the car and a spare tyre. Any tread depth of 1.6 mm or less is rejected. To be potentially roadworthy, a car must have four tyres with a tread depth greater than 1.6 mm.



Complete Trace table 1 for the tread depth input data:
1.7, 1.9, 1.4, 1.8, 2.0

TreadReject	Count	Depth	OUTPUT

Trace table 1

Complete Trace table 2 for the tread depth input data:
1.2, 1.9, 1.4, 1.8, 2.4

TreadReject	Count	Depth	OUTPUT

Trace table 2

[4]

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[Turn over

4 For each of the **four** checks in the table, place a tick in the correct column to show whether it is an example of a **validation** or **verification** check.

Statements	Validation	Verification
Range check		
Double entry		
Check digit		
Presence check		

[4]

5 Identify and describe **three** loop structures that are available in pseudocode.

Loop structure 1 .....

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Description .....

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Loop structure 2 .....

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Description .....

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Loop structure 3 .....

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Description .....

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[6]

Question 6 begins on page 14.

6 A database table, TRAIN, is used to keep a record of train departures from a station.

Train Number	Platform	Destination	Departure Time	Status
1A37	1	Newtown	08:00	On time
2X19	2	Anytown	08:10	Late
1A29	1	Bigcity	08:15	On time
1A28	2	Anytown	08:30	Cancelled
1A67	3	Gardenvillage	08:45	On time
1A37	1	Newtown	08:50	On time
1A24	2	Charter Train	09:00	Late
1A67	3	Gardenvillage	09:15	On time

(a) Explain why the field **Train Number** could not be used as a primary key.

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(b) A query-by-example has been written to display only the train numbers and platforms of all trains leaving after 08:30 that are late.

Field:	Train Number	Platform	Departure Time	Status
Table:	TRAIN	TRAIN	TRAIN	TRAIN
Sort:				
Show:	☐	☑	☐	☐
Criteria:		= Y	< 08:30	
or:				= "Late"

Explain why the query-by-example is incorrect, and write a correct query-by-example.

Explanation .....

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

[7]

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