Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

8771681685

COMPUTER SCIENCE **2210/22**

Paper 2 Problem-solving and Programming **May/June 2017**

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.

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.

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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

The organiser of a senior citizens' club arranges outings for the members. For each of these outings a coach is hired, meals at a restaurant are reserved and tickets for the theatre are booked. A program is required to work out the costs and provide a printed list showing everyone on the outing.

Write and test a program for the club organiser.

- Your program must include appropriate prompts for the entry of data.
- Error messages and other output need to be set out clearly.
- 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 – Work out the total cost of the outing.

The organiser finds out how many senior citizens would be interested in the outing. The program for TASK 1 works out the cost from this information.

Number of people	Hire of coach ($)	Cost of a meal ($)	Cost of a theatre ticket ($)
12–16	150	14.00	21.00
17–26	190	13.50	20.00
27–39	225	13.00	19.00

The minimum number of senior citizens needed for the outing to go ahead is 10; there cannot be more than 36 senior citizens on the outing. A minimum of two carers must go on the outing, with an additional carer needed if more than 24 senior citizens go on the outing. Carers do not have to pay anything for the outing. Work out the total cost and the cost per person for the senior citizens.

TASK 2 – Record who is going on the outing and how much has been paid.

Using your results from TASK 1, record the names of the people on the outing and the amount they have paid; include the carers on the outing. If there are spare places on the coach then extra people can be added; they are charged the same price as other senior citizens. Calculate the total amount of money collected. Print out a list of the people on the outing.

TASK 3 – Identify the break-even point or profit that will be made on the outing.

Show whether the outing has made a profit or has broken even using the estimated cost from TASK 1 and the money collected from TASK 2.

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

(i) For a variable that you have used to record information about the cost of the outing in **Task 1**, state the name, data type and its use.

Variable name .....

Data type .....

Use .....
[3]

(ii) State **two** constants that you could have used for **Task 1**. Give the value that would be assigned to each one and explain what it is used for.

Constant 1 name .....

Value 1 .....

Use 1 .....

Constant 2 name .....

Value 2 .....

Use 2 .....
[6]

(b) Explain how you would need to change your calculation in **Task 1** if each carer were paid $20.00 for coming on the outing.

.....

.....

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.....[2]

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[Turn over

(c) Write an algorithm to complete **Task 2**, using **either** pseudocode, programming statements **or** a flowchart. You can assume that **Task 1** has been completed. You do not need to produce the list of people on the outing.

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.....[5]

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

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.....[4]

Section B

2 **(a)** Write an algorithm to input three different numbers, and then output the largest number. Use **either** pseudocode **or** a flowchart.

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.....[4]

(b) Give **two** sets of test data to use with your algorithm in **part (a)** and explain why you chose each set.

Test data set 1 .....

Reason .....

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Test data set 2 .....

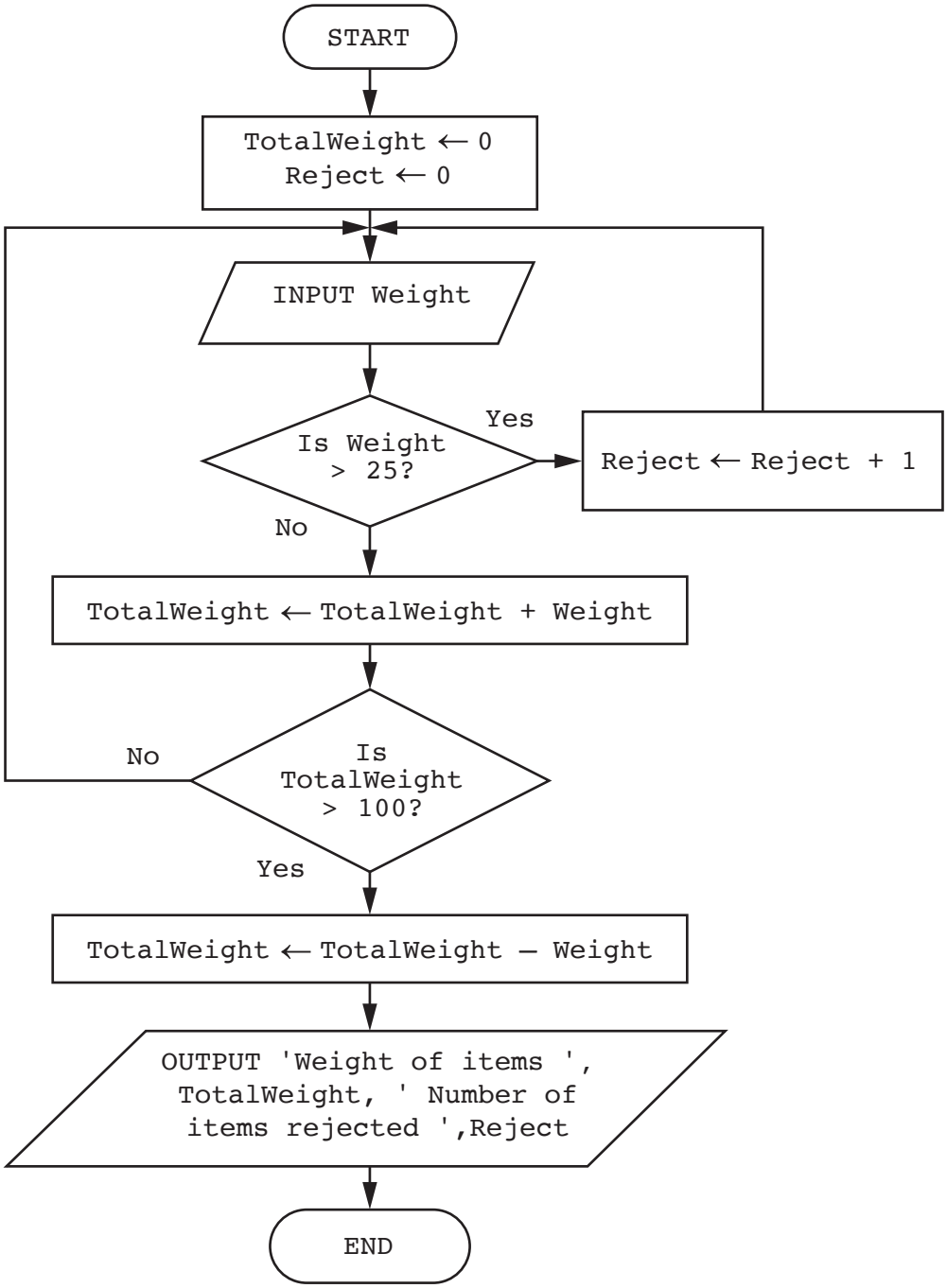
Reason .....

.....

.....

[4]

3 This flowchart inputs the weight of items in kilograms to be loaded on a trailer. Any item over 25 kilograms is rejected. The trailer can take up to 100 kilograms.



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Complete the trace table for the input data:

13, 17, 26, 25, 5, 10, 15, 35, 20, 15

Weight	Reject	TotalWeight	OUTPUT

[5]

4 An algorithm has been written in pseudocode to input 100 numbers and print out the sum. A `REPEAT … UNTIL` loop has been used.

```
Count ← 0
Sum ← 0
REPEAT
  INPUT Number
  Sum ← Sum + Number
  Count ← Count + 1
UNTIL Count > 100
PRINT Sum
```

(a) Find the error in the pseudocode and suggest a correction.

Error.....

Correction .....

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[2]

(b) Rewrite the correct algorithm using a more suitable loop structure.

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.....[3]

5 A database table, SHEEP, is used to keep a record of the sheep on a farm. Each sheep has a unique ear tag, EARnnnn; n is a single digit. The farmer keeps a record of the date of birth, the gender and the current weight of each sheep in kilograms.

(a) Identify the **four** fields required for the database. Give each field a suitable name and data type. Provide a sample of data that you could expect to see in the field.

Field 1 name .....

Data type .....

Data sample .....

Field 2 name .....

Data type .....

Data sample .....

Field 3 name .....

Data type .....

Data sample .....

Field 4 name .....

Data type .....

Data sample .....

[8]

(b) State the field that you would choose as the primary key.

.....[1]

(c) Using the query-by-example grid below, write a query to identify the ear tags of all male sheep weighing over 10 kilograms. Only display the ear tags.

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

[3]

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