Cambridge Assessment International Education

CS BY AQIB KHAN

Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

3022701867

COMPUTER SCIENCE **2210/22**

Paper 2 Problem-solving and Programming **May/June 2022**

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- **Do not attempt Tasks 1, 2 and 3** in the copy of the pre-release material on page 2; these are for information only.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- 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.
- Calculators must **not** be used in this paper.

INFORMATION

- The total mark for this paper is 50.
- 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 AQIB KHAN
AN INSTITUTE OF O/A LEVEL

This document has **12** pages.

DC (LK) 311524
© UCLES 2022

TAK (The AQIB KHAN)- An institute of O/A level

Aki.Khan CS By AQIB Khan CS By AQIB KHAN TheAkikhan.com +92 3145030717

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 following tasks before the examination to answer Question 1.

Pre-release material

A program is needed to allow a Wildlife Park to sell tickets. A booking consists of one or more tickets for the same day(s) and can be made up to a week in advance. A booking can be made for a visit of one day or two consecutive days. A booking can have extra attractions included. A booking will be valid for the day(s) chosen only.

Ticket type	Cost for one day	Cost for two days
one adult	$20.00	$30.00
one child (an adult may bring up to two children)	$12.00	$18.00
one senior	$16.00	$24.00
family ticket (up to two adults or seniors, and three children)	$60.00	$90.00
groups of six people or more, price per person	$15.00	$22.50

Extra attraction	Cost per person
lion feeding	$2.50
penguin feeding	$2.00
evening barbecue (two-day tickets only)	$5.00

Write and test a program or programs for the Wildlife Park:
- Your program or programs must include appropriate prompts for the entry of data. Data must be validated on entry.
- All outputs, including error messages, 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 – displaying the ticket options and the extra attractions available
Set up your program to:
- display the options, attractions and prices for one-day tickets
- display the options, attractions and prices for two-day tickets
- show the days available for booking; assume that there are tickets available for any valid day.

Task 2 – process a booking
Extend your program for **Task 1** to:
- input the tickets and extra attractions required, then calculate the total cost of the booking
- allocate a unique booking number
- display the booking details, including the total cost and the unique booking number
- repeat as required.

Task 3 – ensuring each booking is the best value
Check that the total for each booking gives the best value and offer an alternative if this is **not** the case. For example, buying two family tickets is better than a group ticket for a group of 10 that includes four adults and six children.

CS BY AQIB KHAN
© UCLES 2022 9230/22/M/J/22
TAK (The AQIB KHAN) - An institute of O/A level
Aki.Khan CS By AQIB Khan CS By AQIB KHAN TheAkikhan.com +92 3145030717

CS BY AQIB KHAN

1 All variables, constants and other identifiers must have meaningful names.

(a) (i) Identify **one** constant that you could have used for **Task 1**.
Give the value and use of the constant.

Constant .....

Value .....

Use .....

.....

[3]

(ii) Identify **one** variable that you could have used for **Task 2**.
Give the data type and use of the variable.

Variable .....

Data type .....

Use .....

.....

[3]

(b) Explain how your program showed the days available for booking in **Task 1**.

.....

.....

.....

.....

.....

..... [3]

(c) Explain how your program made sure that each booking number allocated in **Task 2** was unique.

.....

.....

.....

..... [2]

THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

TAK (The AQIB KHAN) An institute of O/A level
Aki.Khan CS By AQIB Khan CS By AQIB KHAN TheAkikhan.com +92 3145030717

(d) Write an algorithm for the part of **Task 2** that inputs the tickets and extra attractions required then calculates the total cost of the booking.

Assume that the booking is for a single day.

Use pseudocode, programming statements or a flowchart.

CS BY AQIB KHAN
THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

CS BY AQIB KHAN

[6]

THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

TAK (The AQIB KHAN) - An institute of O/A level
Aki.Khan CS By AQIB Khan CS By AQIB KHAN TheAkikhan.com +92 3145030717

(e) Explain how your program decides when a family ticket is better value in **Task 3**.

Any programming statements that you include in your answer must be fully explained.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [3]

CS BY AQIB KHAN

THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

CS BY AQIB KHAN

Section B starts on page 8

THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

Section B

2 An algorithm allows a user to input their password and checks that there are at least eight characters in the password. Then, the user is asked to re-input the password to check that both inputs are the same. The user is allowed three attempts at inputting a password of the correct length and a matching pair of passwords. The pre-defined function `LEN(X)` returns the number of characters in the string, `X`

```
01  Attempt ← 0
02  REPEAT
03    PassCheck ← TRUE
04    OUTPUT "Please enter your password "
05    INPUT Password
06    IF LEN(Password) < 8
07      THEN
08        PassCheck ← TRUE
09      ELSE
10        OUTPUT "Please re-enter your password "
11        INPUT Password2
12        IF Password <> Password
13           THEN
14           PassCheck ← FALSE
15        ENDIF
16    ENDIF
17    Attempt ← Attempt + 1
18  UNTIL PassCheck OR Attempt <> 3
19  IF PassCheck
20    THEN
21     OUTPUT "Password success"
22    ELSE
23      OUTPUT "Password fail"
24  ENDIF
```

(a) Identify the **three** errors in the pseudocode and suggest a correction to remove each error.

Error 1 .....

Correction .....

Error 2 .....

Correction .....

Error 3 .....

Correction .....

[3]

CS BY AQIB KHAN
THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

(b) The algorithm includes **two** types of check on the data input.
Identify and describe each type of check.

Type of check 1 .....

Description .....

.....

Type of check 2 .....

Description .....

.....
[4]

(c) Give **two** sets of test data for this algorithm and a reason for choosing each set.

Each set of test data and its reason must be different.

Set 1 .....

Reason .....

.....

Set 2 .....

Reason .....

.....
[4]

3 **(a)** Describe a one-dimensional array. Include an example of an array declaration.

.....

.....

.....

.....

.....

..... [3]

(b) Explain how indexing could be used to search for a value stored in a one-dimensional array.

.....

.....

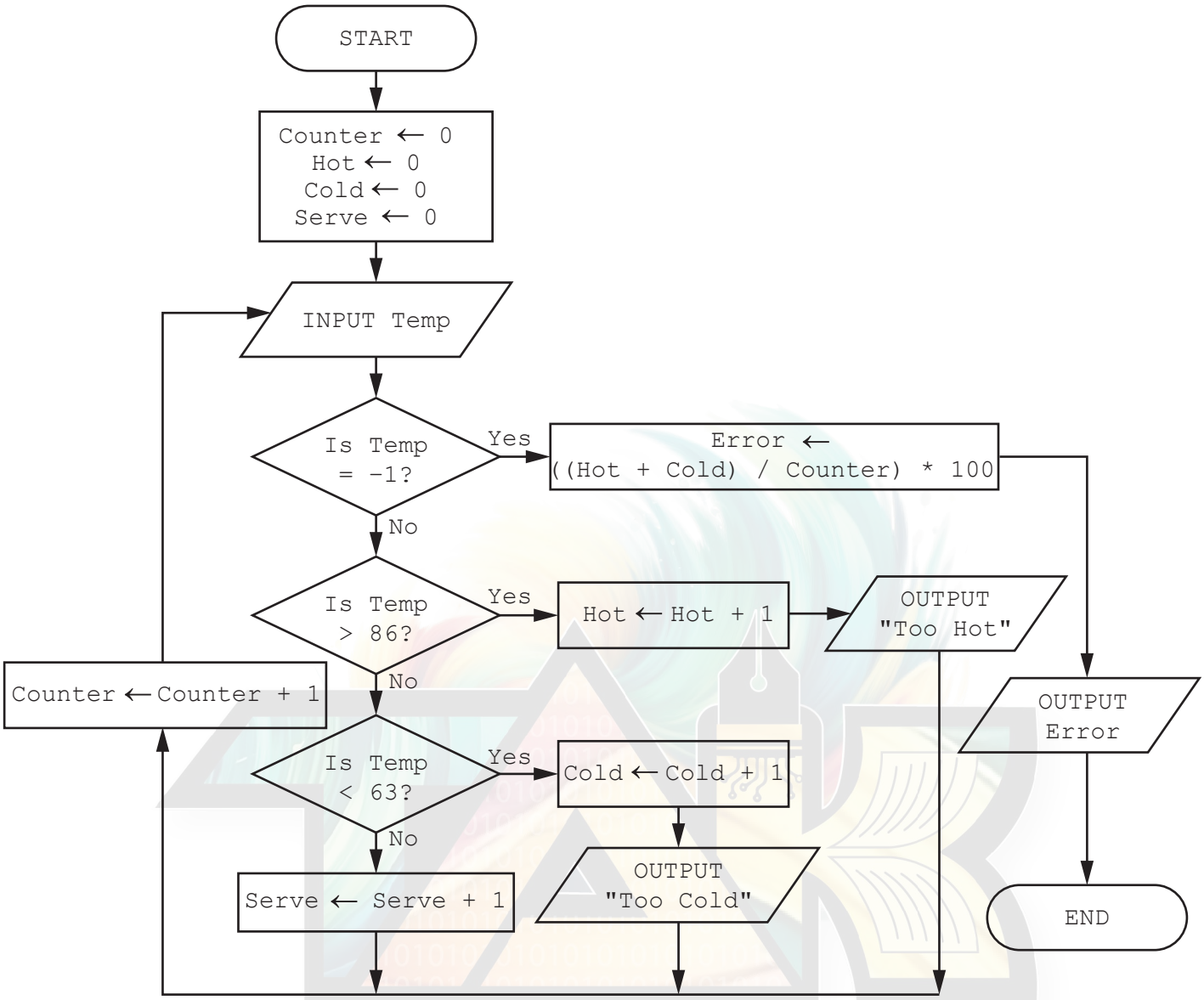
.....

..... [2]

CS BY AQIB KHAN
THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

TAK (The AQIB KHAN) - An institute of O/A level
Aki.Khan CS By AQIB Khan CS By AQIB KHAN TheAkikhan.com +92 3145030717

4 This algorithm checks the temperature of hot food being served to customers.



CS BY AQIB KHAN
THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

(a) Complete the trace table for the algorithm using this input data:

75, 78, 84, 87, 91, 80, 75, 70, 65, 62, –1, 20

Counter	Hot	Cold	Serve	Temp	Error	OUTPUT

[7]

(b) State how the final output from the algorithm could be improved.

.....

..... [1]

(c) Identify the process in the algorithm that is **not** required.

.....

..... [1]

CS BY AQIB KHAN
THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

TAK (The AQIB KHAN) An institute of O/A level
Aki.Khan CS By AQIB Khan CS By AQIB KHAN TheAkikhan.com +92 3145030717

CS BY AQIB KHAN

5 A database table, NURSE, is used to keep a record of disposable items worn by veterinary nurses.

This is part of the table:

ItemNumber	Description	SingleUse	Uses	StockLevel	ReorderLevel
DIG1	Glove (pair)	Y	1	500	800
DIA1	Apron	Y	1	700	800
DIM5	Hair net	Y	1	650	500
DIA2	Apron	N	5	25	100
DIS4	Suit	N	3	70	50
DIV9	Shoe cover (pair)	Y	1	400	250

(a) Complete this query-by-example grid to display only the item number and the description of single use items, where the stock level is below the reorder level.

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

[4]

(b) Give a reason why the field SingleUse is **not** required in the table NURSE.

.....

..... [1]

THE AQIB KHAN
AN INSTITUTE OF O/A LEVEL

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

TAK (The AQIB KHAN) An institute of O/A level
Aki.Khan CS By AQIB Khan CS By AQIB KHAN TheAkikhan.com +92 3145030717