Cambridge O Level

COMPUTER SCIENCE **2210/23**

Paper 2 Problem-solving and Programming **October/November 2022**
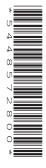
PRE-RELEASE MATERIAL

No additional materials are needed.

This material should be given to the relevant teachers and candidates as soon as it has been received at the centre.

INSTRUCTIONS

- You should use this material in preparation for the examination.
- You should attempt the practical programming tasks using your chosen high-level, procedural programming language.

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2

Your preparation for the examination should include attempting the following practical tasks by **writing and testing a program or programs**.

A program is needed for a window cleaning company to store details of the services provided to their customers for each cleaning job.

The data stored will be used to show the customers exactly what services they are paying for (provide an itemised bill). The data will allow the company to find out which services are used most often and least often.

The services available to customers are:

Service	Cost
basic window clean outside, only one floor, up to five windows	$10.00
additional windows up to and including five	$5.00
two floors	10% extra
three floors	15% extra
inside as well	25% extra
polish all windows cleaned	5% extra
special solar panel clean	$20.00

The total cost of the customer's bill is calculated in the same order as the rows of the table.
For example, a customer who has six windows over three floors is charged $10 + $5 with 15% extra, giving a total bill of $17.25.

Write and test a program or programs for the window cleaning company:

- 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 – setting up the system to store the customer and service details

Set up your program to:
- store a customer name and address in a single dimensional array at the next position
- use the array index of this position as the unique number of the itemised bill
- store any service required at the same position in the appropriate service array; use an array for each service.

Task 2 – storing the services for a customer and displaying the itemised bill

Extend your program to:
- display the services and the cost of each one
- input and store a customer's details and the services they require
- calculate the total cost
- display the itemised bill including the total cost and the unique number of the bill
- repeat as required.

Task 3 – providing statistics about the services

Excluding the basic window clean and the additional windows, find the most popular service and the least popular service. For these two services, display the service name, whether it was the most or least popular and the number of times each service was used as a percentage of the total bills stored.

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3

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