Cambridge Assessment International Education

Cambridge IGCSE™

COMPUTER SCIENCE **0478/21**

Paper 2 Problem-solving and Programming **October/November 2020**

PRE-RELEASE MATERIAL

5954081616

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.

This document has **2** pages. Blank pages are indicated.

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

A car insurance system allows customers to check how much it would cost to buy insurance for a car for twelve months. The starting price of the car insurance is $500. The actual price a customer pays for the car insurance changes depending upon this information:

- engine size of car
- value of car
- where car is kept overnight
- number of kilometres (km) driven a year
- age of driver
- years insured without an insurance claim

Engine size in litres	Price change
<=0.5	–5%
>0.5 to 1.0	0%
>1.0 to 2.5	+5%
>2.5	+10%

Value in $1000	Price change
<0.5	–5%
0.5 to 2	0%
>2 to 10	+5%
>10 to 20	+10%
>20	+15%

Kept over-night	Price change
Garage	–5%
Drive	0%
Street	+5%

1000 km driven a year	Price change
<5	–5%
5 to 20	0%
>20	+5%

Age of driver	Price change
18–20	+100%
21–25	+50%
26–30	+25%
31–70	0%
71–80	+10%
>80	+20%

Table 1

Years without claim	Price change
1	–10%
2	–20%
3	–30%
4	–40%
5	–50%
6	–60%
>6	–70%

Table 2

The actual price is calculated by:

- finding the total of the percentage changes for the customer using Table 1
- applying this total percentage change to the starting price of the car insurance
- applying the years without claim discount percentage for the customer using Table 2.

Write and test a program or programs to calculate the price for a customer to insure a car.

- 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 – Calculate the price to insure a car.

Write a program to obtain the required information from a customer and calculate the price to insure the car. Display the price to insure the car. Display the total percentage change calculated from Table 1, and the years without claim discount percentage from Table 2 separately.

Task 2 – New customer discount.

Extend **Task 1** to include an additional discount of 10% off the price to any new customer who is aged between 26 and 70 inclusive, who also has 2 or more years without a claim. Display the amount of money this would save and the new price.

Task 3 – Adding an extra driver.

Customers can add one extra driver. The age of the extra driver may increase the price. The new price is calculated by applying the percentage price change for the age of the extra driver from Table 1 to the price. Extend **Task 2** to calculate and display the new price including an extra driver if required.