COMPUTER SCIENCE **0478/22**

Paper 2 Problem-solving and Programming **October/November 2019**

PRE-RELEASE MATERIAL

No Additional Materials are required.

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

READ THESE INSTRUCTIONS FIRST

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

Any businesses described in this paper are entirely fictitious.

This document consists of **2** printed pages.

[Turn over

In preparation for the examination candidates should attempt the following practical tasks by **writing and testing a program or programs**.

A company supplies concrete slabs for paving. The slabs are made to order in batches of 20; all slabs in a batch are identical. Customers can order from a small range of standard sizes and colours. All measurements are given in millimetres. The price is calculated at $0.05 for a volume of $100\,000\,mm^3$ of grey concrete; red and green concrete are charged at 10% more. Customers can choose their own colours; a custom colour has an initial set up cost of $5 then 15% more than the price for grey.

Colour of slab
Grey
Red
Green
Custom

Depth of slab
38
45

Shapes	Sizes for each shape
Square	600 × 600 or 450 × 450
Rectangular	600 × 700 or 600 × 450
Round	Diameter 300 or 450

Write and test a program or programs for the concrete slab company.

*   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 – Price for a batch of 20 slabs

Using the information above set up a routine that allows a customer to choose the concrete slab they require and calculate a price for a batch of 20 slabs. The details of the slab chosen and the price for a batch of 20 should be displayed on the screen.

Task 2 – Customer places an order

Using the information from TASK 1, the customer places an order for the number of slabs they require. Orders for fewer than 20 slabs or more than 100 slabs are not accepted; orders that are not a multiple of 20 are rounded up to the next multiple of 20 slabs. Display the order price and the number of slabs to be produced.

Task 3 – Flexible pricing

The cost of concrete is variable. The cost for $100\,000\,mm^3$ of grey concrete can be input and two grades are available; basic at the cost input and best at 7% more. Use a copy of your program for TASK 1 to develop TASK 3 to input the cost and grade of concrete before calculating the price for 20 slabs.