Cambridge IGCSE

COMPUTER SCIENCE **0478/21**

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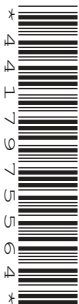
This document consists of **2** printed pages.

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

You have been asked to write a program to calculate the area of a patio and the cost of the stone slabs needed to cover it. The program should work for any patio that can be represented as a rectangle, or group of rectangles that are joined together, and only one type of stone slab may be used.

Type of stone slab	Price per square metre
Dover	$30.00
Exeter	$35.00
London	$42.00
Portland	$49.50
Shaftesbury	$55.00
York	$62.75

Write and test a program or programs to calculate the cost of the stone slabs for a patio.

- 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 – Setting up the system for a simple rectangular patio.
Set up your program to:
- Store the type and price per square metre of the stone slabs using a suitable programming technique.
- Prompt and allow the user to input the length and width of their patio and the type of stone slab they would like.
- Calculate and display the number of square metres of stone slabs required, rounded up to the next whole square metre, and the total cost of the stone slabs.

Task 2 – Working on more complex shapes.
Assuming that a patio can be made up of a group of rectangles, extend your program to:
- Enter the number of rectangles making up the patio and the type of stone slab to be used.
- Allow the dimensions for each rectangle to be entered.
- Calculate and display the total area of the patio rounded up to the next whole square metre.
- Calculate and display the total cost of the stone slabs.

Task 3 – Allowing for waste.
It is likely that some of the stone will not be useable, so it is sensible to allow a percentage for wastage, for example, 10%. Alter your program to allow the user to input a percentage to calculate wastage and add this to the number of square metres of stone slabs to be purchased, rounded up to the next whole square metre. Display the revised total area and cost.