Cambridge Assessment International Education

Cambridge O Level

COMPUTER SCIENCE **2210/22**

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

PRE-RELEASE MATERIAL

0433190336

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.

DC (CJ) 315859

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

An organisation has a visitor car park with 20 car parking spaces numbered 1 to 20. Car park spaces can be booked by visitors up to two weeks before the date they are needed, as long as a space is available. Visitors request a car parking space by stating the day in the two-week period in which it is required. They give the licence number of the car to be parked and their name. The next available space, beginning at space 1, is allocated and the given data and booking are stored. A system is required to record the car park bookings.

Write and test a program or programs for the visitor car park booking system to work for a static period of two weeks:

- 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 booking system

Set up suitable data structures to store the car licence numbers and names of visitors who have booked car parking spaces. The data structures should have sufficient capacity to store data for each of the 20 parking spaces for a static period of two weeks. Allow a visitor to request a parking space on any day within the two-week period by entering a number between 1 and 14, inclusive. The system will check that there are spaces available on the day requested, and if so, will ask the visitor to enter their name and car licence number. This data will be stored in the data structures representing the first available parking space for the day requested. The visitor will be told the number of their parking space.

At the end of the two-week period, allow all of the data to be deleted ready for the next two-week period.

Task 2 – adding accessible parking spaces

The visitor car park booking system is to be re-designed to offer accessible parking. Spaces 1 to 5 are named accessible spaces. Spaces 6 to 20 are named general spaces.

Extend your program in **Task 1** so that:

- when a visitor requests a parking space, they are additionally asked if they need an accessible space
  - if so, they are allocated the first available space beginning at space 1 and finishing at space 20
  - if **not**, they are allocated the first available space beginning at space 20 and finishing at space 6.

The system must work so that visitors requiring accessible parking may be allocated any of the 20 spaces, but visitors who do **not** need accessible parking may only be allocated general spaces.

Task 3 – working out car park usage statistics

Extend the program to enable the following statistics to be counted and output on request:

- The number of accessible spaces used on any of the 14 days.
- The number of general spaces used on any of the 14 days.
- The total number of spaces used on any of the 14 days.
- The number of accessible spaces used in the whole 14-day period.
- The number of general spaces used in the whole 14-day period.
- The total number of spaces used in the whole 14-day period.