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Cambridge Assessment International Education

Cambridge O Level

COMPUTER SCIENCE **2210/22**

Paper 2 Problem-solving and Programming **October/November 2021**

PRE-RELEASE MATERIAL

7832151421

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

An integrated transport system has been designed to reduce the need for privately owned vehicles. A vehicle is booked to take a passenger from home to a start station, from where they will travel to an end station. A vehicle at the end station will take the passenger to their destination. Each stage of the journey has a price code to represent the distance travelled. The prices for each stage are shown:

Home to start station	
Code	**Price ($)**
C1	1.50
C2	3.00
C3	4.50
C4	6.00
C5	8.00

Start station to end station	
Code	**Price ($)**
M1	5.75
M2	12.50
M3	22.25
M4	34.50
M5	45.00

End station to destination	
Code	**Price ($)**
F1	1.50
F2	3.00
F3	4.50
F4	6.00
F5	8.00

To book a journey, a passenger will enter a code for each stage and the start time of their journey. The total price is calculated by adding together the price for each of the three stages. The total price will be reduced by 40% when the start time of the journey is after 10:00.

Write and test a program or programs for the integrated transport booking system.
- 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 booking system
Write a program to set up arrays to record the following:
- codes and prices for each of the three stages
- passenger accounts that include a unique passenger account number and name
- bookings that include a unique passenger account number, a start time of the journey, a code for each stage of the journey, and a unique booking number for the journey.

Store the data for the code and price for each stage.

Task 2 – using the booking system
Extend **Task 1** to achieve the following:
- Allow passengers to open an account by generating a unique passenger account number and storing it along with their name in the arrays.
- Allow passengers to make a booking by first entering their unique passenger account number, the start time of their journey, and a code for each stage of their journey. Check if the passenger account number already exists.
- Generate a unique booking number for the journey.
- Calculate the total price of the journey, without any discount, and store the journey details.

Task 3 – applying a discount and checking the entry
Extend **Task 2** to check the start time of the journey and if it is after 10:00, apply a 40% discount to the total price.
Display the total price and booking details for the passenger to check, and allow them to either confirm the details are correct or start again.

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