

Version 1.0



General Certificate of Secondary Education

GCSE in Computer Science code

Component 1: Practical programming

Specimen Candidate Booklet: Scenario 1 – Mobile Phone Application

*This scenario is one of four available. Each of the four scenarios is available in separate candidate booklets. You must choose **two** from the four.*

Instructions

- You have approximately 25 hours in which to complete **all** of this scenario.
- There are restrictions on when and where you can work on this scenario. Your teacher will explain them to you. For example, you can only do work that you intend to hand in for marking when a teacher is present so that he or she can confirm that the work is your own.
- Before beginning the scenario, read the whole of this booklet thoroughly. You can ask your teacher to explain anything in this booklet that you do not understand.
- You must not work with other students on anything that you intend to hand in for marking.

Component 1: Practical programming

Scenario 1 – Mobile phone application

You have been asked to develop a system for a transport company. They are thinking of introducing an electronic system for students who travel to school by bus.

The new system will be known as '*ChipRider*'. It has been invented to allow mobile phone users to buy credit that is stored within a mobile phone application. This can be used to buy tickets on buses. It means the students do not need to carry money to pay for their tickets.

The student can buy credit that is stored on the phone. When they get on a bus they can use their phone to buy the on-screen ticket. The student gives their phone to the driver. The driver types a code into the student's phone. The code takes credits from the stored balance on the phone.

The application can store a maximum of 30 credits to buy tickets.

There are two types of ticket:

- Single – for a single journey from one place to another. This will cost 3 credits.
- Return – for a journey from one place to another and a journey back to where they came from. This will cost 5 credits.

The phone produces a 'ticket' on the screen that can be shown to an inspector if a ticket needs to be checked.

When there is not enough credit on the phone, the student can buy credits to add to their balance. This is done by the driver entering a special code that only he/she will know.

The system must be able to perform all of the actions described in the situations below.

1. Buy a ticket (one person)

1. Allow the phone to accept a code that the driver types in.
2. If the ticket is a single, deduct 3 credits from the balance.
3. If the ticket is a return, deduct 5 credits from the balance.
4. If there are not enough credits on the phone, allow the student to 'top-up' (see 3 below).
5. Generate a ticket for the journey on the screen (see 4 below).

2. Buy a ticket (more than one person – single journey ONLY)

1. Allow the phone to accept a code that the driver types in.
2. Deduct 3 credits from the balance for each person travelling. So for three people travelling, the cost would be 3 credits x 3 people = 9 credits.
3. If there are not enough credits on the phone, allow the student to 'top-up' (see 3 below).
4. Generate a single on-screen ticket that would cover each of the travellers for that journey (see 4 below).

3. Top-up the phone with travel credits

1. Allow the phone to accept a code that the driver types in.
2. Allow the phone to be fully topped up to 30 credits in one transaction.
3. Allow the phone to be partially topped up to any number of credits below 30.

4. Display a ticket

Allow the phone to display a ticket for a driver or inspector to check.

The ticket should display the following information:

- Type of journey – Single or Return
- Number of students the ticket will cover for the journey
- Date and time the ticket was paid for
- The amount paid for the ticket

5. Protect your credits from misuse by other people

A parent of a student who has been asked to test this system is concerned that someone who steals a mobile phone could use the '*ChipRider*' credit to make free journeys on the bus.

You need to think of a way that you could prevent this from happening.

Design and build a system that provides this functionality so that credit stored in the '*ChipRider*' system is protected if the phone is stolen.