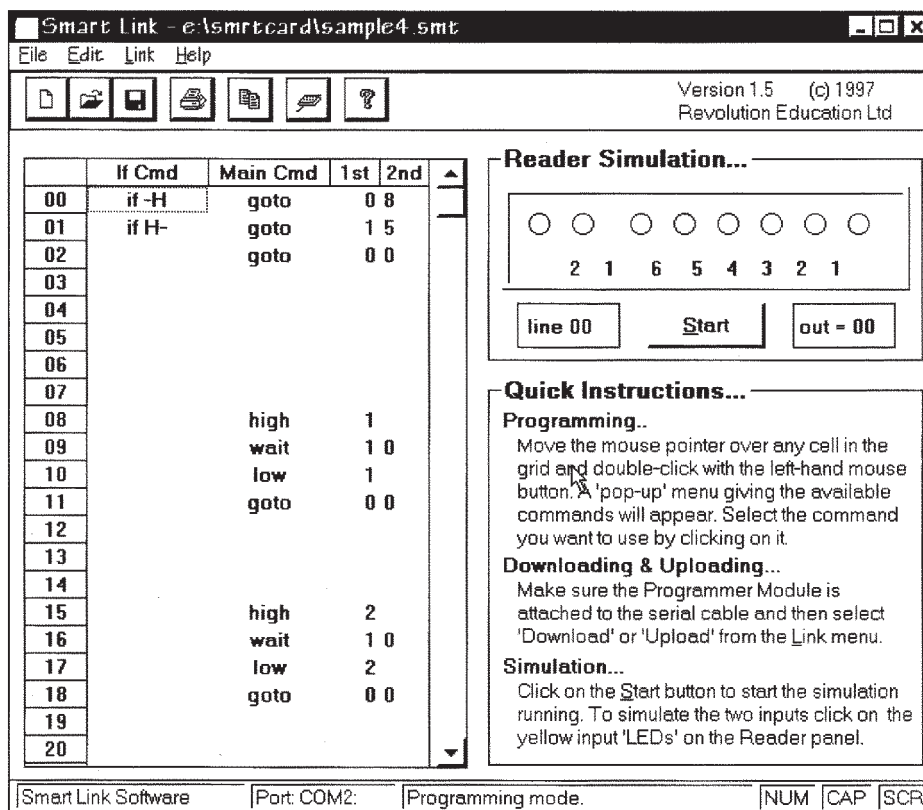


Using a smart card for control



Smart link software

Part 1

A common use of smart cards is to control entry to a building or room, e.g. a door might open only when a smart card is inserted into a reader.

What to do

- 1 Set up a working model of a door control system including:
 - ◆ A system to open the door that is controlled by either a motor or a solenoid. Think about the structure that you will use to support the door and the mechanism that you will use to make it move.
 - ◆ A red 'Wait' and green 'Enter' light mounted next to or above the door.
 - ◆ A buzzer mounted near the door.
 - ◆ A smart-card reader mounted securely next to the door, with the component leads connected to its outputs.
- 2 Program a smart card to produce the following sequence when it is inserted into the reader:
 - ◆ switch on the red light for 2 seconds;
 - ◆ switch on the solenoid to open the door, or the motor for long enough to open the door;
 - ◆ switch the red light off and the green light on;
 - ◆ wait for 10 seconds;
 - ◆ switch the green light off and the red light on;
 - ◆ switch off the solenoid to close the door, or reverse the motor for long enough to close it.

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- 3 Test your program by inserting the smart card into the reader and observing the action of the model.

What to write

- ◆ Write down the program or sequence of steps that you wrote on the smart card to control the door.
- ◆ Describe any ways that you think the sequence could be improved; don't forget to explain why you think these improvements are needed.
- ◆ If you have time, you can improve the sequence in the way you have described.

Part 2

Sometimes, as an extra security measure, the user of a smart card has to type in a code as well as inserting the smart card. For example, if you use a cash machine, you need a Personal Identification Number (PIN) as well as your cash card.

What to do

- 1 Add a pair of push switches to the model of the door control system. These should be connected to the two inputs of the smart-card reader.
- 2 Add to the smart-card sequence a requirement for a code to be entered before the door is opened. You have two switches available so, for example, you could:
 - ◆ require them to be pressed one after the other in the right order;
 - ◆ wait for a sequence of presses such as 1, 2, 2, 1, 2.
- 3 If the wrong code is entered, keep the door closed and use the buzzer as an alarm.
- 4 Test your program by inserting the smart card into the reader and observing the action of the model.

What to write

- ◆ Write down the new program or sequence of steps that you wrote onto the smart card to control the door.
- ◆ Describe any ways in which you think this sequence could be improved. Don't forget to explain why you think these improvements are needed.
- ◆ If you have time, you can improve the sequence in the way you have described.

