UNIVERSITY OF EDINBURGH

FACULTY OF SCIENCE AND ENGINEERING

MASTER OF SCIENCE IN COMPUTER SCIENCE

HUMAN COMPUTER INTERACTION

Thursday 26 April 2001

14:00 to 15:30

Examiners:

I. Watson (External)

R.N. Ibbett (Chairman)

INSTRUCTIONS TO CANDIDATES

Answer any TWO questions.

All questions carry equal weight.

1. (a) Describe the main features of State Transition Networks (STNs) with respect to dialogue specification. [*4 marks*]

   (b) Describe two features of Statecharts not found in STNs and explain with the aid of examples how these features extend their power as a dialogue specification notation. [*10 marks*]

   (c) It is proposed to introduce drinks vending machines in the Division of Informatics so that late-working students may obtain refreshment. All options are a very reasonably priced £2. For user convenience, the machine only accepts credit cards.

   The user interface of the proposed machine is shown in Figure 1. The `checkbox` and `radio` style controls have the usual meaning.

   - The option `Extra milk` is only available when the drink selection is `Cappucino`, whereas the option `Sugar` is always available.
   - The default drink selection is `Capuccino` and the default size is `Medium`. The default option selection is *none*
   - Health and safety regulations require that the `Large` option is not available when the drink selection is `Espresso`.
   - Pressing the `Cancel` button will return the machine to its default settings until the credit card is inserted.
   - Once the user is happy with her choices, she inserts her credit card. Once the transaction has been accepted (you may assume that it will be), the user withdraws the card and then the drink is dispensed.

   Produce a Statechart specification of this interface, labelling the arcs with the major input and output events where appropriate. [*11 marks*]

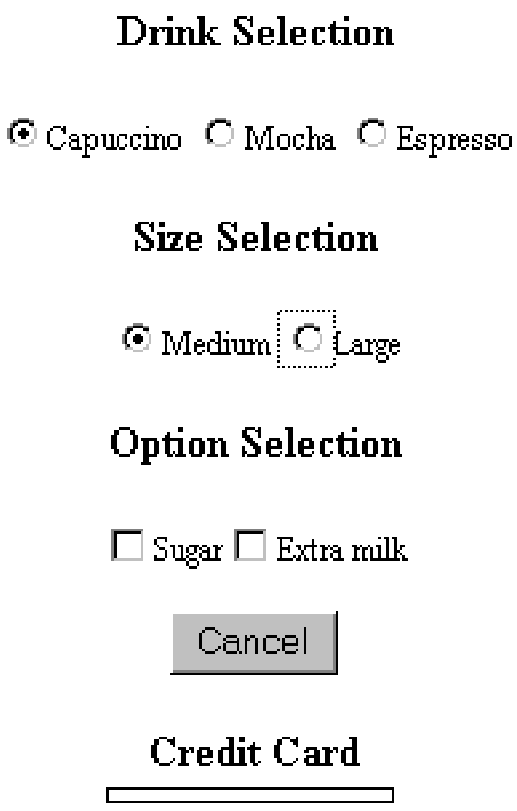

Figure 1: The Coffee Machine User Interface.

2. (a) You have been asked to design a set of controls for the user interface of a technical instrument.

   i. Define and justify one criteria each that you could use to decide upon

      A. The layout of the individual controls

      B. The size of the individual controls [*4 marks*]

   ii. For the criteria you gave for layout, briefly describe one technique you could use to gather and analyse the data you would then need to decide upon the layout. [*4 marks*]

   (b) You have been asked to do a comparative evaluation of two different hypertext-based help systems. Define and justify two different, objective performance measures you could choose to compare the two systems. [*6 marks*]

   (c) Using these two criteria, outline how you would experimentally compare the two prototypes, indicating what kinds of data you would collect and how you would analyse it. Your answer should include reference to dependent and independent variables, statistical analysis, and experimental design. [*11 marks*]

3. (a) It has been claimed that the direct manipulation/desktop metaphor interface style has reached the limits of its potential. Briefly outline three commonly cited limitations of this interface style. [*4 marks*]

   (b) Three alternatives to the direct manipulation/desktop metaphor interface style are speech, virtual reality and ubiquitous computing. For each of these three interface styles

      i. Explain, with reference to the limitations you identified in part (a), the advantages it offers over the direct manipulation/desktop metaphor interface style
      ii. Briefly outline one of its own limitations

   [*12 marks*]

   (c) It is planned to introduce a hand-held text messaging device to aid communication between workers in a factory. You have been asked to conduct an initial requirements investigation for this device, focusing on how workers currently communicate with one another. Briefly outline

      i. The kinds of issues that you would expect the investigation to address
      ii. The method you would use for this investigation and why

   [*9 marks*]