

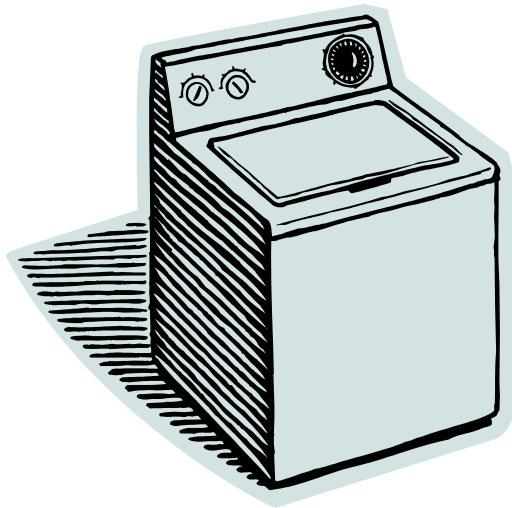
## 17ELC018 Real-time software engineering

### Task 1 Top-level design of washing machine system (30%)

#### Introduction

The purpose of this group task is to produce a design for the software needed to control the operations of a Bytronic washing machine simulator.

Documentation for the Bytronic washing machine has been supplied on the Learn Server and you may find this helpful in producing an appropriate design.



#### Scope of the design

The design will only need to consider the high-level functionality of washing machine and not the low-level device drivers (the software needed to interface with the various inputs and outputs of the washing machine simulator). The interface to the hardware through device drivers will be written in task 2.

A washing machine is normally capable of running a number of different programs each consisting of a number of stages (fill with water, heat, wash, spin etc). As the customer will require a different set of programs for each individual washing machine model, the specifications of the wash programs and the drum function for each stage of the wash program are not provided. However, your design will need to allow for programs to be incorporated at a later stage when being tailored for a particular washing machine model. This will be further considered in task 3.

#### Washing machine control program operating specification

In the simulator, the program is to be selected by means of the three program selector buttons. The selected program is indicated on the three program LEDs as a binary encoded number.

Pressing the accept button will start execution of the relevant program. The system should use timers to define the duration of each stage. Further use of the accept button should cause the program status to advance by one stage for each press.

As the program executes, the 7 segment display should indicate the stage the program has reached.

Pressing the cancel button will interrupt the program, causing it to pause. Pressing the accept button at this stage will cause the program to resume. Pressing the cancel button for a second time will cause the machine to reset.

If the door is not closed (this will be indicated by a door indicator LED embedded in the door switch becoming illuminated) when the accept button is pressed the machine will not start and a brief warning will be sounded on the buzzer.

If the door open/close switch is operated during a wash program, the buzzer sounds briefly and the program is suspended until the door is closed again. If the user presses cancel during the suspension, the machine resets.

If you need clarification of any aspect of the specification please consult with the customer (me). Make sure you document in your report any agreed additions or changes to the specification.

### **Deliverable**

A report describing your design, to include the following.

- Title page.
- Statement of group members' contribution using the standard coursework cover sheet (under 'Coursework Submission and Cover Sheets' in the Departmental Information section on LEARN). You will be deemed to have signed the form and to agree with the split of effort by submitting.
- The final specification you used for your producing your design. Note that your design diagrams need to satisfy this specification.
- Your design diagrams, to include appropriate structural and behavioural descriptions. Which diagrams to include is left for you to decide, but make sure you cover fully both the structural and behavioural aspects of the design.
- Discussion and clarification of the design diagrams as appropriate.

### **Marking scheme**

The report will be marked out of 30. The breakdown of marks will be as follows.

- Presentation, structure and content of the report (6)
- UML diagrams form a coherent set and meet the specification (8)
- Structural diagrams (8)
- Behavioural diagrams (8)

### **Submission**

Online submission to LEARN of the report as a single PDF file.

**David Mulvaney**

**12 October 2017**