UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
School of Electrical and Information Engineering
ELEN7045 – SD Methodologies, Analysis and Design

Coffee Machine Problem

Requirements 1

Your group have just won a bid to design a custom coffee vending machine for the employees of AmaFijet Works to use. Arnold, the owner of AmaFijet Works, like the common software designer, eschews standard solutions. He wants his own, custom design. He is, however, a cheapskate. Arnold tells us he wants a simple machine. All he wants is a machine that serves coffee for R 5-00, with or without sugar and creamer. That's all. He expects us to be able to put this little machine together quickly and for little cost. You get together and decide there will be a coin slot and coin return, coin return button, and four other buttons: black, white, black with sugar, and white with sugar.

Thinking About the Problem; Communicating the Solution

Draw a diagram or diagrams answering the following:

- What are the *components* of this system?
- What are their *key responsibilities*?
- Which components *communicate* with each other?

Driving these design decisions is the need to provide a *service* — coffee for R 5-00.

Requirements 2

After five machines are installed and have been operating for a while, Arnold comes along and says, "I would like to add Milo, at R 5-50. Change the design." You agree to add one more button for Milo, and one more container for Milo powder.

Create a *new* diagram for your coffee machine based on the new requirements.

How have these changes affected your design?

Requirements 3

Arnold comes back a while later with a brilliant idea. He has heard that some companies use their company badges to directly debit the cost of coffee purchases from their employees' paychecks. Since his employees already have badges, he thinks this should be a simple change.

How many components does this affect in your design?

Requirements 4

People are starting to buy Seattle Coffee Company lattes instead of Arnold's coffees. So Arnold wants the machine modified just slightly, so that he can create a "drink of the week." He wants to be able to add new drinks and change prices any time, to match his competition. He wants to be able to add espresso, cappuccino, latte, choco-latte, steamed milk — in short, anything he can mix together.

Redesign (redraw) the coffee machine to support these new services. What do you notice about the abstractions in this new design?