Chapter 7

Additional Case Study Work, Exercises and Projects

7.E Write use case descriptions for the additional use cases given in the use case diagram above (those relating to the Production Planner, Costing Clerk and Factory Manager actors). Make any necessary assumptions to flesh these out. Draw communication diagrams for each use case and extend your analysis class diagram so that it includes any additional classes and associations.

7.F Working out an accurate cost for a product involves more than the costs of production. It is also necessary to obtain up to date costs for the various raw materials used as ingredients in the factory. For FoodCo, many of the raw materials are vegetables grown on the company's farms. For this reason, it is planned to introduce a farm costing system soon after the initial production costing system is complete. Ken Ong has been sent to Home Farm to carry out some preliminary analysis. He begins by talking to Aldo Higgins, the Farm Manager, about how the main farm operations are organised. The following transcript is an extract from this interview. Read the transcript, then carry out the exercises that follow.

KO: Thanks for seeing me this afternoon, Aldo. I'd like you to begin by learning a bit about how the farm is organised, what sort of things you do. I really need just an overview for the moment.

AH: Well, let me see now. You probably already know we are quite a large arable farm, almost 2,500 acres under cultivation. All our produce is for FoodCo, so we don't get into some of the standard cash-crops like wheat and other cereals. We concentrate on vegetables like cabbage, carrots, leeks, courgettes and broccoli. If you can buy it in your supermarket and we can grow it in this climate, it's here on this farm. That includes a fair-sized market garden operation for the salads: lettuces, onions, cucumbers, peppers and so on. We grow these in plastic tunnels.

KO: One of the main thoughts for the new system that I will be working on is to try to get more accurate costs for all FoodCo products. How do you do your costing at present?

AH: Well, one basic unit of measurement here is the field. No surprise there, I'm sure. A field can have one or more crops in it. For each crop we keep track of essentially three things. First there is the cost of the seed. That's not usually a big proportion of the total, but we account for it all the same. Then there is the labour for planting, spraying and harvesting. And last but not least, there is the cost of the chemicals we apply to the crop while it is growing. This is mainly fertilisers and pesticides. Add those three together, plus a bit for the general overheads, and there's your cost for the crop.

KO: How much difficulty do you have with this? I'm asking this because I want to get a feel for how great the benefits might be if we automate some of the task.

AH: To be honest, I would love some independent evidence of our efficiency. There have been so many arguments about production costs in general. I know we do a good job here, but it's very hard to prove at Management Team meetings. It takes me hours and hours with a spreadsheet to produce any useful figures, and that's usually in my own time at the week-end. Then the other managers argue that my figures are unreliable because I produced them myself. So anything you can do to confirm what is happening will be very welcome.

KO: I'm sure we can come up with something that will help. Let's go into a little more detail. You say there are three essential elements to the cost: seed, labour and chemicals. How do you currently collect your data?

AH: I keep a record card for each crop. Most of the data on the cards comes originally from farm timesheets.

KO: How does that work? Are they a weekly or daily thing?

AH: They're weekly. Each farm operative records their hours, split down to show how long they've spent on each crop, and what they were doing to it. They also put down the quantity of seed used when the field is planted. If any chemicals are used, these are also shown on the timesheet. But we have an independent check on chemicals from the CII forms.

KO: That sounds rather formal. What are they?

AH: It is quite formal. CII stands for Chemical Input Instruction. They're also a real hassle, but we haven't got any choice. Supermarket buyers are so fussy about the levels of chemicals we use that we have to employ a firm of independent consultant agronomists. They inspect our crops periodically and issue an instruction that tells us exactly how much of each chemical to use.

KO: Right, I think I've got that. You have fields, that may be subdivided to grow more than one crop. Each crop has a cost made up of seed, labour hours and chemicals. The chemicals can be either fertilizers or pesticides, and you have to keep careful track of the quantities applied. Do you also keep track of who works on which crop?

AH: Well, this information would be there on the timesheets, but I don't need to know. I'm only interested in the total labour hours, and the grade of the operatives. I need the grade to work out a cost, because sometimes the farm foremen drive tractors and operate the machinery. Naturally, they're a bit more expensive than the ordinary workers.

KO: Thanks. Now, once you've collected all this data, can you tell me how you analyse it in your spreadsheet? I'm really interested in what kinds of figures you have to present at Management Team meetings.

AH: I suppose the most important is …

First identify the main use cases and write use case descriptions. Then draw a communication diagram for each use case. Next, convert your communication diagrams into use case class diagrams. Finally, collate these class diagrams into an initial analysis class diagram for this new system. Include in your models any operations and attributes that you think are justified by the information in the transcript.