INFS600 Data and Process Modelling, Semester 2, 2017

Individual Assignment
Object-oriented Analysis and Modelling

Iteration	Content	% Grade	Due
Iteration 1	Requirements Analysis & Use Case Modelling • *Questions 1 & 2*	25% of assignment	22nd August, 11:59pm (Tues, Week 6)
Final Iteration	Requirements Analysis & Use Case Modelling • *Review Questions 1 & 2, 4* Class Analysis & Modelling • *Questions 3 & 4* Behavioural Analysis & Modelling • *Questions 5*	75% of assignment	15th October, 11:59pm (Sun, Week 11)
Assignments Total Contribution to final grade:35%			

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1. Introduction to Assignment Requirements

Goals & Overview

This assignment is designed to provide students with practical exposure to software requirements engineering activities including the development of relevant data and process models using UML.

This is an **individual** assignment. It provides an opportunity for students to apply to a larger case study the principles discussed in class and practiced in exercises.

The case study is described in detail in Section 2. Students can ask for additional clarification of the case study in class times that are set aside for that purpose or using the AUTonline discussion forum set up for the assignment. All questions and all responses will be visible to everyone enrolled in the course. Questions may be posted anonymously.

The questions are set out in Section 3. Section 4 describes the submission details and dates. A marking guideline is provided in Section 5.

Expectations

The assignment includes 5 questions and will be delivered in two iterations in line with an agile approaches to modelling. Questions 1 & 2 will be delivered as iteration 1 and students will receive feedback on their submission both from an academic perspective and from the stakeholders' view of how well their goals have been captured. This will allow work to be updated based on that feedback for the final iteration submission. The final iteration will include all questions. The aim of the iterative approach is to help students to analyse the system correctly as a poor solution in the early stages will almost certainly lead to a system that is not fit for purpose if it is not reviewed and adjusted.

 It is expected that all submissions will be presented professionally using the tools and templates outlined and must be the individual work of the submitter. Any quotes or ideas from the work of others must be correctly referenced using APA 6th.

Tools & Templates

You are to use the specified **CASE tool, Visual Paradigm** for this Assignment. An introduction to this tool will be provided in class. You must also use the *Use Case Template* provided on Blackboard.

Late Policy

Late assignments will not be accepted.

Plagiarism

Plagiarism means borrowing from the work of another without indicating by referencing (and by quotation marks where exact phrases are borrowed) that the ideas expressed are not one's own. Students may use the ideas and information of other authors, but this use must be acknowledged. It is not acceptable to submit an assignment that is simply paraphrasing of extracts from other authors: the work submitted must include some intellectual contribution of the student.

Unauthorised Collaboration

Unauthorised collaboration means joint effort between students or students and others, in preparing material submitted for assessment, except where this has been pre-approved by the paper programme. Students are encouraged to discuss matters covered in classes, but the expression of ideas and arguments must be the student's own work.

2. Case Study

(La France)

Background

'Our Shared Garden' is a community food sharing cooperative in an inner city Auckland suburb. The group was set up in 2013 after two neighbours attended a talk by Debbie Swanwick (Soil & Health – Organic NZ) at the Green Living Show. Debbie's talk was entitled 'How New Zealand communities are taking back control of their food supply. (Organic NZ. 2013) Debbie's talk inspired the two neighbours to do something in their community.

The two contacted others in their neighbourhood who had gardens or fruit trees and 'Our Shared Garden' was set as a result. They have operated as a growing collective since 2013 and have over that time agreed on a set of rules and elected coordinators. They have set up a Facebook page which they use to communicate and swap surplus food. Activities over the last four years have also grown. In 2015 they held their first Harvest Festival in autumn at a local park. It proved very popular and was repeated in 2016 when they added an additional Spring Festival as well.

Recent talks with a local charity that provides food for those struggling to feed themselves have inspired the coordinators to decide to expand their cooperative activities further. They have agreed that the simple Facebook page and the current additional paperwork no longer meets the needs of their cooperative. They would like to manage the whole of their cooperative online and need a purpose built system to support their plans. Your task in this assessment is to analyse and describe their requirements and to provide suitable models to support the proposed development.

The sections below have been prepared by the 'Our Shared Garden' cooperative to identify both the rules and processes they have developed and those they would like to add as they move forward. Stories from some individual members also highlight the ways in which they would like to use the system, and are provided as a way of broadening your understanding of their vision.

You should use the material provided here, along with classroom discussion and the Blackboard discussion forum to build your understanding of the cooperatives needs. On the discussion forum you should pose your questions to the members of the cooperative who can best provide the information you seek.

Cooperative Facts

Current members: 147 households, 2 not for profit food distributors, 23 Transport Angels

Coordinators: There are 5 coordinators elected from our members. Each is elected for a two year term after which they must be reelected if they wish to continue in the role. We hold an election each October for as many new coordinators as are needed. We would like this to be handled by the new online system, including allowing members to choose to stand as a candidate and resign from a coordinators role. We want members to get election notifications, voting and declaration of a result and candidates to be able to send approved election material to voters.

Credits: We operate a system of credits for our members. No money is ever involved in our food swapping or donating processes. Members can decide between advertising their food for direct swap where no credits are involved (for example, I want to swap 4 kgs of lemons for some garlic) and/or they can attach a credit value of their choice to a product so that other members can use previously acquired credits to pay for the food. Donations involve no credits and are only made to the 'not for profit food distributors'.

Membership: New members currently apply using a paper-based membership form. Copy attached. We would like to handle all our membership applications online form now on. There is a small annual membership fee - $15 per household. The annual membership fees are waived for Not for profit food distributors, Transport Angels and Coordinators. This small fee will cover the cost of a service provider and any maintenance needed in future for our new system. We plan to crowd source the funding to develop the actual system. Our household members need to live within our community but we are more flexible for Not for profit food distributors and Transport Angels.

Partners: Since we started our two festivals we have also had partner organisations. Generally they provide a product or a service that is of interest to our members, usually at a discounted rate. They participate in our festivals with stalls, workshops etc.

Noticeboard: We currently also operate a Noticeboard in conjunction with our Facebook page. We would like to continue this feature. Members use it to communicate things other than food swap related things to other members. For example, to put up a notice to see if anyone is interested in sharing transport to an Eco Festival on the other side of town or to look for a babysitter.

Member Stories

Tina Lee.

Hi, I am Tina and I am a chef at a busy restaurant in the central city. Our household consists of myself and 4 flatmates. Two of my flatmates also work in hospitality and two are Uni students. We joined OSG a year ago. We have several fruit trees and grow a large range of herbs, salad greens and garlic. We like to swap our excess produce for other available vegetables to manage our shared food costs in the flat.

We also sometimes donate surplus salad greens to the charity organisations. We like the fact that we can build up some credits in summer when our greens grow and use that to get some basics like root vegetables for soup in winter. As we are all very busy, a good online way to achieve all these things would be great.

Eruera Williams

My partner Sue Paratene and I have been part of the cooperative since the start. Sue loves to grow veges and to make jams and pickles from our produce. It has been a great benefit to be able to swap these for things like fruit which we don't have and which our three kids love.

Additionally, as I work from home I have more flexibility than Sue who has a 9-5 job, I also operate as a Transport Angel. This is something I really enjoy. I collect donated food from members and take it to the 'Not For Profit' (NFP) they are donating it to. I love the opportunity to chat with members and I am also doing some volunteer work now for one of the NFPs. It will make my Angel role much easier if the system lets me elect which transport jobs I can do and if it also gave me a handy location map both for the donating member and the NFP delivery site. Some NFPs have more than one delivery site.

Cara O'Sullivan

I am the food sourcing coordinator for Rourou, a non-denominational not for profit that provides food baskets to those in need. We really appreciate the food donations from the Our Shared Garden Cooperative. They have really improved the amount of fresh nutritious food we are able to provide for our clients. We also appreciate that they organise to transport the food to us as well.

What we most look forward to with the new system will be a way for us to publicise the particular food that we lack at any time or to make it clear what we don't want as we already have a too many of them. My life would certainly be much easier if I can make this clear within the system

Jayesh Lal

I have been a coordinator for OSG for 3 ½ years. I will probably stand down at the end of my current 2 year term because while I have really enjoyed the role it has been quite a lot of work and I would like to have more time to work with Simon in our garden.

I envisage the new online system as being a enormous benefit to future coordinators by getting rid of the paper work and supporting many of the tasks we do ☺

At present I am handling new applications for membership. People, households and organisations can apply to be different sorts of members. They complete our membership application form which I believe you have a copy of. I then contact them and once I am happy I can approve their joining and let them know our bank account number to pay their fee (if they are liable for one). I see no reason to change the bank system as that works well and I don't think we want to deal with an online payment system etc. As soon as I confirm the fee is paid, I approve them as members. It would be great if the application and confirmation process could be part of this system. I also handle any resignations (so far only people who move out of the area) and they should be able to do this online as well.

Sina James
This is my first year as a coordinator for OSG though my family have been members for 3 years. Mostly I work on organizing the festivals. I also approve new partners and try to ensure we get a mix of different possibilities for our members. Partners can have stalls at our festivals and will often do things like run workshops or pay for a speaker we cannot afford to bring here. They are great. At the moment I mostly deal with them by phone. However, it would be much easier to provide information for them in one place online and give them a straightforward way to contact us. That way I could easily put up dates for the next festival, deadlines etc and keep them informed without having to send individual emails or phone them.
This year I will also help Clark, another coordinator, with organising the election process for coordinators. We currently use a postal voting system which asks members to rank the candidates according to their preferences.

Current Membership Form

Membership Application

Applicant Name: _____

Address: _____
_____

Email Address: _____
Phone : _____

Type/s of memberships wanted.

☐ Household

Household name: _____
Other household members names: (Please just add names for each adult member below)

☐ Not for Profit

Delivery sites: _____
_____
_____
_____

☐ Transport Angel

Type of transport: (eg, car van etc) _____

3. Questions

Question 1 Identify Stakeholders & Elicit Requirements (39 marks)

Identify each actor involved in the new Our Shared Garden (OSG) system. For each:

a) Write a brief description of the goals of that actor.

b) Describe one scenario in which this actor uses the system to achieve one of their main goals.

c) Develop a set of key functional user requirements using an appropriate semi-formal grammar for the actor.

d) Identify any non-functional requirements, using an appropriate semi-formal grammar.

Question 2 Identify Interaction between Users & System (21 marks)

a) Using the Visual Paradigm CASE tool, create a new model and name it '(Your full name) INFS600 Assignment'. Develop a use case diagram for the OSG system. Make sure that the use cases cover the requirements identified in Question 1.
- Identify all association relationships between actors and use cases.
- Show any <<extend>> and <<include>> relationships between use cases.
- Describe any assumptions you have made in a text note in the diagram.

b) Using the provided Use Case template complete **one** important use case for each actor identified. Be sure to consider what each actor's main goals are for the system so that you identify a use case that has high value for them.

Question 3 Model System Interactivity (20 marks)

One of the important goals for the OSG system will be to manage the cooperative's elections for coordinators.

a) Describe a scenario where a coordinator triggers an election. You will need to think about how candidates identify themselves, and how they communicate with members about their policies. Consider also how the election is held and how results are determined and shared with members.

b) Develop an Activity Diagram for the election scenario you have described in your Visual Paradigm model.

Question 4 Review Update (15 marks)

After submission of Questions 1 & 2 you will receive feedback on your work. This question requires you to update your work based on that feedback before you continue with the remaining questions. It is important to have quality requirements on which to base your modelling. Marking for this question will be based on how well you have used the feedback provided to improve your work for questions 1 & 2.

a) For each document or model produced for Iteration 1 that requires change, create a new version of the artefact to apply the changes to. For example, if you need to adapt your Use Case Diagram then save a copy of your Visual Paradigm model as '(Your full name) INFS600 Assignment v2'. For the final iteration submission you will

be required to submit both your initial version and the adapted version.

Question 5 Domain Model (35 marks)

Develop an OSG domain model that identifies the classes that will be needed and captures the relationships between them.

a) For each class create a CRC card, using the provided template, to identify the class's main responsibilities and collaborators.

b) Create a Class Diagram (in your Visual Paradigm model) to show all your classes. For each class identify the important attributes. Show all relationships between your classes and indicate their multiplicities. Be sure to consider whether using inheritance will help you to generalise any classes.

Question 6 Behavioural Models (30 marks)

a) Develop a Sequence Diagram (in your Visual Paradigm model) that shows the interaction necessary for a member to exchange existing credits for advertised food. Ensure that you show all the objects that need to be involved and that each message is named.

b) Develop a State Machine Diagram (in your Visual Paradigm model) that that illustrates the interesting events and states for an object that is an instantiation of one of your classes. Ensure that you show all state transitions and label clearly with the name of the event that triggers the transition. You **must** obtain approval from your lab teacher for your choice of object to describe. Answers with no recorded approval will not be marked.

4. Submission Instructions

Iteration 1 (Questions 1&2): Due 22nd August, 11:59pm

Detailed instructions will be provided in class and on Blackboard.

Final Iteration (All questions): Due 15th October, 11:59pm

Submit as for Iteration 1. Remember that for all updated material you are required to resubmit your original version as well as your updated version.

References

La France M. (nd) *Vegetables and fruits from my garden.* retrieved from http://www.publicdomainpictures.net/view-image.php?image=28799&picture=fresh-vegetables&large=1 License: CC0 Public Domain

Organic NZ. (2013) Food Co-operatives in New Zealand on the rise. Retrieved from http://business.scoop.co.nz/2013/05/31/food-co-operatives-in-new-zealand-on-the-rise/

5. Marking Guidelines

Assignment Marking Schedule, Iteration 1, S2, 2017

Question	Criteria	Max Mark	Feedback	Mark
1	a) Identifies each actor. Includes description of their goals.	5		
	b) Describes clearly and correctly one main scenario for each actor.	10		
	c) Provides a set of key functional user requirements using an appropriate semi-formal grammar for each actor. • User requirements written from the perspective of the user. • Meets criteria for good user requirements (e.g. testable, concise, not ambiguous)	20		
	d) Identifies non-functional requirements, using an appropriate semi-formal grammar.	4		
2	a) Visual Paradigm use case diagram provided. • Covers the requirements identified in Question 1. • Identifies all association relationships between actors and use cases. • Shows any <<extend>> and <<include>> relationships between use cases. • Assumptions described.	6		
	b) One full Use Case provided for each actor. Covers a high value goals for them. • Correct template used. • All parts of use case present and correct.	15		
		60	Total Marks	

Assignment Marking Schedule, Final Iteration, S2, 2017

Question	Criteria	Max Mark	Feedback	Mark
3	a) Describes election trigger scenario. Covers all required aspects: • Candidates identify themselves. • Candidates can communicate with members. • The election is held, results determined and shared with members.	10		
	b) Visual Paradigm Activity Diagram provided, using case tool and correct.	10		
4	a) Updated version of Q1&2 provided. Original version of all material included.	15		
5	a) CRC card provided for each candidate class. • Identifies the class's main responsibilities and collaborators.	10		
	b) Visual Paradigm Class Diagram provided using case tool. • Shows important attributes. • Includes all relationships and multiplicities. • Includes any useful inheritance.	25		
6	a) Visual Paradigm Sequence Diagram using case tool provided and correct.	15		
	b) Visual Paradigm State Machine Diagram provided for approved object.	15		
	Total Marks possible	100	Total Marks	