



## SCHOOL OF DESIGN, ENGINEERING & COMPUTING

### ASSIGNMENT – 2011/12

**Course:** Computing Framework  
**Year:** Final Year (Level H)  
**Unit:** Software Systems Modelling

**Assignment Number:** 1 of 1  
**Unit Leader:** Keith Phalp

**Issue Date:** 25/10/2011  
**Due Date:** 28/11/2011

#### **This is an individual assignment**

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This assignment forms the coursework for this unit, and covers (or partially fulfils) learning outcomes, 2, 3 and 5.

1. Demonstrate expert knowledge of the changing nature of software-intensive systems.
2. Select appropriate techniques systematically from the range of methods and tools available to develop such systems.
3. Demonstrate expertise of object oriented modelling, and apply the Unified Modelling Language (UML) to produce appropriate software design models for software-intensive systems.
4. Apply Model Driven Architecture (MDA) and patterns in order to create designs for business applications effectively.
5. Understand the professional issues, implications and impact of the production of software systems models.

The weighting of coursework to examination is 30:70, so this coursework counts for 30% of the total unit mark.

**Deliverables and Assessment Criteria / Marking Scheme**

You have been given a brief description of a particular scenario, and have been asked to produce a number of deliverables, for the software systems design.

**A: Design Models**

You must produce design models which will enable the readers of your design to be able to implement the subsequent system.

In doing so, you must ensure that both the static representation of the system is clear and that the interaction among system elements (e.g., objects or modules) is also depicted clearly. This depiction of interaction might require models which show specific sequences of events, or particular dependencies, e.g., one event needing to occur as a pre-requisite for another. (60 marks)

**B: Analysis of Scenario**

It is often the case, as a professional software designer, that in analysing a given scenario you uncover ambiguities or issues with the description.

Describe any ambiguities that you have discovered from your analysis, ideally relating this to the design models you have produced. (10 marks)

Similarly, as a software professional, where you have made design choices, it is often important to document the rationale for such choices, so that those that follow can understand the rationale for the design, or even, in different circumstances make changes. Hence, you are required to justify and document your decisions and choices. (10 marks)

**C: Choice of Design Models**

You must include a brief rationale of the choice of models (or diagram types) that you have used, making reference to particular features of the models that they allow you to describe.

Where possible, refer to relevant literature to support the choices made, or your arguments for why a particular approach has been adopted. (20 marks)

**Signature of Assignment Setter .....**

**Signature of QA .....**

## Breed Society System

You have been approached by an equine society to produce a bespoke software application to keep details of members, their horses, and various details on breeding.

The software must be able to produce certificates, and passports for animals. In addition, unlike existing products, your application must be able to predict features of offspring given certain genetic details of the parents.

*The members have heard much about the benefits of object-oriented software engineering, and their children have told them that they need to approve an analysis class diagram before going ahead, as well as other diagrams to describe the interactions among objects, and the dependencies (what actions are dependent on others).*

An owner may have a number of animals (horses or ponies). For each animal you must be able to record the full name, the breed, and, where the animal is already registered with another society, their breed registration. You also need to know the date of birth, colour, and height. Young animals (foals) may be male or female, being born as either fillies or colts. Males and females are born in roughly equal proportions.

Clearly, fillies become mares, but colts become either geldings (castrated males) or stallions. Typically, only males of particularly good breeding are left 'intact'. Thus, for practical purposes it is often simplest to separate sex into females, stallions or geldings. Whilst geldings are recorded and may be used in competition they will not have any impact on future generations. Nevertheless their success (or otherwise) might still suggest the value of certain breeding.

All animals may be used for competition, across a variety of disciplines, and history of success in either an animal or its lineage can add to value. Good females will often be used for breeding, thus can have a value as either competitive animals or as brood mares. Stallions are typically valuable for breeding, and a good stallion will command a hefty fee for stud.

Since many animals are imported it is also important to record the country of origin. Finally, since security is an issue many animals are freeze branded, or have microchips and thus it will be necessary to record such details with the society.

Aside from these basic details for the animal, it would also be useful to track any other useful information, perhaps by having the facility to add notes.

For each horse you would also record details of the sire (the father) and dam (mother). The details recorded for a sire or dam, are those recorded for a horse, and, therefore, include sire of dam, dam of dam and so on. Hence, your application should be able to give details such as the grand sire of a particular horse, and so on, perhaps over a number of generations. Of course, some horses registered by members may be the sire or dam, or even grand sire or grand dam of others. Hence, it should also be possible to find details of offspring of particular horses.

The proposed system must keep a record of the date of registration with the society. You must also know the owner or owners, and details of any joint owners. In addition, it

would be useful to keep track of different owners over time, and the society would definitely need to know when the current owner took ownership, and details (if given), of any previous owners.

You also need to record details of the breeder. For example, you may need to find information about horses by a certain breeder, and would additionally need breeder name, address, contact details, email, phone number and so on.

Owner contact details are also important, since owners, who are typically members, are the main stakeholders within the society. However, some members may not be owners, but may simply be supporters or enthusiasts. Similarly, there may be information, which the society keeps about certain horses, where the owner is not a member. Despite this, it is important to store information about membership subscriptions, and classes of membership. Members may join as individuals, or jointly, e.g., self and spouse, self and child, self and partner, as a family membership, or as a business venture, all at different rates. In addition, members are asked whether they would like to give a donation, and details of all payments must be kept. Furthermore, it is possible to have lifetime or long-term memberships in addition to a normal annual subscription.

Certificates have long been issued by the society. However, now that passports are a legal requirement rules governing their issue by societies mean that it is more important than ever, that these be generated from accurate records.

To eliminate any errors the application must allow for automatic production of both certificates and passports. Information must include:

Certificate No: CrM/0001

Name: Horse Name

Sex: Filly

Foaled: 01/01/2003

Sire: Daddy Horse (Grandad x Grandma)

Dam: Mummy Horse (Grandad x Grandma)

Bred By: Mrs Bloggs, Bloggs Cottage, The Village, County, CR1 X23, Country

Finally, in order to reduce the manual input of data, it is the intention that a simple web-based form be used for members to enter details in the required fields. (Of course it is the ideal that the system and web site are integrated). The society already has a web presence and an active discussion forum. Such data may need to be validated before being entered into official records. However, the society would like to see any applications as being part of an integrated web-based solution, and would like to understand the process that a user would go through in using the web form approach. Hence, you must also describe clearly the envisioned processes and allowable navigation that you wish the site to employ.