ICT284 Systems Analysis and Design

Assignment 1

Worth:	15% of your final grade.
Due:	See LMS
Submit to:	LMS, via the Assignments tool. Submit as a single Word document including all parts of the assignment. Ensure you complete the declaration that is part of the submission process. You do not need to include a separate cover sheet but you should include your name and student number as part of your document filename. Your name and student number should also be included in the assignment document.
Late assignments that do not have an extension will be penalised at the rate of 5% per day. For example, if your assignment was 2 days late and the original mark was 65%, your final mark will be 55%.	

The assignment involves several exercises requiring you to carry out some systems analysis activities based on the material covered in Topics 1-4. The exercises are separate and do NOT form part of a single case study.

- You may need to make assumptions where information is incomplete: state any assumptions clearly.
- Your diagrams should be drawn using Visio or a similar tool, using the appropriate template for each diagram type. Diagrams should be pasted into the Word document.
- Your diagrams must follow the correct notation and naming conventions, and **each diagram should include a title and legend.**
- All the questions are worth equal marks.
- This is an INDIVIDUAL assignment.

1. Stakeholders and Requirements

The Youth Bowling Clubs Association (YBCA) is a loose group of children's ten-pin bowling clubs that compete with inter-club competitions regularly throughout the year. It is run on an amateur basis, and each week volunteers from each of the clubs present at a competition provide a referee and scorer for the competition. As the clubs are affiliated with bowling alleys, each club takes it in turns to host the competitions, and there is a rule that no club can have a scorer or referee at a competition they are participating in.

The Managing Committee of the YBCA have been organising the competitions informally for many years, and now want to put the officiating on a formal basis, which will be auditable by the Australian Bowling Association (ABA). They have passed a set of by-laws, and to ensure that the process works properly, and is fair, they have decided to commission a computer system – Official-Eze.

The Committee wants the Official-Eze system to automate the process of assigning referees and scorers, so that volunteers can have advance notice of when they are officiating at a competition, where the competition will be held, and the role that they will play there (scorer or referee). This will combine calendaring and scheduling with a mechanism for advance notice of unavailability and messaging to find a substitute official. The Official-Eze system will have a central secure database and be accessible through the web and mobile devices by the committee members, ABA and the volunteers.

Official-Eze needs to maintain information about the volunteers, including whether they have had training in refereeing and/or scoring, have a government clearance for working with children, and have a current first aid certificate. Obviously, it also needs to keep track of the various matches to be played throughout the season.

Official-Eze should send out text messages a week before a competition, and reminder messages the day before and the morning of the competition. Ideally it should enable a call on a GPS system (such as Google Maps) to show where the competition is being held and how to get there. If a scheduled official is unavailable for a match, she or he will be able to send a notification to Official-Eze, which will then call on remaining volunteers to assign a substitute.

(a) List the **stakeholders** for the proposed Official-Eze system, and in each case explain what their interest in the system is.

(b) List and briefly describe the **functional requirements** for the Official-Eze system as identified in the description.

(c) Using the FURPS+ categories, identify and briefly describe several **non-functional requirements** for Official-Eze. Address all of the categories (URPS+): if you consider that any of them are irrelevant, explain why.

2. Use case modelling: user goal technique

You have been asked to carry out **use case modelling** to identify the functional requirements for a new fitness watch targeted at swimmers, similar to those produced by Garmin or Polar. The target user is anyone from a recreational to a competitive swimmer, and both open water and swimming pool laps are to be catered for. The watch is to connect with an app that will provide a variety of additional features as well as those on the watch itself.

Use the **user goal technique** to identify all the use cases that would be relevant to a swimmer who would be a potential user of the watch. Use your own experience, or that of a swimmer of your acquaintance, together with any research you need to do.

(a) Present your list in a table giving the use case name and an informative brief description.

(b) Draw a **use case diagram** representing the same information.

3. Use case modelling – event decomposition technique

Use the **event decomposition technique** to carry out use case modelling for the Safe Crawlers Artificial Caving System (SCACS) described below. For each event you identify, name the event, state the type of event, name the resultant use case and give a brief description of it, and name the actors involved. Present your results in the form of a table with the headings:

Event	Type of event	Use case	Brief Description	Actors (only for external events)

Safe Crawlers (SC) is an artificial cave tunnel facility that operates at an outer suburb of the city, which enables people to learn potholing and caving in a safe monitored environment. It has 16 tunnels that interlink, with doorways between them to enable customers to experience up to 218 crawls, with 80 Grade 4 and 30 grade 5 caves. This is a new venture undertaken by a renowned speleologist, Frank Burroughs, who is keen to see SC grow and expand.

Safe Crawlers would like to implement an information system. The *Safe Crawlers Artificial Caving System (SCACS)* must manage the booking system for the caves, and maintain all information about customers, staff, and sessions. It must also manage the information about cave maintenance, and keep track of staff safety induction training.

Customers book online or at the SC centre. As the caving sessions are heavily subscribed, customers are sent reminder texts about their booking the week before and the day before. Cancellation without incurring a charge is only possible up to 4 weeks before the session (after that the full price is payable). The SCACS is not required to handle any payment information as this is done by a third party system.

A single booking for a cave session can cater for a group of 1 to 10 people, and must be accompanied by a trained staff member if anyone in the group is under 13 years of age. The staff member who acts as leader (i.e. goes through the cave first and has the rope affixed) must have had a full safety induction within the last 3 months. The SCACS must ensure that all

staff satisfy 'leader' requirements by recording training dates, and sending Frank an email one week before any staff member's induction lapses. This relevant staff member also requires an alert at the same time.

All customers must also meet various conditions: be under 70 years, not be pregnant and not have claustrophobia or breathing complaints. This is confirmed when they book, along with name, address, and contact phone number, and the date and time of the session required. Group bookings always need a primary contact. Details of all customers in a group are required, and all customers must sign a statutory declaration that the information they provide is true. Insurance and OHS requirements mandate permanent storage of these declarations.

Each caving session is booked out at 1:30 hours, with 15 minutes preparation time, and 5 minutes clean-up time.

Cave sets 1 and 2 provide the basic caving experience, while 'wet' cave sets 3 and 4 also have the ability to be semi-flooded so that the customers can prepare for caving in river caves, including wearing breathing equipment. These 'wet' cave sessions are more expensive than the basic ones, and there is a requirement for the customer to have a swimming competency certificate, which must be sighted when they book.

Safety and comfort of customers is obviously paramount for SC. Between each session an inspection is made of the caves (including physical damage, cleanliness and hygiene, any dropped belongings from the previous session, etc). There is also a technical check of the equipment (ropes and breathing equipment) before and after each session. These checks are noted by the system.

There is a full check of the caves by a service engineer at the beginning and end of every working day, and, in addition, each cave must be fully serviced every three months or every 50 hours of use, whichever is sooner. This takes 2 days, so to keep the centre open Frank tries to stagger the downtime so there are always at least two caves in service (one basic and one 'wet' cave). While a 'wet' cave is being serviced the drainage system on the flood chambers is also inspected.

The hours of cave use are logged by the SCACS, by adding the number of session minutes to the usage log at the end of each session. When a cave reaches 50 hours of use it is removed from the booking system until the service has been completed (which may not take place immediately). If there are less than 10 hours of bookings over the next two days, these are allowed to take place, but no cave can operate for more than 59 hours without a service. The system records when the cave will be 'bookable' again. Then the number of usage hours is reset for the cave. The information system also records the dates, times, and details about each service.

Several reports will be required of the new system. The SCACS must be able to provide an ad-hoc status report on each cave, showing whether it is in use or being serviced, its current hours of use and date of next scheduled service. Frank would like a report showing the customer usage of the caves so that he can see what are the most popular times of year and types of bookings and plan for expansion.

4. Domain modelling

Draw **a UML domain model class diagram** for the system as described here. Be as specific and accurate as possible, given the information provided. If any information you need is not given explicitly, make realistic assumptions and document them.

Everything for Dogs is a new business that brings together people who are prepared to offer a service for dogs with dog owners looking for that service. Dog lovers offer boarding (in their own home or the dog's home), dog grooming, dog walking and dog training. Owners register on the website and search the Everything for Dogs database to find a suitable service provider in their local area, and contact them to discuss making a booking. If the service provider and the owner are happy then a booking is made. The service providers charge a rate for their service, but the system does not handle the payments.

Everything for Dogs needs a new system to keep track of the owners, dog lovers and services provided. The systems analyst has commenced the requirements analysis and has provided a set of notes for you to draw a domain model class diagram, as follows:

- The dog lovers providing the service may be boarders, walkers, trainers and groomers, or indeed all four.
- Information held about the dog lovers is their name, address, suburb, contact phone number, email, and details about the different services they provide along with the rates charged for each service.
- The dog lovers offer a range of services. Dog sitters have an own home and dog home rate per day; dog groomers have separate charges for wash, trim, nail clipping; dog trainers offer beginner, intermediate and advanced training courses, while dog walkers offer short and long walks.
- Information held about owners is their name, address, contact phone number and email.
- Each owner may have many dogs. Each dog has its name, breed, size, and age recorded, along with any special notes about it.
- Each booking is for a single dog or group of dogs belonging to the same owner for the same time period (e.g. an owner's two dogs may be booked for a wash and trim in the same booking, or may both be taken for a walk at the same time).
- The owner can add comments and a star rating to the booking after the service has been provided. These comments are used as advertising on the Everything for Dogs site and the star rating is used as one of the search criteria that users can use.