Tutorial Objectives:
- to develop further understanding of ER modelling
- to practise these modelling skills
- Start to discuss the case study for assignment 1.

Tutorial Task:

Draw an entity relationship diagram to describe each of the following situations. You may list any assumptions you have made about the "business rules" which apply.

1. The ACME Credit Card Company maintains accounts for either individual clients or companies. Each account is owned by either a person or a company. For each account, many credit cards may be issued.

   Each credit card is allocated an authorised holder. This means that any individual may have an account with one card for themselves and a second card for their spouse. In addition, that individual may also have a credit card owned by their company and held for them for their expenses.

   Each credit is embossed with a valid-from date, an expiry date, the account number and the name of the authorised holder. There are three different types of credit card, each with different limits and payment terms.

2. The Monash Soccer League consists of a number of clubs which compete against each other in the winter season. There are currently ten clubs each of which has several teams. Each team has eleven players and during the season players in a club may play in several of the teams. Each team has one of the players as its captain.

   There are two types of team, senior and junior. Each team has one coach and some of the coaches coach both senior and junior teams.

   During the season, each team plays several matches and, of course, each match is between exactly two teams. Many of the clubs have several soccer pitches and each match is located at one of the pitches of the opposing teams.

3. Cutprice Airlines offers flights throughout Australia. In order to travel on Cutprice Airlines, passengers need to purchase a ticket from a travel agent. The ticket has the date of issue and the full price printed on it and contains many coupons. Each coupon is for a particular flight and contains the departure date and time of the flight. For example, a ticket from Melbourne to Cairns contains two coupons. One coupon is for the flight from Melbourne to Sydney and the other coupon is for the flight from Sydney to Cairns.

   Each flight is scheduled from the predefined routes which are offered by Cutprice airlines. For example, the route from Melbourne to Sydney is a popular route and has many flights scheduled each day. Each route is allocated a unique route number and has a prescribed departure airport and destination airport. Each airport is identified by a three character code and is described by its name and location.

   Each flight has a particular aircraft allocated to it well before the departure date. Prior to boarding the aircraft, passengers are allocated a seat on the aircraft. Each seat on an aircraft is identified by a seat number and seat type (first class, business class, and economy). Each coupon therefore relates to exactly one seat.

4. Glen Waverley golf Club
The following is a logical description of a desired system. The task is to track golfers and rounds of golf, including computation of match rankings.

The members of the Glen Waverly golf club regularly compete in matches to determine their comparative ability. A match is played between two golfers; each match either has a winner and a loser, or is declared a tie. Each match consists of a round of 18 holes with a score kept for each hole. The person with the lowest gross score (gross score = sum of all hole scores) is declared the winner. If not a tie, the outcome of a match is used to update the ranking of players in the league: The winner is declared better than the loser and any golfers previously beaten by the loser. Other comparative rankings are left unchanged.

The application should keep the following information about each golfer: name, club ID, address, home phone number, work phone number, handicap, date of last golf round, date of last golf match and current match ranking. The application should furthermore keep information about the details of the golf course. The information that should be recorded for each of the holes are: length of the hole, number of strokes considered a par, the difficulty index for the specific hole. Experts determine the index for each hole. The most difficult hole on the course is index 1 and the easiest is index 18.

Each round of golf should also be tracked including golfer’s club ID, name, scores for all 18 holes, total for the round, match indicator (ie. Yes or No), match opponent ID (if indicator = Y), winner of the match, and date of the match. The application should allow golfers to input their own scores and allow any legal user to query any information in the system. Only the system should be allowed to change rankings. Only club employees should be allowed to correct data entry errors in data entry for winners or losers. Members of the golf club would like to implement the Stableford system for golf scoring in the future. The Stableford system is a points system and uses a hole's difficulty index and a golfer's handicap in determining the winner of a match.

A heated debate has been going on between different members of the club. Some members are opposed to the idea that any one can make enquiries about all information in the system. Other members of the club do not see any problems with the proposed system.

(Case study adapted from Conger, S., 1994. The new software engineering, Wadsworth Publishing Company, California, USA)

**Extra Exercises**

1) This scenario describes the activities of the Information Technology faculty in a university. Students take courses in the university. The courses are run by departments. It is possible for a course to be run by more than one department. Each course consists of a number of units. Lecturers teach the units, and in some circumstances more than one lecturer will teach a unit. Lecturers, of course teach on more than one unit. Since the introduction of 'modular' courses, it is possible for one unit to be included on more than one course. A lecturer may be a course leader for a particular course.

2) Retro Homes is a building company employing both permanent and contract staff. The main activity of the company is building houses which recapture the feeling of bygone days on land it acquires cheaply. Once the land has been purchased, the land is known as a 'site' and details of it such as area, cost, vendor etc. are kept so that management decisions can be assessed. Several houses are built on the site; the number and style are determined by the location, the land size, target market and the physical assets of the land e.g. trees or ponds. All houses are built to an individual design created by an architect. Information on each house such as number of bedrooms, style, sale price etc. is recorded, again so that management can review their decision making and also monitor costs. In order to maintain quality, only building materials which have been approved by the quality assurance manager can be used to build the houses. Records are kept of the approved materials. All the materials which are used to build a particular house are itemised and then purchased from the cheapest supplier. The items (bricks, cement, kitchen units etc.) are noted on a list which also contains details of the supplier and cost. A list of suppliers containing nature of business, telephone number and address is maintained. Once the houses have been built, they are marketed directly by Retro Homes. Houses are sold directly to the purchaser (or in some cases joint purchasers) without involving estate agents. Details of purchasers are kept on file