Advanced Diploma in IT Systems Analysis and Design: Assignment Three.

Acceptable file types: docx, txt, html, htm, jpg, jpeg, gif, rtf, ppt, xls, zip, doc

Maximum number of files: 10
If there is more than one file, please combine in a single zip file.

Total marks for this Assignment: 100.

This assignment is based on a scenario which has been constructed to provide assessment of a range of topics covered by the unit. There is therefore a degree of artificiality in the scenario, and in the way in which the information is presented.

You are asked to assume that the data model has been agreed and you are given an entity relationship diagram and the names of the attributes of some of the entities. You are not, however, given a detailed data model (for example, including domains, data types and constraints) because we ask you to make decisions about these things in the assignment.

In order to limit the amount of routine work involved in the assignment some attributes you might expect to see (for example the address of a person or an organization) have been omitted. We do not expect you to identify additional routine attributes of this type.

We do, however ask you identify some of the attributes that are required to implement
keys and the required relationships between relations.

The scenario (Newtown Swimming Club) on which the assignment is based is provided in the appendix to this document.

Question 1 [10 marks]

In this unit you were asked to work as a small team to explore the definition of a formal schema. From your involvement in that process please say (briefly, maximum of 200 words)

- Reasons why you thought the exercise helped (or did not help) you understand the subject.

- What problems arose (or might have arisen) when drafts of a diagram or schema definition were shared and amended.

Question 2 [15 marks]

This question is based on the Newtown Swimming Club scenario and covers the material in topic 1 of the unit

2(a) Different classes of user will require different levels of access. Explain how these levels of access can be implemented through:

(i) the database design
(ii) the user interfaces

(400 words) [8 marks]

2(b) Identify any risks to the data, or other misuse that might occur, despite anything you propose in part (2a), and suggest policies or technologies to address them.

(300 words) [7 marks]

Question 3 [20 Marks]

This question is based on the material in topics 2 and 3

Produce a formal schema for the Newtown Swimming Club database, using the methodology introduced in topic 3 of the unit. The schema should *include* the definition of all relevant keys and any constraints that can be enforced by key or domain definitions.

You do not need to include any user-schemas in your answer.

Question 4 [20 marks]

This question is based on the material in topics 2 and 3.

(a) Identify in ordinary language the constraints set out or implicit in the scenario.

[4 marks]

(b) For each constraint provide a definition using one or more relational algebra expressions.

[You may have defined one of these constraints by a domain or attribute definition in question 3 and if so, there is no need to provide a further definition of it here.]

[16 marks]

Question 5 [15 marks]

This question is based on topic 4. It asks you to produce the SQL expressions that would be used to implement and query the database designed in question three. For each part of this question include in your answer the SQL expression which would produce the required result. *You are not expected to implement the database and you do not have to produce any example output.* All we need is the SQL expression you would use to obtain the output

a. The Member with MemberID 2 has been upgraded from JuniorMember to member. Provide an SQL expression to make the database reflect this upgrade

[1 mark]

b. Provide a list showing member types and the number of members of each type. We do not want a list of names, but something like this:

[3 marks]

Member Type	Number
Senior Member	4
Member	9
Junior Member	5

c. List the Team Name, the Captain and all Members of the Red Team. (Your list can repeat the team name and captain).

[2 marks]

Team	Captain	Members
Red	Fiona Bell	Benjamin Dover
Red	Fiona Bell	Alfred Hall
Red	Fiona Bell	Penelope Black
Red	Fiona Bell	William Eckerslike
Red	Fiona Bell	Alfred Hall
Red	Fiona Bell	Frederick Bear

d. List the dates of sponsored galas showing for each gala the name of the venue and the sponsor.

[2 marks]

Date	VenueName	SponsorName
2016-04-22	OldTownBaths	DrinkCo
2016-04-24	NewSpa	DrinkCo
2016-04-28	NewtownBaths	SportsShop

e. Provide a list showing which members have participated in a gala at Newtown baths. Show the venue name, the date of the gala and, in a single column, the full name of the member. Here is a specimen of the desired output format.

[3 marks]

VenueName	GalaDate	Member
NewtownBaths	2016-04-28	Benjamin Dover
NewtownBaths	2016-04-28	Andrew Mann
NewtownBaths	2016-04-28	Alfred Hall
NewtownBaths	2016-04-28	Penelope Black
NewtownBaths	2016-04-28	Michael Stand
NewtownBaths	2016-04-28	Robert Innes
NewtownBaths	2016-12-10	Benjamin Dover

f. Show the number (just the number – not a list) of races entered by Benjamin Dover since 1st January 2016

[4 marks]

Name	Entries this year
Benjamin Dover	3

Question 6 [20 marks]

This question requires knowledge of all the topics but is mainly concerned with issues covered in topic 5.

Assume the system designed in question 3 was implemented, and has proved successful. The club has asked for the system to be made available over the internet so that users can access the database from home. The website already exists but you are asked to design either an addition to the site or a separate linked site, to provide access to the database.

(a) Explain the technologies involved and how they work together. (You may need to use code examples to illustrate your narrative, but we want a narrative explanation, not an implementation of the coding.

[16 marks]

(b) You have discussed security issues in question 1(b). Now the system is on line what further security issues arise and how would you address them. (If you think your answer to 1(b) already covers this question, explain why you take this view)

[4 marks]

[Your answer to this part should not exceed 1000 words]

Appendix

Newtown Swimming Club – Scenario for Unit 3 assignment

This scenario is rather artificial, being designed to test a range of topics whilst keeping to a minimum the routine work involved. As well as the narrative description you are provided with an entity relationship model of the data structure of the database, and you should ensure your answer reflects this model.

Some attributes you might expect to see (for example the address of a person or an organization) have been omitted. We do not expect you to identify additional routine attributes of this type. You may, however, need to assume some attributes in order to implement the relationships in the ER model.

Newtown Swimming Club has a large membership and runs regular training sessions on different days of the week and at different venues. From time to time it also organises public galas at which members compete in a variety of swimming events (or races). It is managed by a management committee drawn from senior sports personalities, local authority nominees and club instructors. It also has an Events Committee drawn from the members of the Management Committee. Both are supported by a secretary who maintains the database and uses it to carry out research and discover trends.

Each gala takes place on one day in a single venue and may be sponsored by a single local business. (There cannot be two or more galas on the same day). Members can ask to be entered into the races at a gala but it is the Events Committee that makes the selections, and a member cannot be entered for more than two events at the same gala. For each event there is a pre-determined qualifying standard and only members who have demonstrated to a

coach that they have reached that standard can enter the event at a gala. In each gala a particular event or race can only feature twice. During the gala the times and position in the race for each competitor are recorded (usually by the secretary but sometimes by a member of the Events Committee) in the RaceEntry records.

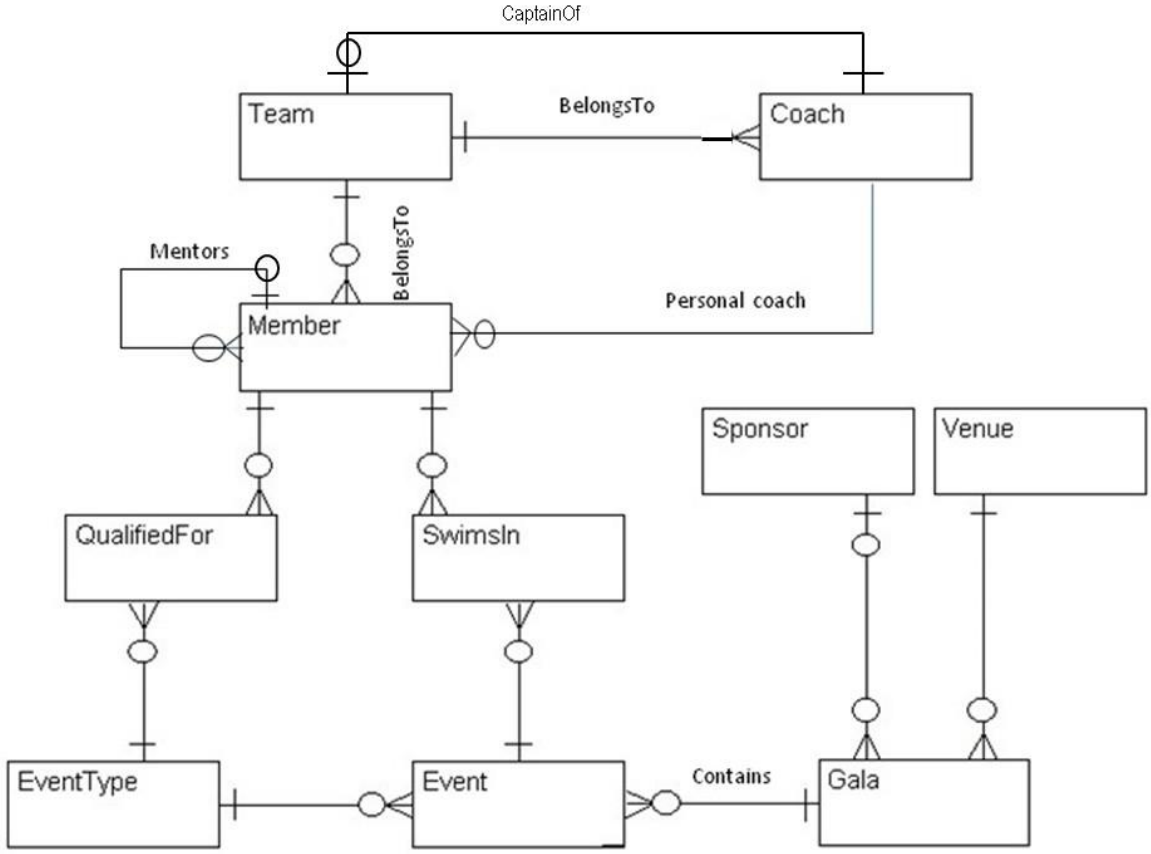
Members and coaches are allocated to teams, which have a name (e.g. Red, Blue etc.) and a captain (who is always one of the coaches allocated to that team). Each member is allocated a coach, who must be from the same team as the member.

As well as records required to implement the scenario outlined above, the club needs to record, for members: a first name, a last name, an email address, and a member type (NewMember, Member, or SeniorMember); for coaches and sponsors it needs to record a person or company name, and an email address.

All new members are paired with a senior member (called here a 'mentor') to help them learn the club rules and the club needs to record these relationships.

The initial requirement is for a database running on a laptop, but also accessible from other laptops in a local Wi-Fi network. (You do not need to consider the precise workings of this network, and should concentrate on the database.) Any member can view lists of forthcoming galas and can view the entries made so far for each event in the gala, but members cannot add or amend any data. A coach should be able to read and update records relating to qualifications and entries in gala events for any member in the same team. Only the team captain can add new members or amend membership status,

Galas are arranged by a member of the management committee but the related entries in the database are made by the club secretary who also manages the events and, where necessary, settles any disputes about entries in events.


CaptainOf
Team
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Coach
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Mentors
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Member
Sponsor
Venue
QualifiedFor
SwimsIn
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Gala