

## Part (b)

In this assignment you will practice database design. In Part (a) you will begin by working through a number of normalization problems. In Part (b), you will then apply principles of database design to transform your FunRun-based ERD into an Oracle database.

The Appendix shows a data model that you are to use as a starting point for this assignment. (NOTE: This data model is not a solution for Assignment 2; I have altered that solution in some ways to make it more suitable for this assignment.)

### ***Task 1 – From E-R Diagram to Relational Schema***

1. Step (1) Convert the provided data model (see Appendix), based on assignment #2, into a detailed logical data model.
2. Step (2) Convert the logical data model into a relational schema
3. Step (3) Make sure that all of your tables are fully normalized.

For Step (1), you will do the following things

- Choose a primary key for every entity. Review required and desirable qualities of a primary key. Briefly justify your choice of a primary key in writing for every entity.
- Transform many-to-many relationships into an associative entity (if any).
- Decompose composite attributes, solve multi-valued attributes, and solve attributes with more than value (e.g., collections) (if any).

Step (2) involves renaming columns in the physical data model so that they are more suitable for column names, defining data types and possibly domains for your attributes (providing a domain name, a data type, and possibly additional constraints). For this assignment, you don't need to display and show the data types and constraints at this stage, though you will want to be sure they are correctly reflected in Task 2. If you decide to use Oracle data modeler for this task, review tutorial 2 in week 4. Please note, this assignment does not require you to use Oracle data modeler, although I believe it will help you.

Step (3) is not something a tool can help you with. You may also normalize after Step (1) if you prefer. The business rules from Assignment 2 are still in effect. Whichever way you choose to handle normalization, your outcome will be (we hope) a set of well-defined tables. Please be aware that you may not have to normalize at all.

Define your relational schema by taking a screenshot of your ERD in Oracle data modeler and paste into a document, or use the following format example:

ORDER(ord\_id, ord\_date, ord\_total, cust\_id)

Here, the table name is followed by column names in parentheses. The primary key attribute(s) is(are) underlined, and the foreign key attribute(s) is (are) in red.

## ***Task 2 – Implementation***

### **Create the database**

Create a collection of tables in Oracle that conform to the relational schema you defined in task

1. Include any domain integrity constraints, referential integrity, etc.

### **Populate the database**

Add some data, minimum requirements, make up your own data, however, use realistic data:

- Add a school with a current fundraiser (hint: 2 tables need inserting)
- Add three different classrooms to the fundraiser
- Set up three different rewards for the fundraiser
- Register two parents
- For each parent register two kids each in a classroom of your choice (hint: 2 tables need inserting)
- For each kid create one to four pledges, at least 6 pledges with a sponsor for each pledge (hint: 2 tables need inserting)

NOTE: Consistency between your relational schema and the implementation is one of the items I'm going to look for while grading...

## ***Task 3 – Querying***

### **Write queries for FIVE of the following questions**

- Slide 3: (Q1) Search for current fundraiser using the school name. Display school name, start date, name of fundraiser, and the fundraiser unique code.
- Slide 4: (Q2) Display all classrooms associated with the current fundraiser (populates the drop-down menu).
- Slide 5: (Q3) Choose one parent and display all associated student-fundraiser-participations. Display the name of the student, name of fundraiser, and event date (start date).
- Slide 8: **Choose one student and one fundraiser** and write queries to display the following numbers:
  - (Q4) Display the number of pledges.
  - (Q5) Display the dollar amount from flat donations pledges.
  - (Q6) Display the dollar amount from per lap pledges.
  - (Q7) Display the laps completed.
  - (Q8) Display the total pledge amount. Please be aware that this means that you need to find a way to add flat donations and pledges per lap together. Remember, the correct transformation is  $\text{flat donations} / 35 = \text{per lap}$  and  $\text{flat donations} = \text{per lap} * 35$ .
  - (Q9) Display the percentage pledge amount goal reached (total pledge amount per lap / student goal).
- Slide 9: **For the same student and fundraiser as in slide 8:**

- (Q10) Display the percentage pledge amount goal reached for the classroom (total pledge amount all students in the classroom and fundraiser / classroom goal).
- Slide 10: (Q11) Display the rewards for the fundraiser
- (Q12): Create a query that gives you a list of all students for the fundraiser and the rewards, they earn.

### **Task 4: Reflection**

Pick **two** (2) of the bullet points from this list and answer the questions<sup>1</sup>. Please indicate which questions you are answering. Post your reflections to the appropriate discussion forum in Blackboard.

- What did I actually achieve with this piece of work? Which were the most difficult parts, and why were they difficult for me? Which were the most straightforward parts, and why did I find these easy?
- How well do I think I achieved the intended learning outcomes for this task? Where could I have improved my achievement? Why didn't I improve it at the time?
- What have I got out of doing this assignment? How have I developed my knowledge and skills? How do I see the payoff from doing this assignment helping me in the longer term?
- What else have I got out of doing this assignment? Have I developed other skills and knowledge, which may be useful elsewhere at another time? If so, what are my own emergent learning outcomes from doing this assignment?
- What was the best thing I did? Why was this the best thing I did? How do I know that this was the best thing I did?
- What worked least well for me? Why did this not work well for me? What have I learned about the topic concerned from this not having worked well for me? What have I learned about myself from this not having worked well for me? What do I plan to do differently in future as a result of my answers to the above questions?
- With hindsight, how would I go about this assignment differently if doing it again from scratch? To what extent will this assignment influence the way I tackle anything similar in future?
- What did I find the greatest challenge in doing this work? Why was this a challenge to me? To what extent do I feel I have met this challenge? What can I do to improve my performance when next meeting this particular sort of challenge?
- What was the most boring or tedious part of doing this assignment for me? Can I see the point of doing these things? If not, how could the assignment have been re-designed to be more stimulating and interesting for me?
- Has it been worth the effort I put in? Do the marks represent a just reward? Should this assignment be worth more or less marks in the overall scheme of things?
- Do I feel that my time on this assignment has been well spent? If not, how could I have used my time more sensibly? Or should the assignment have been designed differently? Which parts of the assignment represent the time best spent? Which parts could be thought of as time wasted?

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<sup>1</sup> Questions taken from <http://www.escalate.ac.uk/resources/reflection/09.html>

- How useful do I expect the feedback to be, that I receive on my efforts for this assignment? What sorts of feedback do I really want at this point in time? What sorts of feedback do I really need at this point in time? What are my expectations of getting useful feedback now, based on the feedback (or lack of it) that I've already received on past work?
- Overall, how has this assignment helped (or hindered) my motivation to learn more about this part of my syllabus? Has it encouraged me, or disillusioned me?
- To what extent has this assignment helped me to clarify what I need to learn about this topic? Have I a clearer picture after doing the assignment, or a foggier one? Who can help me gain a clearer picture, if the latter?
- To what extent has this assignment helped me to see where the goalposts stand for future assessments such as exams? Has it given me useful insights into what will be expected of me in future?
- What advice would I give go a friend about to start on the same assignment? How much time would I suggest that it would be worth putting into it? What pitfalls would I advise to be well worth not falling into?
- What are the three most important things that I think I need to do with this topic at this moment in time? Which of these do I think is the most urgent for me to do? When will I aim to start doing this, and what is a sensible deadline for me to have completed it by?

### **Deliverables**

- Task 1: One word or pdf document
  - Justification of primary keys for all entities
  - Your relational schema (readable screenshot from Oracle data modeler or in described written format)
- Task 2: An Oracle implementation of the tables (You don't actually hand them in, I will find the tables in Oracle) including the data you entered
- Task 3: A .sql document with FIVE queries
  - Please indicate in a comment which query you answered (e.g., - - Q4: Display the number of pledges.)
- Task 4: Reflection posted on Blackboard

## Appendix

