Project Part 1: Conceptual Data Modeling 100 points Due: Part A (2/17), Part B (2/24), Part C (3/2)

**Overview**

Project Part 1 gives you an opportunity to apply what you are learning about data modeling in a number of different ways.

- You are to develop a conceptual data model based on the classdojo.com website. This app is a behavior management tool for schools. It allows a teacher to award or remove points to students based on positive and negative behavior in the classroom. This feedback can then be shared with parents to give them an idea how their kid is doing in school. The points that the students collect can be exchanged for rewards though this is still done outside the app. Teachers can also share stories and student's portfolio with the parents.
- You will carry out one element of a data model quality assurance program: the data model review. Here you will review another student's data model and, in turn, have yours reviewed. You will incorporate the results of the review of your model into your final deliverable for this assignment.
- This assignment has several deliverables with both individual and team components. Data modeling is a collaborative activity that requires to work together with several stakeholders.

***Overview of Parts and Tasks***

There are three parts with three deliverables and due dates. Each part has different tasks.

Part A (2/15) – One Task – Create a first draft of the data model

Part B (2/22) – One Task – Work with two other students on refining the data model and adding metadata.

Part C (3/1) – Three Tasks – Review a data model from another student group, meet for a review session, and submit your finalized data model including all required metadata. Write a reflection.

**Grading**

Your grade will be computed in the following way:

| ***Item*** | ***Fraction of grade*** | ***Individual or Group Grade*** |
|---|---:|---:|
| Initial draft of the ERD (Part A) | 10% | Individual |
| Revised draft of the ERD and Metadata (Part B) | 10% | Group |
| Reviewing class student group's diagram (Part C) | 10% | Group |
| Addressing comments of your reviewers (Part C) | 5% | Group |
| Quality of the final ERD (Part C) | 50% | Group |
| Entity and attribute definitions (Metadata) (Part C) | 10% | Group |
| Reflections | 5% | Individual |

**If you have any questions:**

If you have questions about the requirements for the data model, you may post them in the Canvas discussion board created for this purpose. Answers will be posted there for all to see. Please do not include solutions in your question. You may also email me or ask your question(s) in a meeting.

Please ask me at any time and please do not hesitate to ask me! Questions show me that you participate and engage in the class! I do expect questions on this assignment due to the nature of the iterative development of a data model.

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***Part A Task: Create an E-R Diagram (10% - individual)***

Read through the problem description and examine the screen shots in the accompanying Pdf file. Based on this information, you should create a conceptual data model using entity-relationship diagramming. The data model should be able to accommodate all of the data found in the description and may include other information found in the screen shots. You should do your best to conform to the standards and guidelines we discuss in class.

You may either use Oracle's Data Modeler (ODM) or hand-draw your ERD using IE notation. ODM supports the Information Engineering (crow's foot) notation we use in class. It is very nicely integrated with Oracle. Make use of the online documentation under the Help menu as well as the tutorial posted on Canvas. If you hand-draw your ERD, make sure it is legible. Remember, you will compare and merge drafts into a group draft in part B. Your teammate(s) should be able to read your ERD.

Your ERD should contain all important entities, their relationships, as well as attributes. Please note that we expand the conceptual model by including more details, namely attributes. At this point, we are still concerned with the business/logical view on the data and not the implementation view. That why you should keep the following in mind:

- Primary keys: You should only define primary keys if it is clear that the attribute(s) are used as a key by the business. Remember, that there may be unique attributes which are not primary keys. It may well be that most entities in your conceptual model have no primary key or identifier at this point.
- Foreign keys: This also means that there may be no foreign keys to link entities together. Which is how it should be for a conceptual model. Relationships between entities are to be shown as lines and not manually modeled as foreign keys.
- Relationships: Include the verb phrase of the relationships and identify minimum and maximum cardinality. At this point, m-n relationships need to be used if the relationship has no attributes. If a m-n relationship has attribute, you may add the attributes in the relationship window, or include a composite entity (i.e., replace the relationship with an entity and connect it with the other two entities using 1:m relationships). This is your choice. Make sure that relationship attributes show up in the ERD.
- Attribute: Only include the name of the attributes. Use the convention: *entity name + optional qualifier + attribute name* with spaces instead of underscores. Do not define data types yet.

At this point, I would not add Metadata such as definitions for entities or attributes in ODM, but you may start writing them down outside ODM. The result of this task should be a first and good draft of your current understanding of the data model. It does not have to be perfect. There may be entities, relationships, and attributes missing. Make sure that you arrange the entities, relationships, and attributes so that they are readable. Re-size entities if necessary to show all attributes. Move entities to show all verb phrases.

**Deliverable:**

- Submit your initial draft on Canvas (File – Print Diagram – To PDF) or take a good picture of your hand-drawn ERD. It needs to be readable and all elements need to be visible.
- Answer the survey to help me create groups by Friday
- Due 2/15. Late submission penalty as defined in the syllabus will apply. Please make sure to meet the deadline since your delay will cause delay in other student's submission.

**Grading notes:** I will quickly review your ERD and see if you made an effort to come with a good, initial draft of the ERD. My solution has 14 entities, so that should give you an idea of how many entities your first draft could include. Your number of entities may differ depending how you solved certain parts, but should not be too far of. I may not give individual feedback for this task.

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***Part B Task. Collaborate to refine your ERD and capture the metadata (10% - team)***

Compare your ERDs and merge them by coming to a consensus on the differences in the ERD you have. Discuss the differences and ask me (post on the discussion board on Canvas or email me) if you need additional information about the business rules governing the data model.

Add metadata as described next:

1. For each entity in the model, double-click the entity to bring up the Entity Properties dialog box. Click on *Comments* on the left of the dialog box and type in the definition in the space provided.
2. In the Entity Properties dialog box, click on *Attributes* on the left of the dialog box. Then, click on an attribute name in the Details tab (or, create the attribute first by clicking on the green '+'). Enter in a definition for the attribute in the *Comments* tab of the Attributes section of the Entity Properties dialog box. Determine whether an attribute needs to be mandatory by checking the mandatory box. You do not need to add an attribute domain yet, that will be done in part 2 of the project. Name and definition are what we need in this part.
3. When you are all done defining your model, generate a report that you will turn in as part of your assignment. Choose File > Reports to bring up a reports dialog box. In the 'Available Reports' drop-down box, choose 'Entities'. In the 'Output Format', choose 'PDF'. Click on the 'Generate Report' button to create the report.

**Deliverable:**

- Submit your refined ERD as pdf on Canvas. It needs to be readable and all elements need to be visible.
- Submit your Metadata Report as pdf on Canvas. Submit a report generated by the tool, as described above.
- Email your refined ERD as well as Metadata Report to the students of the student group that will review your ERD.
- Due 2/22. Late submission penalty as defined in the syllabus will apply. Please make sure to meet the deadline since your delay will cause delay in other student's submission.

**Grading notes:** Again, I will review your ERD and see if you improved your model and added the metadata. I may give feedback for this part of the assignment. You may still have errors and omissions in your data model. You will receive full points as long as I can see that you came up with a refined and merged data model and added the metadata (entity and attribute definitions) to your data model. All students in the team will receive the same grade.

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***Part C Task 1. Data Quality Walkthrough Session: review, be reviewed, address the issues raised by reviewer (15% - team)***

In addition to creating your own diagrams, you will also conduct a peer walk-through of another student group's diagram and, in turn, have yours reviewed.

First, review the ERD that you received from another student group (deliverable from part B). In reviewing another E-R diagram, you will go through the process we'll discuss in class, and create a list of issues the creator of the E-R diagram should address. In doing this, you will use a walk-through checklist (Walkthru-Checklist.pdf) available on Canvas. For your convenience, I have also provided a sample issues sheet (ReviewExample.pdf) and a blank issues sheet (ReviewTemplate.doc). The former shows a number of sample issue statements. Notice that these samples identify issues (potential problems), but do not propose solutions. The blank issues sheet is a template you can use to type up the issues for the classmate whose E-R diagram you are reviewing.

If you are worried about having a classmate see your work and discover problems, don't be. Although you will be handing in a copy of the revised E-R diagram of part B, I will only grade the finalized diagram. In other words, the more issues the reviewer raises, the more likely it is that your final E-R diagram will be a good one. I will ******NOT****** assign a lower grade because many problems were uncovered during the review.

Second, meet with the student group for a review session. This review session should be done synchronous online. I recommend using Zoom for online meetings. Walk through the issues you identified and discuss them. If more issues are uncovered during the review session, add them to your review sheet. At the end of the review session, share your review sheet with the issues with the other student group.

Third, after the review session address each of the issues raised by the reviewer. Some of the issues will require changes to your E-R diagram, to your entity and attribute tables, or to both; others may not. I would like you to make the necessary changes, and write a short description of how you addressed the issue. If an issue turned out not to require any change, then state why not.

**Deliverable:**

- Submit your review of the other student group's ERD. You can download the template from Canvas (ReviewTemplate.doc). This file should contain in the left-hand column the issues you raise as a reviewer of the other students E-R diagram. The right-hand column will be empty. This is the document you need to give to the other student at the time of your review session. Include the date of your review session on the template.
- Submit the review you received from the student group with your response to the issues raised. This is the document (also based on the template ReviewTemplate.doc) that you received from the other student. It should contain the issues your reviewer raised about your E-R diagram in the left-hand column and in the right-hand column your discussion of how you addressed each issue. Note the date you received the document.
- Due 3/1. Late submission penalty as defined in the syllabus will apply.

**Grading notes:** Each student in a group will receive the same grade. The grade will depend on the quantity and quality of raised review issues as well as on the way they are addressed.

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***Part C – Task 2. Finalize your data model (60% - team)***

Finalize your data model and metadata.

**Deliverable:**

- Submit your final version of the ERD on Canvas. It needs to be readable and all elements need to be visible.
- Submit the finalized MetaData Report on Canvas. Submit a report generated by the tool, as described above.
- Due 3/1. Late submission penalty as defined in the syllabus will apply.

**Grading notes:** The ERD and Metadata report will be graded. For the ERD, I will review whether all business rules stated in the Appendix as well as raised on the Q&A discussion board are included. Your grade will also depend on following the conventions we discussed in class and quality of the metadata.

***Part C - Task 3: Reflection (5% - individual)***

**Deliverable:**

- Post your reflection on the discussion board "Project Part 1 Part C" on Canvas
- Due 3/1. Late submission penalty as defined in the syllabus will apply.

**Grading notes:** As long as you pick and answer two questions, you will receive full points for this part of the assignment. The reflection is after all your opinion and reflection on your experience doing the assignment.