MACQUARIE
University
SYDNEY·AUSTRALIA

DEPARTMENT OF COMPUTING

COMP1350 2020 – ASSIGNMENT ONE

Due: 11:59 pm Sunday 13 September 2020

Introduction to Database Design and Management
Database Design Assignment
(Worth 20% of your grade, marked out of 100)

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Case Background

Remote Island Resort, Fiji has been in the hospitality business for the last 80 years. They started storing data in a file-based system and then transitioned into using spreadsheets. As years progressed, their business has grown exponentially leading to an increase in the number of customers and volume of data. You are employed to develop a database model to replace the current spreadsheets.

You have been provided with the following business rules about Remote Island Resort.

Customers: Every customer needs to be uniquely identified in the system. Other details which the system needs to store about a customer include their name, address and phone number.

Villas: Every Villa is provided with a unique identifier. Other details of a villa include the name of the villa, the type of the villa, and its size (in sqm). Some villas could be interconnected. If villas are interconnected, they can be connected to one other villa. Villas are of a particular Villa Type. Every Villa Type is provided with a unique identifier Description and features are stored for each villa type.

Villa Reservation: Every reservation has a unique code. A reservation also has other information to be captured such as the date the reservation was made, the customer it is reserved for, the villas included in the reservation (A customer can make a reservation for multiple villas), dates each of the villas are reserved for, names of the guests staying in each of the villas, and its corresponding cost is stored. The total cost is stored with the rest of the reservation data. The total cost would include the cost of villa reservations, the cost of all activities from the activities booking, and the cost of the dining from all the dinner bookings. Payment for the reservation can be made as split payments. A unique ID is generated for every payment made. The reservation the payment is made for, date of the payment and payment amount is stored.

Activities: Every activity is provided with a unique identifier. Other details of activity include the name of the activity, description, and its cost. There are two types of activities- Indoor and Outdoor activities. Indoor activities have difficulty level stored. Some activities are made up of sub-activities (Think of something like a day tour- which could include two half-day tours; A half-day tour could be made up of Yoga and Kayaking. This means that some activities could be both indoor and outdoor at the same time). Outdoor activities use different types of equipment. Every equipment is provided with a unique identifier. Other details of the equipment include details like the name of the equipment, the supplier that supplied the equipment, and quantity on hand. Equipment is supplied by a supplier. Every supplier is provided with a unique identifier. Other details of a supplier include the name of the supplier, the name of the contact person, and a contact number. A supplier may supply multiple types of equipment. On arrival at the resort, customers can register to a variety of experiences (activities) that they would be interested to partake. The date of the activity, the number of persons, and any special requirements are also stored.

Dinner Reservations: Remote Island Resort offers a variety of dinner options that customers can choose from. Every dinner option is identified by a dinner code. Other details of a dinner include a dinner description and cost. Since the resort has beautiful locations customers can choose to dine at, every dinner venue is identified by a venue code. Other details of a venue include a venue description and capacity. There are two different types of venues- indoor and

outdoor. Outdoor venues use multiple equipment and an equipment could be used for multiple outdoor venues. Size of the indoor venues is also registered. While making dinner reservations, customers will have to choose a venue and a dinner option. Date of reservation, date of dinner, and any special dietary requests are recorded.

Staffing: Every staff member is provided with a unique staff number at the resort. The resort also needs to keep track of other details about their staff members like their name and date of birth. There are two types of staff that need to be tracked in the system: Senior and Junior Staff. For Senior staff, their seniority level and year of certification need to be recorded. For Junior staff, their year of employment needs to be recorded. Every activity reservation includes one tour guide (who is a senior staff), one helper (who is a junior staff) and additional support staff (this is optional and can be multiple) as a matter of policy.

Task Description

Task 1- EER Diagram (50 marks)

Based on the business rules, you are expected to construct an Enhanced-ER (EER) diagram. The EER diagram should include entities, attributes, and identifiers. You are also expected to show the relationships among entities using cardinality and associative entities (if any). You may choose to add attributes on the relationships (if there are any) or create an associative entity with these attributes. Your diagram should also specify the complete (total) and disjoint (mutually-exclusive) constraints on the generalization/specialization.

Task 2- Logical Transformation (30 marks)

Based on your EER, for the "Dinner reservations" excerpt from your case study, perform a logical transformation. Any entities mentioned in the excerpt must be used in the transformation. You will have to use Step 8a for conversion.

Also, use 8b, 8c and 8d and show the process of transformation for these steps. You do not have to repeat steps 2-7 for these.

Task 3- Normalisation (20 marks)

Normalise the table into 3NF relations with Primary and Foreign keys

DinnerCode	MenuItemID	MenuItemName	DinnerCost	PortionSize	DressCode	DressCode Description
DIN1	ENTR1	Spring Roll	$125	1	D1	Formal Attire
DIN1	MAINS1	Pumpkin Quinoa Salad	$125	2	D1	Formal Attire
DIN1	DESS1	Banoffee Pie	$125	2	D1	Formal Attire
DIN2	ENTR1	Spring Roll	$75	1	D2	Smart Casual

DIN2	MAINS1	Pumpkin Quinoa Salad	$75	1	D2	Smart Casual
DIN2	DESS1	Banoffee Pie	$75	1	D2	Smart Casual

What to include in your report (as a PDF)

- To present your answers to these tasks, please use the template provided in the assignment folder.
- Fill out the details provided on the first page of the template.
- For Task 1, attach the image in the document (either hand-drawn/system-generated) of the EER model you have created. For Task 2, 3 write the answers under the right spaces in the template.
- Assumptions: If you have any assumptions, please list them down in the last page of the report. (e.g. about relationships between entities in your EER Model).
- If your images lack clarity, you will not be given any marks. Tutors can zoom in to check the diagram but should not have to deal with images that are blurry / fuzzy. Whatever is submitted is the final submission. So, please make sure your image is readable.

What to Submit for the Assignment

- One pdf document with all the answers included. Please do not submit multiple copies.
- You can submit many times up until the deadline (so get an early version in just in case)

You are allowed to use either a professional CASE tool, such as PowerDesigner, a simple online tool like www.draw.io, or clearly hand-drawn (with legible handwriting) the data model.

Please submit your work on iLearn (there is a submission Turnitin link in the Assignments section) as a report (as a .pdf ONLY) by 9pm Friday 11 September 2020. You need to rename the template provided using this format (e.g. StudentName_StudentID.pdf).

A note about the submission deadline:
The submission deadline is a deadline, not a goal! You will have other assignments due around the same time... and this is not an assignment you will be able to complete at the last minute!

Marking Rubric

Marks	Topic	Explanation
50 marks	Entities	Existence of correct entities which cover the details in the specification?
	Attributes	Correct attributes? Correct identification of primary identifier?
	Relationships	Existence of appropriate relationships?
		Appropriate cardinalities?
		Appropriate optional/mandatory values?
		Existence of multiple relationships?
	Correct Super types/Subtypes	Correct Super types/Subtype entities?
		Valid reuse of attributes?
	Relationships	Valid relationships?
	Specialization Constraints	Correct disjointness/completeness?
30 marks	Valid Transformation Steps (Steps 1-7, 8a, Repeat steps 2-7, 8b/c/d)	
20 marks	Correct process of normalisation into 3NF	