



Asian Institute of Technology
Mid-semester Examination
August 2020

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| Course: AT82.02 Data Management & Modeling | Total score: 100 (20 %) |
| Date: Friday 2 October 2020 | Time: 13:15-15:15 (2 hours) |

Exam Instructions

- This examination is Open-Book. Number of pages: 2, Number of Questions: 4.
 - Be concise!
 - **Refer to given Case Study to answer Questions 1 to 4. For any missing details, explicitly state necessary assumptions or conditions you make. Make your assumptions rational and practical.**
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Case Study: *TakeMeThere* is a community platform for local guides and tourists where the local guides can offer any traveling programs, activities and experience to interested tourists who visit the platform and search for particular destinations and types of activities/tours such as City Tour, Mountain, Beach, Dining, Cooking. Examples of a tour or traveling program include:

- a half-day tour to the royal grand palace,
- Bangkok Riverside Food Tour
- a Thai cooking class,
- a beach day in Krabi, etc.

Each program may have different program structures, validity period/season, duration (hours) and is only for a private tourist group, taken care by a local guide who may be able to speak certain languages such as Thai, English, Japanese, etc. The price of each program could be defined per person, per small group, etc. At the end of each program, a tourist can give a service rating star based on the local guide's Friendliness, Area Expert, Language Proficiency.

Basic operations and queries of *TakeMeThere* include:

- Q1: Registration of new tourists, local guides, traveling programs.
- Q2: Search for available program details based on specific criteria such as destination, activity types, program duration, price.
- Q3: Make a traveling program reservation.
- Q4: Find total revenues of each destination and each activity type per month with the total revenue more than 50,000 BHT.

Exam Questions

1. Relational model design and data management:
 - a. (20 points) Perform conceptual design and logical design. Show few sample data in your database tables with proper use of PKs, FKs.
 - b. (15 points) Implement the given basic operations/queries Q1, Q2, Q3, Q4 in SQL.
 - c. (15 points) Suggest three queries to better support business decisions, to promote revenue generation, to further enable efficient marketing plans/strategies such as personalized marketing, product/service recommendation. Implement your queries in SQL.
2. Key-value model design and data management:
 - a. (10 points) Show how to design and use key-value model to properly maintain data and support the queries Q1 and Q2. Explain your design for the keys and values in your model.
 - b. (5 points) Implement the queries Q1, Q2.
3. Document model design and data management:
 - a. (15 points) Show how to design and use document model to properly maintain data for *TakeMeThere*. Briefly explain if embedding or referencing technique should be used in your model and why.
 - b. (10 points) Implement the queries Q2, Q4.
4. (10 points) Considering the following perspectives: data model design, data maintenance, data quality such as accuracy, consistency, and supported operations/queries, analyze and compare the benefits and limitations of your resulting design and implementation of previous questions 1 to 3.

-- End of Exam Paper --
