CSIE4105 Database Systems

Homework # 1
Due on 10/08/2024

1. (30%) Install a DBMS, such as MySQL, MariaDB, or PostgreSQL, on a computer. Use the *default database* of the installed DBMS or *create your own database*. Practice at least **three** of the following commands: SHOW (SHOW DATABASES, SHOW TABLES, SHOW COLUMNS), DESCRIBE, CREATE DATABASE, CREATE USER, and GRANT. Show <u>three</u> screen snapshots of the major installation steps and <u>**one**</u> screen snapshots for <u>each</u> selected command to manipulate the database.

2. (10%) Describe the **main characteristics** of the database approach.

3. (10%) Define the following terms:
    a. (5%) data model
    b. (5%) database schema

4. (10%) What is three-schema architecture? What are **logical data independence** and **physical data independence**?

5. (20%) Cardinality ratios often dictate the detailed design of a database. The cardinality ratio depends on the real-world meaning of the entity types involved and is defined by the specific application. For the binary relationships below, suggest **cardinality ratios** based on common-sense meaning of the entity types. ***Clearly state any assumptions you make***.

	Entity 1	**Cardinality Ratio**	**Entity 2**
1.	Student		Book
2.	Student		Advisor
3.	ClassRoom		Wall
4.	Student		Course
5.	Car		Engine

6. (20%) Consider the following application form for school suspension (drop-out), leave, and refund. Suppose that the school is designing a system to allow students to fill the application form online and you are responsible to design the database for the system. Note that the signatures of students and parents (or guardian) on the application form will be scanned as images and stored in the database.
    a. (5%) What are the possible **entities** involved in this application form? For each

entity, specify its attributes shown on the application form.

b. (15%) Draw an **ER diagram** for the database. Specify the **relationships** among the entities. Indicate the *cardinalities* that can be inferred from the data on the application form.

National Taipei University of Technology
English Application Form for School Suspension (Drop-out), Leave, and Refund, **No.:**

Name		Date of Application	(YYYY/MM/DD)	Application	□Suspension □Drop-out (Leave the following blank)	Date of Resumption	YYYY/MM
Student ID No.		ID No.		Term of Suspension	From Year__ ____,_____ Semester for 1	Signature	
Department/Graduate Institute		Reason for Suspension (Drop-out):			□Semester □Year		
Class	□Doctoral Program □Grade of Master Program □Undergraduate Program	□Health □Economic Factor □Academic Result □Not compliant with Interest □Military Service □Conduct □Other_____		Suspension	□Never □Have been suspended for___Year Semester	Cellphone No.	
Signed by Parent				**For students (excluding graduate students) applying for suspension (drop-out), the parent or the guardian shall present the consent and the signature.**			
Address:							