Purdue University
Computer Science Department
CS44800 Homework 1
Spring 2023

Due: **January 25, 2023, 11:59 PM**
Reference: **Fundamentals of Database Systems by Elmasri & Navathe, 7th Edition**
Total Points: **3 points**
Submit via Gradescope

Provide enough detail to support your answers. If possible, use bullets to organize the ideas in your answer.

Question 1. (0.50 pts)

(a) Discuss the main capabilities that should be provided by a DBMS.
(b) Highlight the difference of using a database system with respect to the following approaches. Please, make sure to highlight the benefits offered by a DBMS.
      b.1) Traditional file systems.
      b.2) In memory storage

Question 2. (0.50 pts)

Cite some examples of integrity constraints that you think can apply to the database shown in Figure 1.2 in the textbook. Please, provide at least two examples for each type of the following constraints: unique constraints and referential integrity constraints

Question 3. (0.25 pts)

What is the difference between a database schema and a database state? Please, use examples to support your answer.

Question 4. (0.50 pts)

(a) What is logical independence and physical independence? Please, use examples to support your answer.
(b) Which one is harder to achieve? Explain why.

Question 5. (0.50 pts)

What are the different components of a DBMS? Discuss the importance and need of each component.

Question 6. (0.50 pts)

    (a) What is a user transaction?
    (b) What properties must be maintained for a transaction by the database system? Please, discuss each property using an example to support your argument.

Question 7. (0.25 pts)

Why is accessing a disk block expensive? Discuss the time components involved in accessing a disk block.