DBMS Course — End-sem Exam

Instructions

1. Answer ALL questions.
2. Please write your NAME and STUDENT ID clearly in your answer script.
3. Time limit for this exam is 3 hours.
4. Once you have completed the exam, please upload your file (either a PDF file or a scanned image file) to the link, which has been sent by your TA. The marks for each question are indicated in brackets.
5. Your answers should cover ALL the key points. I will grade based on the content of your answers (not the length of your answers).
6. This is an open-book exam i.e., you can look at the lecture slides, text books, your own notes etc.
7. Please avoid any discussions among yourselves during the duration of the exam.
8. This course has a zero-tolerance policy against plagiarism. Any act of plagiarism will result in an F grade for the entire course.

QUESTIONS

1. Design a database for a retail bank. Start from the unnormalized database and normalize the database to be in 1NF, 2NF and 3NF. Show the steps clearly. [10]

   Note: This is an open-ended question. Please feel free to make any reasonable assumptions.

2. Consider the following two application scenarios:
   (a) E-commerce portal [10]
   (b) Placement office at a University [10]

   1. Ask 5 meaningful questions for each of the above scenarios in plain English. a. The queries should make sense and should have some usefulness (Use your best judgment)

   2. Now show the relational algebra expressions for each of the above queries using selection, projection, joins etc. Each of your queries should contain selection and projection.

3. Can you completely satisfy the ACID properties of database transactions in case of a large-scale e-commerce portal such as Amazon.com? Justify. Suggest some approaches for handling a large number of concurrent database transactions in a scalable manner. [10]