

第一部份：

1. Discuss the main characteristics of the database approach and how it differs from traditional file systems. (10%)
2. Discuss the entity integrity and referential integrity constraints of the relational data model. Why each considered important? (10%)
3. List the three main approaches to database programming. What are the advantages and disadvantages of each approach? (10%)
4. What is the lossless (or nonadditive) join property of a decomposition of a relation? Why is it important? (10%)
5. What is a statistical database? Discuss the problem of statistical database security. (10%)

第二部份：

1. How can the key and foreign key constraints be enforced by the DBMS? Can the constraint checks be executed in an efficient manner when updates are applied to the database? (10%)
2. Prove that any relation schema with two attributes is in BCNF. (10%)
3. Suppose that a static hash file initially has 600 buckets in the primary area and that records are inserted that create an overflow area of 600 buckets. If we reorganize the hash file, we can assume that the overflow is eliminated. If the cost of reorganizing the file is the cost of the bucket transfers (reading and writing all of the buckets) and the only periodic file operation is the fetch operation, then how many times would we have to perform a fetch (successfully) to make the reorganization cost-effective? That is, the reorganization cost and subsequent search cost are less than the search cost before reorganization. Assume $s = 16$, $rd = 8.3$ ms, $btt = 1$ ms. (10%)
4. Can a nondense (sparse) index be used in the implementation of an aggregate operator? Why or why not? (10%)
5. What implications would a no-steal/force buffer management policy have on checkpointing and recovery? (10%)