As usual, provide enough detail to support your answers. **Make sure to answer all the questions.** Also, if you are planning to submit your assignment handwritten, please write legibly. We encourage you to itemize your answers.

The following are some overall comments for each question:

**Question 1**

- Client, server, and communication are more components of a 3-tier application rather than components of a DDBMS.
- Remember, since we are talking about a DDBMS (Distributed Database Management System) components related to handling concurrency, recovery or management of transaction in a distributed environment are important and a must.
- Therefore, you could get some points deducted if you missed to include the following components: CC (Concurrency Control), AC (Atomicity Control), RC (Replication Control), and communication software primitives

**Question 2**

- Even though that it was not required to provide a structured answer (e.g., itemize, use tables, etc), to get full credit you needed to discuss each of the five criteria.
- Cost of deployment of Big Data systems includes the hardware needed. In case of Hadoop/MapReduce you can use commodity hardware, but for Apache Spark that’s not the case.
- Big Data systems are more focus on OLAP operations. Most Big Data storage, such as Cassandra, MongoDB or DynamoDB provide weak consistency. However, lately some systems are providing partial support or similar support than RDBMS to online transactions. Read more on: [Hive ACID Transactions](https://issues.apache.org/jira/browse/HIVE-15146).
Question 3

Sample solution:

a) Not conflict serializable. There is a R-W conflict.

b) Not conflict serializable. There is a: W-W conflict.

c) Serializable. Serial order: T2, T3, T1

d) Not conflict serializable. There is a: R-W conflict.

Question 4

- Schedules should NOT be serial, otherwise there is no conflict.

Question 5

Common errors include:

- (a) Do not explain (briefly) the different types of transaction failures, and just mentioned them. Also fail to discuss most of the transaction failures (e.g., Computer failure, transaction/system error, local error/exception, concurrency, disk failure, physical problems/catastrophic failure)