Concurrent Systems and Applications

Below are four potential problems and two proposed solutions for each one. For each of the problems, give a brief example showing the proposed solutions and explain the advantages and disadvantages of each.

(a) Data held in one object is to be made available throughout a large, possibly distributed, application.

(i) Store the data in a field with the public modifier.

(ii) Store it in a field with the private modifier but provide public methods to access its value.

(b) A class C implements an interface I1 but some code is designed to access it through an alternative interface I2. The two interfaces support similar operations.

(i) Define a new class using inheritance.

(ii) Use the Adapter design pattern.

(c) You are designing a data structure and need to decide how to perform concurrency control in case it is used in a multi-threaded application.

(i) Use synchronized methods (or other features) to make the methods safe for concurrent use.

(ii) Do not manage concurrency here and add comments to the source code.

(d) You have a class that defines how to communicate with a remote server using a TCP socket. The connection is established in the constructor and you must decide how to close it.

(i) Provide an explicit close method in your class.

(ii) Use a finalize method.

[5 marks each]