Homework Assignment #1

1. (10 points) Give 3 examples of violation of availability, 3 examples of violation of confidentiality, and 3 examples of violation of integrity.
2. (10 points) Describe a situation in which you have experienced harm as a consequence of a failure of computer security. Was the failure malicious or not? Did the attack target you specifically or was it general and you were the unfortunate victim?
3. (10 points) Consider a program to display on your website your city’s current time and temperature. Who might want to attack your program? What types of harm might they want to cause? What kinds of vulnerabilities might they exploit to cause harm?
4. (10 points) Consider a program that allows consumers to order products from the web. Who might want to attack the program? What types of harm might they want to cause? What kinds of vulnerabilities might they exploit to cause harm?
5. (10 points) Suppose a per-subject access control list is used. Deleting an object in such a system is inconvenient because all changes must be made to the control lists of all subjects who did have access to the object. Suggest an alternative, less costly means of handling deletion.
6. (10 points) Suggest an efficient scheme for maintaining a per-user protection scheme. That is, the system maintains one directory per user, and that directory lists all the objects to which the user is allowed access. Your design should address the needs of a system with 1000 users, of whom no more than 20 are active at any time. Each user has an average of 200 permitted objects; there are 50,000 total objects in the system.
7. (10 points) Humans are said to be the weakest link in any security system. Give an example for each of the following:
8. (10 points) A situation in which human failure could lead to a compromise of access control
9. (10 points) Why do cryptologists recommend changing the encryption key from time to time? Is it the same reason security experts recommend changing a password from time to time? How can one determine how frequently to change keys or passwords?
10. (10 points) Describe a situation in which a weak but easy-to-use password may be adequate.