

Access Control and Authentication

IMPORTANT NOTES: Study lecture materials at least 1 hour and prepare Question 1-4 prior to the tutorial session. Prepared questions will be discussed in the tutorial session.

1. In the context of access control, what is the difference between a subject and an object? What is an access right?
2. In UNIX, both files and directories include a nine-bit access control permission mode. If care is not taken, this can create access control problems. For example, consider a file `file.txt` with permission mode `rw-r--r--` contained in a directory `dir` with permission mode `rw-x-wx---`. How might the file be compromised in this case?
3. In general terms, what are the three means of authenticating a user's identity?
4. In the context of biometric authentication, define the terms false match rate and false non-match rate, and explain the use of a threshold in relationship to these two rates.
5. What is meant by a one-way hash function? Why is it useful for protecting passwords against attacks that expose the stored file contents of the password authentication server?
6. Let x to be a password that contains exactly 3 characters. The characters are chosen from a set of alphabet $A = \{a, b, c, d, e\}$. How many possible distinct x can be created in the following scenarios:
 - (a) If x can contain repeated characters? e.g. `aaa` is a valid password
 - (b) If x should not contain repeated characters? e.g. `aab` is not a valid password

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